



## A Message from ASABE President Maury Salz

Welcome to the 2019 Annual International Meeting (AIM) of the American Society of Agricultural and Biological Engineers in Boston, Massachusetts. I extend a special welcome to first time participants, international attendees and pre-professionals. I am confident you will find the meeting a welcoming and stimulating investment of your time.

AIM offers a wide array of opportunities for you to gain knowledge in technical sessions, make new or catch-up with old friends at social events, contribute to the ongoing growth efforts in technical communities, and to celebrate the accomplishments of peers in the awards ceremonies. I highly encourage you to engage in the opening keynote session by GreenBiz's Joel Makower and the following panel discussion on sustainability and the need for a national strategy, which could alter how we live. We as individuals, and collectively as ASABE, will be challenged to think about how this broader vision of sustainability could fundamentally change our lives and the profession.

I want to thank our friends at Cornell University for serving as local hosts and the volunteer coordinators. Students work as volunteers to enhance the experience for all meeting participants and you can locate them by their blue shirts. Please thank them when you have the chance.

Boston is rich in history and be sure to take some time to experience what this unique area has to offer. I also encourage you to participate actively in AIM and reflect on how you can advance the Society goals to benefit yourself personally and the people of the world. Enjoy your Boston AIM.

Maury V. Salz

ASABE President, 2018-2019



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**MEETING LOCATION**

Boston Marriott Copley Place
110 Huntington Ave
Boston, Massachusetts 02116
1-617-236-5800

**ASABE REGISTRATION DESK**

The ASABE Annual International Meeting registration desk is located on the 4th floor of the Marriott Copley Place near the escalators.

Registration and information desk hours:
Saturday, July 6 3:00pm – 5:00pm
Sunday, July 7 7:00am – 6:00pm
Monday, July 8 6:00am – 6:00pm
Tuesday, July 9 6:00am – 6:00pm
Wednesday, July 10 6:00am – 3:00pm

**ON-SITE REGISTRATION**

Admission to the Annual Meeting sessions and events is open to those who have registered, paid, and have been issued a badge for the meeting.
The registration fee covers attendance to technical sessions, the Sunday Welcome Reception, Monday General Session and Keynote Address, and the Wednesday Awards Luncheon. Other events have a registration fee requiring payment to attend the event.

**NAME BADGES**

Please wear your name badge at all times when you are attending functions within the hotel. This badge informs us that you are a registered conference attendee and it will allow you access into meetings, the exhibit hall, meal functions, and coffee breaks.

**WHAT TO ATTEND**

The schedule for the ASABE 2019 Annual International Meeting includes 140 concurrent oral sessions, some being invited, rap, and panel discussions. There are meetings being held by committees and their councils. Attendees are free to attend any of the posted committee meetings. There are no prequalification requirements.

All attendees are encouraged to attend the Sunday Welcome Reception, the Opening General Session and Keynote Speaker’s address on Monday morning, and the Awards Luncheon on Wednesday.

A meeting orientation session is scheduled on Sunday, July 7 at 11am at the Atrium on the 3rd floor for those unfamiliar with the ASABE AIM.

**PROGRAM ESSENTIALS**

The AIM Program is organized by day and time for events, followed by the technical sessions by session number and time.

Also available to attendees is the ASABE AIM Meeting App. This easy-to-use app will provide all of the information in the traditional printed program, but offers customizable calendars, search functions, networking options, and more in the palm of your hand. To access the app, be sure to log in with your email used for registration as your user name and your last name as your password. An email with instructions was sent with more details.

**PARENTS WITH CHILDREN**

Attendees of AIM that are here with small children may need a quiet place to go at any point during the busy day. Please feel free to use Massachusetts on the 5th Floor for such an occasion. This room is designed to allow you to have a close escape from all the activity of AIM to allow

your child to rest. An adult must remain with a child at all times. This room will be available Monday and Tuesday 8:00am-6:00pm and Wednesday 7:00am-3:00pm. If you are in need of child care services, please check with the hotel for options, if they are available.

### **ACCESSIBILITY AND DIETARY NEEDS**

If you have needs that you did not include on your registration form, we usually can provide special dietary meal requests if given advance notice. Each dietary request will be handled on a case-by-case basis. For accessibility assistance, we respectfully request as much advance notice as possible.

### **ELECTRONIC DEVICES**

As a courtesy to your colleagues, please turn off or silence all electronic devices during the sessions, workshops, and plenary addresses.

### **PHOTOGRAPHS/VIDEO TAPING**

Photographs and video taping or recording of presentations and slides is strictly prohibited. Persons failing to comply will be asked to leave the meeting room.

## **MEMBERSHIP BOOTH**

Visit the ASABE Membership Booth to:

Become a member!

Pay your dues

Sign up for the Order of the Engineer

Purchase ASABE recognition items

***Discounted technical books, history books,  
and conference proceedings  
are available for sale at the  
membership booth.***

Located in Salon D on the 4<sup>th</sup> floor across from  
the ASABE Registration Desk.

### **ASABE Code of Conduct: Harassment & Safety Policy**

*Adopted 22 April 2016*

ASABE is dedicated to providing a safe, hospitable, and productive environment for everyone attending our events, regardless of ethnicity, religion, disability, physical appearance, gender, age, or sexual orientation. All participants, attendees, ASABE staff, and vendors shall be treated with respect and consideration, valuing a diversity of views and opinions, in a considerate, respectful, and collaborative manner. It is important to remember that a community where people feel uncomfortable or threatened is neither healthy nor productive. Accordingly, ASABE prohibits intimidating, threatening, or harassing conduct during our meetings and conferences.

This policy applies to speakers, staff, volunteers, guests, students, contractors, exhibitors, and attendees participating in the sessions, tours, social events, and other activities of ASABE. Participants violating these rules may be sanctioned or expelled from the meeting or conference, without warning or refund, at the discretion of ASABE leadership.

Harassment of ASABE participants will not be tolerated in any form. Harassment includes offensive gestures or verbal comments related to ethnicity, religion, disability, physical appearance, gender, age, or sexual orientation in public spaces, deliberate intimidation, stalking, following, harassing photography or recording, sustained disruption of talks or other events, inappropriate physical contact, circulation of written or graphic material that denigrates or shows hostility or aversion, and unwelcome attention. Participants asked to stop any harassing behavior are expected to comply immediately and without retaliation.

If a participant or exhibitor engages in harassing behavior, ASABE leadership may take any action they deem appropriate, ranging from a simple warning to the offender to expulsion from this and future meetings and conferences. If you are being harassed, notice that someone else is being harassed, or have any other concerns, please do not hesitate to contact ASABE staff who can work with appropriate ASABE leadership to resolve the situation. Harassment and other code of conduct violations reduce the value of our event for everyone. Confidentiality will be honored to the highest extent permitted without compromising the rights of others.

ASABE staff will be happy to help participants contact convention center/hotel/venue security or local law enforcement, and otherwise assist those experiencing harassment, to enable them to feel safe for the duration of the meeting or conference. Anyone experiencing or witnessing behavior that constitutes an immediate or serious threat to public safety at our meetings and conferences in the convention center is advised to locate a house phone and ask for security. We value your attendance, and want to make your experience as productive and professionally stimulating as possible.



**ASABE**

Annual International Meeting



## Opening General Session

Monday, July 8, 8:00am-9:30am

Location: Salons E-F

ASABE President Maury Salz welcomes each of you to the 2019 ASABE Annual International Meeting. Please join us at this time for a special awards presentation and the keynote speaker address. Awards presented are: ITSC Paper Award; Educational Aids Blue Ribbons; Outstanding Reviewers; Outstanding Associate Editors; Conference Recognitions; Superior Papers; and Standards Development.



Joel Makower is chairman and executive editor of GreenBiz Group, Inc., creator of GreenBiz.com along with research and events on sustainable business and clean technology. He hosts GreenBiz.com’s annual GreenBiz forums as well as the VERGE and Circularity conferences produced by his company, and is principal author of the annual “State of Green Business” report.

For 30 years, Joel has been a well-respected voice on business, sustainability and clean technology. As a writer, speaker, and entrepreneur on corporate sustainability practices, he has helped a wide range of companies align environmental goals with business strategy.

### Keynote Speaker—*From Here to Sustainability*

Joel Makower, Chairman and Executive Editor of GreenBiz Group, will be the Keynote Speaker for the 2019 AIM.

Nearly every company is assessing itself through the lens of sustainability. For a handful of leadership companies, it involves asking the question: “How do we compete in a world in which energy, water, materials, carbon and toxicity are constraints to growth?” Today, sustainability is not just about “doing less bad” or “greening the bottom line.” It’s about

reducing risk—supply chain, reputation, financial, and more. It’s about growing the top line through innovation, new markets, increased productivity and increased ability to attract and retain talent. And, increasingly, it’s about being regenerative and more resilient in a world facing resource constraints and climate challenges.

### Special Panel Discussion on Sustainability

9:30am-11:00am

Location: Salons E-F

Following GreenBiz’s Joel Makower’s keynote talk at the ASABE AIM meeting in Boston, a panel will discuss the implications of sustainability on the agricultural and biological engineering profession. Makower’s definition of “sustainability” encompasses a broad range of economic, security (food, water, and defense), social, and environmental concerns for rural and urban areas globally. The panel will highlight Makower’s key messages that American businesses must take the lead in a bold new direction; one in which a) walkable communities, b) regenerative agriculture, and c) resource productivity form the core. Makower presents an actionable strategy for America to enable sustainable prosperity, security, and global leadership. We as individuals and as ASABE members will be challenged to think about how this broader vision of sustainability within a national strategy could fundamentally change our profession. The panel will provide an opportunity to reflect on this vision and elaborate on what it means to ASABE. Panelists include

perspectives from within our society, from industry, and from outside the profession highlighting the complexity of sustainable systems and the need for convergent approaches to understand and manage this complexity.

Panelists include JoAnn Lighty (Dean of Engineering at Boise State University and former NSF founding co-leader of INFEWS), John Reid (Director, Product Technology and Innovation, John Deere), Rabi Mohtar (Dean of the Faculty of Agricultural and Food Sciences, American University of Beirut, Lebanon; TEES Research Professor, Texas A&M University; and an expert in the area of water resources and transdisciplinary research), and Amy Stein (Professor of Law at the University of Florida and nationally recognized for her research on energy policy and its implications on the energy and water nexus). Norm Scott, panel moderator, and a former Director of Cornell University Agricultural Experiment Station and Vice President of Research and Advanced Studies at Cornell, has been active in research on sustainable communities for over 20 years.

## EVENTS, CPDS, AND TOURS

### **E#1 YPC Social Outing**

Saturday, July 6, 7:00pm-9:00pm; pre-registration required  
What better way to kick off AIM than with the Young Professional Community's Social? Come join us for dinner, games, and socializing at Game on Fenway in downtown Boston. There is plenty to do at this fun place next door to Fenway Park! The social begins at 7pm. Meet at the ASABE registration desk and we will make the 20-minute walk together! All undergraduate, graduate students, and members under 35 years old are invited to this event. Food and drink are available for purchase.

### **E#2 YPC 5K Run/1Mile Walk**

Sunday, July 7, 7:00am-9:00am; pre-registration required  
Cost: \$20  
Join us for a beautiful 5k run or 1mile walk through historic Boston. The route will leave the Marriott Copley Place. We will meet at the registration desk at 7 am to walk to the starting area. The running/walking will start at 7:30am. Every participant will receive a piece of ASABE/YPC swag. We look forward to you joining us for fun and fitness. This event is sponsored by YPC.

### **E#3 Gale Holloway Memorial Golf Outing to Support the ASABE Foundation**

Sunday, July 7, 7:15am-1:00pm Cost: \$120  
Join us for a relaxed golf outing at William J. Devine Golf Course at Franklin Park and help support the efforts of the ASABE Foundation to promote our society. All levels of golfers are welcome—this will be a four-person scramble format (all play from the best shot). Green fee, cart, and lunch included in price. Additional fees for club rental.

### **CPD#1 Agricultural and Biological Professional Engineering Exam Development Session**

Sunday, July 7, 8:00am-4:00pm  
Location: Simmons Cost: NC  
Instructor(s): Naomi Bernstein  
Sponsored by: EOPD-414  
Difficulty Level: Entry Level  
Description: For Engineers currently holding their PE License. Session will be used to develop and review the Ag and Biological Professional Exam Materials for future examinees. Proof of License will be required upon entry. Attendees do not need to be present for entire time slot. Please reserve at least 2 hours of your day between 8am-4pm for attending this session.

Target Audience: Professional Engineers

Benefits: PDHs for amount of time attended

### **CPD#2 Active Learning Techniques in Agriculture and Biological Engineering Courses**

Sunday, July 7, 9:00am-12:00pm

Location: Vineyard Cost: \$45

Instructor(s): Ganesh C. Bora

Sponsored by: EOPD 203

Difficulty Level: Entry Level

Description: Emphasis has been given on active learning techniques (ALT) and instructors have strategically used ALT to promote student engagement all across subject areas. Previous implementations of general no-cost ALT in an Agricultural Engineering course showed encouraging results. The 30 seconds peer discussion, class work solving problems, videos have made the students enthusiastic to participate in the class discussion.

Target Audience: New Faculty, Post-Docs, PhD students, Teaching Assistants

Learning Objectives: Effective teaching with limited resources in Agricultural and Biological Engineering.

Benefits: Innovations in teaching with available resources and engage students in learning.

### **CPD#3 Hyperspectral Imaging and Data Analysis for Agricultural and Biological Engineers**

Sunday, July 7, 8:00am-6:00pm

Location: Orleans Cost: \$155 (includes class, lunch, and round-trip train fare to MIT)

Instructor(s): Dr. Seung-Chul Yoon and Dr. Kurt C. Lawrence, USDA-ARS U.S. National Poultry Research Center, Athens, Georgia

Sponsored by: ITSC-348, ANGASABE

Difficulty Level: Entry Level/Intermediate

8:00 am-12:00 pm, class at the Marriott Copley Place

12:00pm-12:45, lunch break (reservations made at Champions Grill, Marriott)

12:45pm-3:15pm, class continuation

3:15pm-3:45pm, travel on train to MIT

3:45pm-5:30pm, MIT lab tours

5:30pm-6:00pm, travel back to train station and Copley Place

Description: Globally, image-based sensing techniques are increasingly becoming prominent and available to agricultural and biological engineers. Among these are the applica-

tions of multispectral and hyperspectral imaging for non-destructive comprehensive measurements of internal and external properties of things. Participants should expect to leave with an understanding of the fundamental principles of operation and data processing as well as explore applications. The workshop will round off with a visit with researchers at MIT who have developed novel low-cost spectroscopy and imaging instrumentation and a tour of MIT.nano.

**Target Audience:** Engineers, scientists, and graduate students who are interested in hyperspectral imaging and data analysis for applied research. The course is designed for researchers from beginning to intermediate knowledge of hyperspectral data analysis.

**Learning Objectives:** The course will be divided into three parts. The first part will cover a brief overview of hyperspectral and multispectral imaging including improved data capture, calibration, lighting, and visualization. The second part will cover intermediate topics of hyperspectral data exploration and multivariate image analysis. Emphasis will be placed on assessment of the hyperspectral data, exporting data to common chemometrics software for model development, model prediction, and validation with hyperspectral image data. Finally, the third part will explore a couple of case studies for real-world problem solving with hyperspectral imaging technology.

**Benefits:** Many multispectral and most hyperspectral imaging systems are still sold “as-is”. That is, the hardware of the system is usually assembled and packaged with only some form of data acquisition software and limited data analysis. This course is intended to introduce multi- and hyperspectral image analysis to the audience and help them understand the basics of quality data collection, exporting data to popular chemometric packages, and finally evaluation/validation of models back on the hyperspectral imaging technology.

### **ASABE Board of Trustees & Councils**

Sunday, July 7, 10:30am-3:30pm

10:30am-1:30pm (Regis) Meeting of ASABE Board of

Trustees led by Maury Salz, president.

1:30pm-3:30pm (MIT) Membership Council

(Harvard) Meetings Council

(Brandeis) Standards Council

(Northeastern) Publications Council

### **AIM Orientation—What You Didn't Know About ASABE**

Sunday, July 7, 11:00am-11:30am Location: 3<sup>rd</sup> floor Atrium  
Join YPC/IPC for an orientation on the Annual International Meeting. What should you do, who should you talk to, and what should you take away from the meeting? Also, take this opportunity to learn about the Young Professional Community and International Preprofessional Community.

This is a great event for the first time attendee! If you aren't able to attend, stop by the YPC Booth for a pamphlet with all the information!

### **#1 Boston Trolley Tour**

Sunday, July 7, 1:00pm-3:00pm Cost: \$55 per person,

includes round trip from hotel, private professional guide

Enjoy an exclusive, private trolley tour of Boston. From the Boston Common into the Back Bay and over to Beacon Hill, learn about these historic and affluent neighborhoods in Boston. Visit Copley Square, dominated by two of the city's architectural feats, and see the John Hancock Tower and Trinity Church. Following this famed square, the tour will continue to the North End of Boston. On the way, you will see Old South Meeting House where the Revolutionary War began. Conclude the tour by hearing the story associated with the Old North Church where Paul Revere famously hung two lanterns in the steeple indicating the British were invading by sea!

### **CPD#4 Data Analytics using Python in Agricultural and Biological Engineering**

Sunday, July 7, 1:00pm-4:00pm

Location: Vineyard Cost: \$10

Instructor(s): Gurdeep Singh, Sushant Mehan

Sponsored by: YPC

Difficulty Level: Entry Level

**Description:** Data science is a useful discipline to develop and improve existing information from data in various forms, either structured or unstructured. Python, a high-level computer language, has gradually become a more popular choice within the data science field and is user-friendly. This workshop will highlight the basics of data science with python, including data mining and data cleaning, how to best interpret and visualize of agricultural and biological engineering data, as well as some high-level machine learning/deep learning packages.

**Target Audience:** University students, researchers, and other professionals interested in using data science for generating insights.

**Learning Objectives:** (a) Applying Python to clean and understand raw data (b) Understanding how to relate different variables within data and developing simplistic model using python and its advanced application.

**Benefits:** Becoming familiar with one of most highly accepted language in data science and its use to understand your data analytically and visually.

### **CPD#5 Teaching Online: Course Design, Delivery and Learning Analytics**

Sunday, July 7, 1:00pm-4:00pm

Location: Yarmouth Cost: \$45

Instructor(s): Patrizia Busato, Remigio Berruto, Fedro Zazueta

Sponsored by: EOPD

Difficulty Level: Entry Level

Target Audience: Individuals with teaching and extension education responsibilities including, faculty, lecturers and teaching assistants interested in acquiring knowledge and skills on for online teaching, active learning, flipped classroom instruction and learning analytics. “Real world” experience will be shared by the workshop conductors.

Learning Objectives: Describe principles of good instructional design; Describe active learning principles and flipped classroom pedagogy; Identify required resources and skills required for successful delivery of online and flipped classroom courses; Acquire foundational skills to develop online and face-to-face materials for flipped classroom delivery; Lessons learned in the application of the flipped classroom pedagogy; Apply learning analytics to improve student success

Benefits: Implementing active learning pedagogies in engineering education has been shown to improve learning outcomes and higher levels of student satisfaction and success.

### **ABET Outcomes Assessment and Criterion Updates**

Sunday, July 7, 1:30pm-3:30pm Location: Nantucket

This session will cover the transition from former ABET student outcomes to the newer student outcomes with group discussion about assessment practices. Additional discussion will focus on new updates from ABET and visit process best practices.

### **Fountain Wars Oral Presentations**

Sunday, July 7, 2:30pm-4:30pm Location: Falmouth

Are you interested in the preparation and creative behind-the-scenes efforts of the different Fountain Wars teams? Come to the oral presentation phase of the competition and get a heads-up on what will be displayed at the building-testing phase on Monday at 1:00pm. Details page 14.

### **Leadership in ASABE, What You Need to Know to be Effective**

Sunday, July 7, 3:00pm-4:30pm Location: Suffolk

Too often committee members are asked to take on a leadership role without the right tools and without knowing the specific expectations and structure they are to work within. This session will help break down the confusion and provide some foundational information as well as provide a forum for general and specific questions committee officers are confronted with as well as practical solutions.

### **Alpha Epsilon Annual Meeting**

Sunday, July 7, 4:00pm-5:30pm Location: Nantucket

Alpha Epsilon will be having their annual meeting again!

Each chapter is encouraged to have at least one member attend. We will have door prizes!

### **ASABE Welcome Reception**

Sunday, July 7, 4:30pm-6:00pm Location: Gloucester

All meeting registrants are invited to attend the welcome reception. This is a great event to network and make plans for dinner later on. The Boston Visitors Bureau will be available to offer advice and assist you in making your dining reservations.

### **E#4 Women in ASABE Speed Networking**

Sunday, July 7, 6:30pm-7:30pm Location: Simmons

Would you like to visit with other women who participate in the annual meeting and perhaps share some of your same interests? This is the opportunity for you! Participants are divided into mentors and mentees. When the cowbell rings, mentees move to another table to meet other women while the mentors stay at a table to host and encourage conversation. The hour allows enough time to sit at 5-6 tables; arrive on time to maximize the benefit. Information on the mentors will be provided in advance so mentees can select tables based on brief mentor biographies.

### **E#5 Alumni Reception of College of Biosystems Engineering and Food Science, Zhejiang University**

Sunday, July 7 6:30pm-10:00pm Location: off-site

Cost: \$0 alumni/\$30.00 guests

Alumni and visiting professors of College of Biosystems Engineering and Food Science, Zhejiang University are invited to enjoy a reception at a local restaurant and catch up with old friends. Please send email to [xwang2@illinois.edu](mailto:xwang2@illinois.edu) by July 1st if you plan to attend.

### **E#6 Industry-Focused Speed Networking Session**

Sunday, July 7, 7:30pm-8:30pm Location: Simmons

This session is designed for people who want to connect with those working in industry who are further along in their career. Perhaps you are a mid-career person thinking about moving into management and want some advice. Or maybe you're fairly new to industry and want to talk to someone with more experience. Are you a student interested in working in industry after graduation? This is the opportunity for you! Participants register as either mentors or mentees. Brief mentor biographies will be provided so mentees can select tables in advance. Every 10 minutes mentees move from table to table to meet with industry mentees while mentors stay at the tables to host and encourage conversation. This hour-long session allows enough time to sit at 7-9 tables to gain insight from multiple perspectives. Note: the intent of this session is for career advice, and is NOT a career fair. Mentors will be selected to represent a diverse set of industries.

### **E#7 Prayer Breakfast**

Monday, July 8, 6:30am-8:00am Cost: \$20

Location: Simmons

The Fellowship of Christian Agricultural and Biological Engineers invites all meeting registrants, spouses and guests to the interdenominational prayer breakfast. The continental breakfast will begin promptly at 6:30AM and conclude at 8:00AM. Pre-registration is required.

### **E#8 Guide to Professional Licensure**

Monday, July 8, 7:00am-8:00am; pre-registration required

Location: Boylston

Studying for a Professional Licensure Exam? Or just have questions about which Professional Licensure Exam is right for you? Come join us to ask our panel of experts questions and get answers on questions like: why take a licensure exam?, which exam is right for you?, what is covered on a licensure exam?, and how can ASABE help you prepare for the exam?

### **E#9 Meet and Greet Breakfast with Department Chairs and Senior Faculty**

Monday, July 8, 7:00am-8:00am Location: Regis

Cost: \$15.00 faculty/\$10.00 students

This networking event is meant to connect late-career graduate students with department chairs/heads as well as senior faculty members to discuss opportunities for future research and/or faculty position openings. This is a YPC sponsored event, open to all graduate students as well as interested faculty members.

### **E#10 Cornell Friends, Family and Alumni Breakfast**

Monday, July 8, 7:30am-8:30am Location: Vineyard

Cost: \$25

An informal gathering of Cornell friends, family and alumni over coffee and breakfast. Alumni and past associates are encouraged to attend.

### **Opening General Session**

Monday, July 8, 8:00am-9:30am Location: Salons E-F

Please see details on page 4.

### **Special Panel Discussion on Sustainability**

Monday, July 8, 9:30am-11:00am Location: Salons E-F

Please see details on page 4.

### **Robotics Student Design Competition**

Monday, July 8, 9:00am-6:00pm Competition testing

11:30am-1:30pm Poster Session

Tuesday, July 9, 8:00am-6:15pm, Competition

Location: Fairfield/Exeter/Dartmouth

Teams design a robot that will conduct autonomous inventory management and selective fertilizer application in a plant nursery. Robots need to identify simulated plants and move them to a storage area. Details on page 15.

### **Career Fair**

Monday, July 8, 9:30am-12:00pm Location: Salon G

The Career Fair is just one of the many highlights of the ASABE Annual International Meeting. It is an outstanding networking opportunity that allows interested individuals to connect with the Fortune 500 companies, agricultural and bio-based businesses, bio-research companies and major land grant universities looking for qualified candidates. The ASABE Career Fair provides an opportunity for employee and potential employees to come together informally and share information. Academia will also be represented with opportunities at the masters and doctoral level. Employers register their job positions at the registration desk and receive an interview table number. These openings are posted with the table number located near the ASABE registration desk for review. Prospective employees are invited to seek out employers of interest and exchange information.

### **T#2 Growing in the City: A Tour of Freight Farms, Hydroponic, Container Farm**

Monday, July 8, Tour #1: 10:30am-12:30pm

Tour #2: 11:30am-1:30pm

Cost: \$43 per person, includes round-trip transportation

from hotel, tax, gratuities, all arrangements

Boston-based Freight Farms is the leader in the containerized agriculture industry. With its flagship product, The Leafy Green Machine™, the company was the first to integrate smart, hydroponic, vertical farming into an intermodal freight container. Its IoT-software farmhand® is a farming data analytics platform that allows any hydroponic farmer to remotely optimize, automate, and manage their operations from a smartphone or desktop app. Take this opportunity to get a look inside the Freight Farms' latest farm design to see how they've growing hundreds of pounds of fresh produce every week in just 320 square feet.

### **E#11 Spouse/Guest Lunch**

Monday, July 8, 10:00am-12:00pm

Cost: Included with Spouse/Guest Registration. Additional tickets \$75.00. Includes transportation, your meal at the Hampshire House, tax, and gratuities

The Hampshire House is a turn-of-the-century mansion on historic Beacon Hill where generations of Bostonians and their guests have wined, dined, and danced the night away. It is also where friends will gather for the annual Spouse-Guest Brunch during the 2019 ASABE AIM.

This five story Georgian revival townhouse is lavished with Italian marble, carved oak paneling, crystal chandeliers and tall Palladian windows. Those windows not only look out onto the Victorian elegance of the Boston Public Garden, but they also gained a vision of Boston's elite social world

as 84 Beacon Street became one of the most fashionable salons in the city. Gentlemen in top hats and tails and ladies in silk and satin ascended the grand staircase to the heart of the house for gala evenings in the Ballroom and Library. It is now a restaurant, used for special occasions, and continues as the face of the old TV series *Cheers!*, where the original bar from the TV set still welcomes people to enjoy good times.

### **T#3 Street Lamps & Cobble Stones**

Monday, July 8, 12:15pm-2:30pm

Cost: \$37 per person includes professional guide and bus transportation back to the hotel

Following the spouse/guest lunch, a tour guide will lead you by foot into Beacon Hill. From the golden dome of the State House to the elegant homes of Louisburg Square, you will enjoy picturesque streets that highlight examples of Early-American architecture with particular emphasis on the work of Charles Bulfinch. Explore Boston's most photographed street as your guide takes you on a journey of Beacon Hill's ornate past, from its rural beginnings to the vision of the Mount Vernon Proprietors. Walk among this historic collection of Federal and Greek Revival row houses and hear the fascinating stories of Boston's prominent citizens who have called Beacon Hill their home. Note: Wear comfortable shoes as this is a walking tour done at a leisurely pace.

### **T#4 Boston Public Garden and Boston Common**

Monday, July 8, 12:15pm-2:30pm

Cost: \$32 per person includes professional guide

Another option after brunch at the Hampshire House, is to have a guided tour of the beautiful Boston attractions: the Boston Public Garden and the Boston Common located directly across the street. You will be greeted by your guide to walk through the first public botanical garden in the United States. Be regaled with stories from Boston's history. The landscaped 24-acre Boston Public Garden and Boston Common were established in 1837 during the populating of the Back Bay section of the city. It was the first part of the swamp that was filled in to create this iconic neighborhood. The Public Garden contains lovely manicured paths, the famous "Make Way for Ducklings" statues, a 4-acre pond with swans, a variety of other birds, and several memorable statues throughout. At the end of the tour, you will have the option to explore the famous shops along Newbury Street on your own, or return to the hotel. Note: Wear comfortable shoes as this is a walking tour done at a leisurely pace.

### **NRES Community Update**

Monday, July 8, 12:00pm-1:00pm Location: Salon I

Following Session 116 Natural Resources & Environmental Systems Distinguished Lecture Series, and 117 ABE

Curriculum and Industry Needs in Ecological/Water Resources Engineering.

### **Boyd-Scott Graduate Research Award**

Monday, July 8, 12:00pm-2:30pm Location: Hyannis  
The Graduate Student Research Award (GSRA) Competition sets out to recognize excellence in the conduct and presentation of agricultural and biological engineering research carried out by graduate student members. The competition is held in two parts: a written competition and an oral presentation for the top three finalists in the M.S. and Ph.D. categories, which is held at the ASABE Annual International Meeting. Winners will be recognized at the AEM/ASABE Student Awards Breakfast on Wednesday.

### **T#5 YPC Local Agriculture Tour of the Boston Public Market**

Monday, July 8, 12:30pm-4:00pm

Cost: \$37 per person includes round-trip from hotel, tax, gratuities, all arrangements

Join the YPC for a tour of the Boston Public Market, an indoor, year-round marketplace where you can find seasonal and locally sourced food from Massachusetts and New England. You will see fresh produce, meats, poultry, eggs, dairy, seafood, baked goods, and specialty items.

### **Fountain Wars**

Monday, July 8, 1:00pm-5:00pm, Team check-in and build 5:00pm-8:00pm, Team test/adjustment and competition  
Location: TBA; check the meeting app

(Oral presentations are Sunday, 2:30pm.) Teams will construct their systems with PVC pipe, couplers, fittings, valves, nozzles, and pumps during a construction period, followed by the competition. Details on page 14.

### **Past Presidents Roundtable**

Monday, July 8, 2:30pm-4:30pm

Location: New Hampshire

The past presidents of ASABE gather to catch up on Society activities and give feedback on the course our Society has set for the future. This event is open to all past presidents and their guests.

### **Order of the Engineer Induction Ceremony**

Monday, July 8, 4:00pm-5:00pm Location: Simmons  
Engineering graduates and registered engineers are invited to accept the Obligation of the Engineer and a stainless steel ring which is worn on the little finger of the engineer's working hand. All graduates of ABET accredited engineering programs; seniors in ABET accredited programs within two academic years of graduation; licensed PEs; and members of the Canadian Calling by reciprocity are invited to join the Order. All inductees must be present to accept their certificate and ring at the induction ceremony. The cost of entering the Order is \$15.00 and inductees may register with Tina Schultz at

schultz@asabe.org before the meeting or in person at the membership booth at the meeting. Learn more about the Order at <http://www.order-of-the-engineer.org/>.

### **E#12 Women in ASABE Social**

Monday, July 8, 4:30pm-5:30pm Location: Regis  
The Women in ASABE Social is an informal mixer open to all female ASABE members. Hosted by Amy Kaleita-Forbes and Michelle Soupir, this event will provide a unique opportunity to meet, socialize and network with other women from across ASABE. Refreshments will be served. Registration is required but there is no charge for this event.

### **E#13 Association of Overseas Chinese Agricultural, Biological, and Food Engineers (AOCABFE) Annual Business Meeting And Award Banquet**

Monday, July 8, 5:00pm-7:00pm Location: MIT  
Cost: \$65.00 member  
The AOCABFE annual meeting provides a platform for promoting and facilitating research and educational exchanges among researchers with Chinese origin or associations in the areas of agricultural, biological and food engineering. The ASABE meeting attendees with international collaboration interests are invited to attend the meeting as well. The AOCABFE activities in 2018-2019 will be reviewed and plans of action for 2019-2020 will be discussed.

Following the business meeting the members of AOCABFE will be gathering at an off-site location for the awards dinner and an opportunity for socializing and networking. Recognition and awards will be presented at the banquet.

### **E#14 Association of Agricultural Food and Biological Engineers of Indian Origin (AABFEIO) Business Meeting and Dinner**

Monday, July 8, 5:30pm-6:30pm Location: Salon H  
Cost: \$30 member/\$20 student/\$35 non-member  
The 2019 Annual Business Meeting of AABFEIO will be held from 5:30PM to 6:30PM on Monday, July 8 at the ASABE conference venue. Following the meeting, the association will have its annual dinner from 7:00pm to 9:30pm. Dinner location will be announced.

### **Fellows Induction Ceremony/Reception**

Monday, July 8, 6:00pm-8:00pm Location: Salons E-F  
All registrants are invited to this special recognition ceremony and reception honoring the 2019 ASABE Fellows. ASABE defines a Fellow as a member of unusual professional distinction, with outstanding and extraordinary qualifications and experience in, or related to, the field of agricultural, food, or biological systems engineering.

### **E#15 Graduate Student Social**

Monday, July 8, 7:30pm-9:30pm; pre-registration required.  
Location: St. Botolph  
This event will provide an informal setting for graduate

students from all over the world to meet up, socialize and make connections with each other. It's a great chance to get to know the people you'll be seeing in the hallways, sessions, and events throughout the week! This is a YPC sponsored event, open to all graduate students.

### **Iowa State University ABE Reception**

Monday, July 8, 8:00pm-9:30pm Location: Provincetown  
Meet your old friends and make new ones. Find out what is happening in the Department of Agricultural & Biosystems Engineering at Iowa State University.

### **BSE—Virginia Tech**

Monday, July 8, 8:00pm-10:00pm Location: Regis  
The Biological Systems Engineering Department at Virginia Tech cordially invites alumni and friends to this gathering on Monday evening. Come enjoy some refreshments and catch up on the happenings in the department and at Virginia Tech!

### **Texas A&M Former Students and Friends Social**

Monday, July 8, 8:00pm-10:00pm Location: Vineyard  
The Biological and Agricultural Engineering Department invites you to join us in a reception for all Aggies and their supporters. We will meet at 8:00 pm for complimentary appetizers and a cash bar. Gather with us to enjoy an update on the department!

### **E#16 University of Illinois Alumni & Friends Reception**

Monday, July 8, 8:00pm-10:00pm; pre-registration required.  
Location: Simmons  
Alumni and friends of the University of Illinois are invited to attend. We will feature a hosted bar and snacks. There is no fee for the event, but registration is appreciated. Please stop by to visit and hear what is new with the Orange and Blue I-L-L-I-N-I!

### **E#17 International Breakfast**

Tuesday, July 9, 7:00am-8:00am Cost: \$20  
Location: Tremont  
The International Breakfast is a great opportunity to interact with peers from many different countries. If you are coming from abroad or have an interest in international issues this is the place to meet new people and begin long and fruitful working relationships. The speaker for this International Breakfast will be the 2019 recipient of ASABE's prestigious Kishida Award .

### **E#18 Purdue Alumni & Friends Breakfast**

Tuesday, July 9, 7:00am-8:00am Location: Simmons  
Cost: \$5; preregistration required.  
Purdue University's Dean of Agriculture, the Agricultural & Biological Engineering Department, and the Engineering Alumni Association invite all alumni and friends to their breakfast.

### **E#19 ITSC-230 Biosensors Networking Breakfast**

Tuesday, July 9, 7:00am-8:00am Cost: \$20

Location: Regis

Join us for breakfast to network with many biosensor experts and students. In this casual setting, let's share and celebrate our professional success, discuss our interests and boost our collaborative efforts.

### **E#20 Penn State Alumni and Friends Breakfast**

Tuesday, July 9, 7:00am-8:30am Cost: \$15

Location: Vineyard

This event is open to all alumni, student, current employees and friends of The Pennsylvania State University, sponsored by the Penn State Department of Agricultural and Biological Engineering. Come join us for the opportunity to meet old friends, faculty, students and to get updated on the current happenings in the ABE Department. All guests are eligible to win door prizes.

### **Local Production Agriculture 101**

Tuesday, July 9, 7:30am-9:00am Location: Salon J

During your visit to Boston, here is an opportunity to learn about some of the prominent agricultural industries in Massachusetts and the northeastern United States!

Cranberries are one of the five top agricultural products in the state of Massachusetts, while wood and paper products are among the top ten exports from the Port of Boston. Two speakers from the UMass Center for Agriculture, Food, and the Environment will be introducing their respective research facilities and sharing facts and information about regional cranberry and timber production. This session is organized and sponsored by the YPC.

### **Robotics Student Design Competition**

Monday, July 8, 9:00am-6:00pm Competition testing

11:30am-1:30pm Poster Session

Tuesday, July 9, 8:00am-6:15pm, Competition

Location: Fairfield/Exeter/Dartmouth

Teams design a robot that will conduct autonomous inventory management and selective fertilizer application in a plant nursery. Robots need to identify simulated plants and move them to a storage area. Details on page 15.

### **PRS Community Meeting**

Tuesday, July 9, 8:00am-9:00am Location: Salon I

Stay after the meeting for invited session 221 Building Successful Collaborations to Address Challenges in Food and Bioprocess Engineering.

### **K.K. Barnes Student Paper Competition**

Tuesday, July 9, 8:00am-9:00am Location: St. Botolph

The KK Barnes Student Paper Award Competition comprises of an undergraduate student paper competition and an oral competition, which is held at the ASABE Annual International meeting. Winners will be recognized at the AEM/ASABE Student Awards Breakfast on Wednesday.

### **Gunlogson Open**

Tuesday, July 9, 9:30am-10:30am Location: St. Botolph  
The Gunlogson Environmental Design Student Competition comprises of a written design report and an oral competition, which is held at the ASABE Annual International Meeting. Winners will be recognized at the AEM/ASABE Student Awards Breakfast on Wednesday.

### **AGCO National Student Design Competition**

Tuesday, July 9, 11:00am-12:00pm Location: St. Botolph  
The top three entries for the student design competition have been invited to this oral competition. Listen to these outstanding engineering design project presentations. Winners will be recognized at the AEM/ASABE Student Awards Breakfast on Wednesday.

### **E#21 Graduate Student Professional Development Roundtable**

Tuesday, July 9, 12:00pm-2:00pm Location: Simmons  
Cost: \$15

An invited panel of esteemed members of our society will share their academic and professional experiences with current graduate students. This is not a technical session but instead a time to ask questions and gain advice from others who have been there before you. This is a YPC sponsored event, open to all graduate students.

### **Ethics in Engineering Essay and Video Presentation (P-128)**

Tuesday, July 9, 12:15pm-2:15pm Location: Columbus II  
Sponsoring Committee is P-128: Engineering Ethics Competition. Video contest: Three winners will be selected to receive prize money of \$500, \$300, and \$200 for 1st through 3rd placements. Each invited team will receive one complimentary meeting registration. Essay contest: The top three placements will earn cash awards as follows: \$500 for 1st; \$300 for 2nd; and \$200 for 3rd. Each invited competitor will receive one complimentary meeting registration as well.

### **Quarter Scale Tractor Student Design Competition**

Tuesday, July 9, 12:30pm-2:30pm Location: St. Botolph  
Top finishing teams in the Team Presentation category from this year's competition will give their winning presentations during this session. This is an excellent opportunity for students to see what a top presentation looks like and use that knowledge to improve their own presentation in future years. There will be ample time for Q&A, so come ready to learn.

### **Grad School 101: A Panel Discussion**

Tuesday, July 9, 2:00pm-4:00pm Location: Columbus I  
Thinking about graduate school? Wondering what it's all about or if it's the right place for you? A panel of current

graduate students from different backgrounds, programs, and experiences will share their journey as well as answer questions on everything from the application process to every day grad life. This is a YPC sponsored event, open to anyone interested or thinking about graduate school.

### **ASABE Foundation Board of Trustees**

Tuesday, July 9, 2:00pm-5:00pm Location: Regis  
The ASABE Foundation Board of Trustees meeting is led by Lalit Verma, Foundation president.

### **YPC Graduate Student Involvement Committee Meeting**

Tuesday, July 9, 4:00pm-5:00pm Location: Boylston

Have ideas, thoughts, or concerns about AIM's event's for graduate students? Looking to get more involved with YPC and ASABE? We would love to have you! We will be discussing the committee's purpose & goals, reviewing this year's events as well as looking to what we would like to have at the 2019 AIM. This is a YPC sponsored event, open to all grad students.

### **African Network Group of the ASABE Annual Business Meeting**

Tuesday, July 9, 5:30pm-7:30pm Location: Salon J  
Annual business meeting to receive and evaluate feedback on past year's milestones and set new goals in alignment

## **ASABE Annual Business Meeting**

Tuesday, July 9, 1:00pm-1:45pm Location: Harvard

The Annual Business Meeting will be conducted by ASABE President Maury V. Salz, President CLAAS Omaha, and will feature an overview of the state of the Society. All are welcome to attend.



Maury V. Salz  
ASABE President  
President, CLAAS Omaha, Inc

Salz is president of CLAAS Omaha, Inc., manufacturer of LEXION combines and headers for North America, where he is responsible for General operations which includes research and development for CLAAS NA Platform. Salz has worked for CLAAS for 18 years, serving as president since 2007. He holds seven patents relating to tractor drive systems and cotton harvesting and combine harvesting products.

Salz grew up on a family farm in northwest Iowa and continues to participate with his family in corn and soybean farming operations. He received a B.S. in Agricultural Engineering from Iowa State University and an MBA from St. Ambrose University in Davenport, Iowa.

Currently a member of E-05/3 (Digital Strategy) and E-06 (Foundation Liaison), Salz has served on the Board of Trustees (2009-2011), liaising with the Standards Council during that time, and on P-125 (AEM Student Trophies Competition) from 2003 to 2015. His additional Society activities include inaugurating and leading the Values Growth ad hoc committee. Salz is a 20-year member of the Society.

*"What a wonderful opportunity the presidency has been to meet people within our profession. The engagement of our engineers to improve other's lives and our world's environment is amazing and I'm deeply gratified to be associated with ASABE."*

Sue E. Nokes, P.E.  
ASABE President-Elect  
Professor, Associate Dean for Faculty Affairs and Facilities, University of Kentucky



A University of Kentucky faculty member since 1995, Sue Nokes recently accepted the Associate Dean for Faculty Affairs and Facilities position in the College of Engineering at UK, after serving six years as chair of the biosystems and agricultural engineering department. Nokes' teaching interests include process engineering and mathematical modeling of biological systems. Her research emphasis has been in bioprocess engineering, where Nokes has published more than 60 peer-reviewed articles and received over \$12 million in grants. She holds one patent.

Named an ASABE Fellow in 2016, Nokes has been an ASABE member for over 30 years. She served on the Board of Trustees as treasurer from 2013 to 2017 and on the Finance committee from 2007 to 2017. She recently completed a term as chair of the E-20 Initiative Fund Evaluation subcommittee. Nokes has served on numerous other committees, including the Nominating committee twice (2010-2012 and 2001-2003). She received the Young Educator Award in 2000.

*"My presidential focus will be to enable more interconnections within the society and with external partners. ASABE is a diverse group with a common mission –merging technology with biological systems to improve our planet's wellness. Interconnections are essential to spark creativity and resource pooling, which enable significant progress towards achieving this noble mission, and make the journey much more rewarding."*

with the Society's objectives. Old and new members as well as interested parties are cordially welcome to contribute and network.

### **E#22 Association of Korean Agricultural, Biological, and Food Engineers (AKABFE) Business Meeting**

Tuesday, July 9, 7:00pm-7:30pm Location: Nantucket  
Cost: \$30

Annual business meeting sponsored by the Association of Korean Agricultural, Biological, and Food Engineers (AKABFE).

### **E#23 ASABE Foundation Dinner**

Tuesday, July 9, 7:00pm-10:00pm Location: Westin Copley Place Cost: \$150

Plan to join us for a real Boston dining experience—from lobster to Boston cream pie! This year's dinner will take place in the elegant Staffordshire Room in the Westin Copley Place overlooking Copley Square, just a three-minute walk from the Marriott. After dinner we'll enjoy a presentation by Chandra Madramootoo titled "How to Feed 9 Billion People in a Resource Constrained World." Under current growth scenarios, the world's population is expected to reach 9 billion by 2050, leading to increased energy, water, food and nutrition demands. Achieving these requirements through the untamed exploitation of non-renewable resources, will certainly contribute to increased atmospheric temperatures and greenhouse gas emissions, and food production systems will consequently face new stresses. This talk will illustrate some of the key priorities for the ASABE community to consider in shaping the global change agenda to address these significant threats to agriculture and the world's food systems. Chandra Madramootoo, P.Eng., holds a James McGill Professorship in bio-resource engineering at McGill University. He also holds visiting appointments in civil and environmental engineering, and in water and food security at the Massachusetts Institute of Technology (MIT). Come out, enjoy a delicious meal and lively presentation, and help us support the good work of the ASABE Foundation.

### **E#24 AEM/ASABE Student Awards Breakfast**

Wednesday, July 10, 7:30am-9:00am Location: Salons E-G  
Cost: \$5 students/\$20 others

The Association of Equipment Manufacturers (AEM) and the American Society of Agricultural and Biological Engineers (ASABE) invites all of the ASABE student members to attend the AEM/ASABE Student Awards Breakfast. This event is a wonderful time to learn more about the professional side of the world as you dine. Reservations must be made by on or before Tuesday, July 9. Breakfast reservations will be confirmed in your ASABE registration packet. All annual meeting attendees are encouraged to attend.

### **E#25 ASABE Awards Luncheon**

Wednesday, July 10, 12:30pm-2:30pm Location: Salons E-G  
Cost: A luncheon ticket is included with full meeting registration or with Wednesday only registration; additional tickets \$70. A complete list of awards to be presented will be posted at a later date.

### **E#26 344 Autonomous Field Equipment—The Future of Standardization**

Wednesday, July 10, 2:30pm-6:00pm Location: Suffolk  
Cost: \$30/\$10 students

Highly autonomous and autonomous agricultural equipment is our present and our future. Join the discussion as we review where we are, hear from experts in the field about work being done around the world and bring the focus back to where ASABE fits in the future of autonomy in agriculture. Panel members include Norbert Schlingmann, J. Alex Thomasson, Craig Baillie.

### **T#7 Dams: Keeping Communities Safe**

Wednesday, July 10, 2:30pm-6:30pm

Cost: \$60 per person includes round-trip transportation from hotel to all dam locations, snack, water, tax, gratuities, all arrangements

Tour four NRCS-566 flood water retarding dams in the SuAsCo Watershed in Worcester and Middlesex Counties in Massachusetts. The Nichols Dam completed dam rehabilitation in 2012, including a new ACB spillway and toe drains. Rawson Hill Dam will be rehabilitated for spillway integrity and overtopping by reconstructing the dam using RCC. Tyler Dam, which has a 39.5 square mile watershed with multiple flood control structures upstream, will be rehabilitated by increasing the auxiliary spillway efficiency and raising the dam. Delaney Complex Dam which has two impoundments, two principal spillways, one auxiliary spillway and one balancing channel will be rehabilitated for spillway integrity by changing the auxiliary spillway from a grassed line channel to labyrinth weir.

### **ASABE Board of Trustees & Councils**

Thursday, July 11, 8:00am-3:00pm

8:00am-10:00am (Vineyard) Standards Council  
(Orleans) Membership Council  
(Yarmouth) Meetings Council  
(Hyannis) Publications Council

10:30am-3:00pm (Wellesley) ASABE Board of Trustees

### **T#6 Nashoba Valley Winery/Brewery/Orchard**

Thursday, July 11, 9:00am-6:00pm

Cost: \$65 per person includes round-trip transportation from hotel, tax, gratuities, all arrangements

This tour will avail ANGASABE members and other interested ASABE members and guests the opportunity to visit the Nashoba Valley Winery, Brewery and Orchard (Agritourism). It will provide opportunities for collaborations and exchange of knowledge among members and hosts.

# The 2019 ASABE Fountain Wars Competition

The competition is open for all to view.

**Sunday, July 7**

**Location: Falmouth**

2:30pm-4:30pm

Oral Presentations

**Monday, July 8**

**Check the meeting app for location**

1:00pm-5:00pm

Team Check-in and Build

5:00pm-8:00pm

Team Test/Adjustment and  
Competition

Fountain Wars is a hands-on, real-time design competition where students design and model their entry on-site at the Annual International Meeting, and build and test their actual entry under time pressure during the competition. It requires a modest design document and limited expenditures. As such, it is targeted at student clubs or participants in sophomore/junior-level class design projects. Teams will arrive at the competition with a design for their fountain, along with the necessary PVC pipe, couplers, fittings, valves, nozzles, and pumps to assemble their design. After making a brief, marketing-style promotion, they will construct their system during a 120-minute construction period.

Awards are based on scores of the written report, oral presentation, construction, technical tasks and aesthetic display segments of the event.

## **Prizes Awarded**

1st—\$500, 2nd—\$350, and 3rd—\$200, plus seven specialty awards of \$100 each

# The 2019 ASABE Robotics Student Design Competition

The competition is open for all to view.

## Location: Fairfield/Exeter/Dartmouth

Monday, July 8	11:30am-1:30pm	Poster Session
	9:00am-6:00pm	Competition Testing
	5:00pm-6:00pm <i>(Location: Vineyard)</i>	Judges Orientation
Tuesday, July 9	8:00am-10:00am	Competition Round 1
	10:30am-12:30pm	Competition Round 2
	2:00pm-4:00pm	Competition Round 3
	5:30pm-6:15pm	Wrap-up Session

The 2019 competition will challenge teams to design a robot that will conduct autonomous inventory management and selective fertilizer application in a plant nursery. Both the advanced and beginner divisions will have a playing field that is 4 ft × 16 ft and can use only one robot to complete the challenge. There are 21 simulated plants on the board and robots need to identify them and move them to the storage area. One plant, called the Golden Plant, will be placed in the center of the board and will have extra points for the robot that collects it first.

## Prizes Awarded

Beginner Division	1st-\$500	2nd-\$350	3rd-\$200
Advanced Division	1st-\$800	2nd-\$600	3rd-\$400

# Monday, July 8

Coffee and tea are available in the Exhibit Hall on Monday and Tuesday 9:00am-11:00am and 2:00pm-4:00pm, and Wednesday 7:00am-9:30am.

## 101 Carbon Materials: Biochar-Hydrochar-Activated Carbons

Monday, July 8, 9:30am-12:00pm

Location: Boston University

Sponsored by: ASE

Moderators: Kaushlendra Singh, Oluwatosin Oginni, West Virginia University, Morgantown, WV

**9:35am** *Removal of Phosphate from Aqueous Effluents Using Nitrogen Doped Chars* • Presenting author: Sohrab Haghighi Mood, Washington State University, Pullman, WA (Sohrab Haghighi Mood, Michael Ayiania, Manuel Garcia-Perez) 1900928

**9:50am** *A Laboratory Study on a Biochar-Augmented Biosand Filtering System for Escherichia coli Removal from Lake Water* • Presenting author: Peining Guan, McGill University, Montreal, Quebec, Canada (Shiv Prasher, Muhammad Afzal, Saji George, Jennifer Ronholm) 1901384

**10:05am** *The Role of Soil Amendments on Nutrient and Water Use Efficiency of Green Pepper* • Presenting author: Joba Purkaystha, McGill University, Laval, Quebec Canada (Shive Prasher, Muhammad Afzal, Ramanbhai Patel, Christopher Nzediegwu, Ali Mawof) 1900858

**10:20am** *Adsorption of Hydrogen Sulfide on Biochars from Pallet Wood Waste* • Presenting author: Catherine E. Brewer, New Mexico State University, Las Cruces, NM (Luis Moreno Martin, Gustavo Hernandez, Zachary Montoya, Jacob Koranten-Amoako, Lucion Derry, Jonah Levine, Delia Valles-Rosales) 1900359

### **10:35am BREAK**

**10:45am** *Molten Salt Activation of Hydrochar Produced from the Digestate of Anaerobic Digestion for Synthesis of Porous Carbon* • Presenting author: Bo Zhang, North Carolina A&T State University, Summerfield, NC (Lijun Wang) 1900222

**11:00am** *Effect of Activating Agent Type and Impregnation Route on Properties of Activated Carbon Synthesized from Herbaceous Biomass* • Presenting author: Oluwatosin Oginni, West Virginia University, Morgantown, WV (Kaushlendra Singh, Louis McDonald, Gloria Oporto, Edward Sabolsky, Benjamin Dawson-Andoh) 1900609

**11:15am** *Characterization of Biochar from Different Feedstocks under Low and High Temperature* • Presenting author: Syed Rahman, North Dakota State University, Fargo, ND (Syed Rahman, Shafiqur Rahman) 1900457

**11:30am** *Evaluation of Agricultural Impacts and Carbon Sequestration on Application of Biochar Pellet as Slow Release Fertilizer in Rice Paddy* • Presenting author: JoungDu Shin, National Institute of Agricultural Sciences, JenJu Korea (SunIl Lee, EunJeong Choi, EunSuk Jang, SangWon Park, Changyoon Jeong) 1900043

**11:45am** *Effect of Pyrolysis on Oxygen Functional Groups of Hydrochars* • Presenting author: Nepu Saha, Ohio University, Athens, OH (Nepu Saha, Danhui Xin, Pei Chiu, M. Toufiq Reza) 1900902

## 102 Conservation Agriculture for Sustainable Intesification—INVITED

Monday, July 8, 9:30am-12:00pm

Location: Salon H

Sponsored by: E-2050

Moderator: Manuel Reyes, Kansas State University

**9:35am** *Testing the Oggun Tractor for Conservation Agriculture Production System in Cambodia* • Presenting author: Lyhour Hin, Sustainable Intesification Innovation Lab, Kansas State University (L. Hin, H. Clemmons, V. Leng, F. Tivet, S. Vuthy, M. Reyes) 1901939

**9:45am** *Design and Development of Conservation Agriculture Machine Prototype for Cambodian Farmers* • Presenting author: Saruth Chan, Ministry of Agriculture, Forestry, and Fisheries, Cambodia (Saruth Chan) 1901940

**10:00am** *Solar Drip Irrigation Project in Burkina Faso* • Presenting author: Ajit Srivastava, Michigan State University, East Lansing, MI (A. Srivastava, T. Harrigan) 1901941

**10:15am** *Testing the Maji Solar Pump and Irrigation Water Management in the Ethiopian Highlands* • Presenting author: Seifu Tillahun, Bahir Dar Institute of Technology, Bahir Dar University, Ethiopia (S. Tillahun, S.G. Gebeyehu) 1901942

### **10:30am BREAK**

**10:40am** *Identifying the Best Tools for Conservation Agriculture Commercial Vegetable Homegarden Production System* • Presenting author: Pao Srean, Faculty of Agronomy, University of Battambang, Cambodia (P. Srean, S. Lo, S. Rien) 1901943

**10:55am** *Assessing Early-Stage Agricultural Machinery Technologies For Gender Sensitivity—Experience Conducting Gender Technology Assessments in Cambodia, Bangladesh, Burkina Faso and Ethiopia* • Presenting author: Maria Jones, University of Illinois, Urbana, IL (Maria Jones) 1901985

**11:10am** *Overcoming the Valley of Death: Linking Research and the Private Sector* • Presenting author: Rajiv Pradhan, Swisscontact, Cambodia (Rajiv Pradhan) 1901944

**11:25am** *Conservation Agriculture with Drip Irrigation for Commercial Vegetable Homegardens Training Package* • Presenting author: Ruth McDaniel, Kansas State University, MasRiego Project, KS (M. Reyes, R. McDaniel, R. Walle, A. de Leon Ceto) 1901945

**11:40am** *Overview: Conservation Agriculture with Drip Irrigation for Commercial Vegetable Homegardens Training Package* • Presenting author: Antonio de Leon Ceto, Universidad Rafael Landivar, Guatemala City, KSU MasRiego Project, Universidad de San Carlos, Quetzaltenango, Guatemala (Ruth McDaniel, Antonio De Leon, Jorge Rodriguez, Robert Walle, Manuel Reyes) 1901946

# Monday, July 8

## **103 Educational Approaches for Facilitating Digital Agriculture—RAP**

Monday, July 8, 9:30am-12:00pm

Location: Salon J

Sponsored by: EOPD-203

Moderator: Luis Rodrigues, University of Illinois, Urbana, IL

**9:35am** *A Tale of Two Courses: Challenges and Opportunities for Bringing Data Science into the Biological and Agricultural Engineering Curriculum* • Presenting author: Natalie Nelson, North Carolina State University, Raleigh, NC (Natalie Nelson) 1901200

**9:50am** *Data Science Training for Biological Systems and Agriculture Engineering Majors: A Conceptual Framework* • Presenting author: Francisco Munoz-Arriola, Department of Biological Systems Engineering and School of Natural Resources, University of Nebraska-Lincoln, Lincoln, NE (Gabriel Lopez-Morteo, Francisco Munoz-Arriola) 1901650

**10:05am** *Evapotranspiration Analytics in Decision Support Tools for Groundwater Mapping in Irrigated Landscapes: An Undergraduate Research Experience in Hydroinformatics* • Presenting author: Allison Hauger, University of Nebraska—Lincoln, Lincoln, NE (Allison Hauger, Francisco Munoz-Arriola, Alessandro Amaranto, Jessica Johnson, Joel Cantu-Guerrero, Joanne Craven, Gerald Corzo, Dimitri Solomatine) 1901713

## **104 Thinking Outside the Furrows: Startup Companies are Changing the World—PANEL**

Monday, July 8, 9:30am-12:00pm

Location: MIT

Sponsored by: EOPD-416

Moderator: Tony Grift, University of Illinois, Urbana, IL

## **105 Current Achievements and New R&D Trends in Renewable Energy Resources and Technologies —INVITED**

Monday, July 8, 9:30am-12:00pm

Location: Harvard

Sponsored by: ES-210

Moderator: Sarah Wu, University of Idaho, Moscow, ID

**9:35am** *Advances in Biomass Power Generation Using Fluidized Bed Gasification Techniques: Update of Current State of the Art and Report of Challenges and Opportunities* • Presenting author: Sergio C. Capareda, Texas A&M University, College Station, TX (Sergio Capareda) 1901932

**9:55am** *Thermodynamic and Economic Analysis of Dead-Biomass Harvesting in Apalachicola National Forest Area* • Presenting author: Satyanarayan Dev, Florida A&M University, Tallahassee, FL (Satyanarayan R.S. Dev, Johnny Grace III, Ying Ouyang, Aavudai Anandhi) 1901550

**10:15am** *Using Agent-Based Modeling to Examine the Adoption of Bioenergy Crops in Agricultural Production Areas* • Presenting author: Damon S. Hartley, Idaho National Laboratory, Idaho Falls, ID (Damon S. Hartley, Ruby T. Tguyen, L. Michael Griffie, Yingqian Lin, Pralhad H. Burli) 1901704

**10:35am** BREAK

**10:45am** *Investigating the Obstacles of Biogas Productions and Applications in Iran* • Presenting author: Shirin Ghatrehsamani, University of Florida, Gainesville, FL (Shirin Ghatrehsamani, Behzad Sadeghi, Yiannis Ampatzidis) 1900873

**11:05am** *Potential of Wind Energy Development for Water Abstraction Systems in Developing Country Context: A Case of Teso Sub-region of Uganda* • Presenting author: Nicholas Kiggundu, Makerere University, Kampala Uganda (Kasozi James Tondo, Nicholas Kiggundu, Joshua Wanyama, Noble Banadda) 1900419

## **106 Production, Processing and Conversion of Algae**

Monday, July 8, 9:30am-12:00pm

Location: Brandeis

Sponsored by: ES-220; PRS-280; PRS-707

Moderator: Brendan Higgins, Auburn University, Auburn, AL

**9:35am** *Evaluation of Lipid Release from Chlamydomonas Reinhardtii Using a Biological-Based Biorefinery Model* • Presenting author: Lisa R. Wilken, Kansas State University, Manhattan, KS (Chelsea K. Dixon, Linah Alkotami, Timothy P. Durrett, Lisa R. Wilken) 1900185

**9:50am** *Analyzing the Microalgae-Wastewater Microbiome* • Presenting author: Matthew Paddock, University of California, Davis, CA (Matthew B Paddock, Jesus Dionisio Fernandez Bayo, Jean S VanderGhenyst) 1900230

**10:05am** *Co-Solvent Hydrothermal Liquefaction of Wastewater Algae* • Presenting author: Catherine E. Brewer, New Mexico State University, Las Cruces, NM (Zheng Cui, April Wright, Cesar A. Martinez Bejarano, Jacob Usrey, Nicolas Carrera-Little, Feng Cheng, Jacqueline Jarvis, Umakanta Jena) 1900360

**10:20am** *Anaerobic Digestion System for Algal Turf Scrubber Biomass: Energy Production with Nutrient uptake for Storm Water Management* • Presenting author: Stephanie Lansing, University of Maryland, College Park, MD (Freddy Witarsa, Andrea Yarberrry, Peter May, Patrick Kangas, Danielle Delp) 1901630

**10:35am** BREAK

**10:45am** *Use of Activated Sludge to Overcome Algal Inhibition during Growth on Anaerobic Digestate* • Presenting author: Qichen Wang, Auburn University, Auburn, AL (Brendan Higgins) 1900650

**11:00am** *Drying of Microalgae with Infrared Radiation* • Presenting author: Kary Jiayong Liang, UC Davis, Davis, CA (Kary Jiayong Liang, Hamed Elmashad, Tyler Barzee, Chang Chen, Zhongli Pan, Ruihong Zhang) 1901807

**11:15am** *Renewable Diesel and Bioprivileged Chemicals Distilled from Algal Biocrude Oil Converted via Hydrothermal Liquefaction* • Presenting author: Wan-Ting (Grace) Chen, University of Massachusetts Lowell, Lowell, MA (Wan-Ting Chen, Zhenwei Wu, Yuanhui Zhang, Buchun Si) 1901223

**11:30am** *Synergistic Integration of Gas Separation and Algal Cultivation to Capture CO<sub>2</sub> in Air* • Presenting author: Wei Liao, Michigan State University, East Lansing, MI (Yurui Zheng, Douglas Clements, Shiwang Cheng, Yan (Susie) Liu, Wei Liao) 1901634

# Monday, July 8

**11:45am** *Comparison of Protein Extraction and Recovery from Chlamydomonas reinhardtii Lysates after Mechanical or Enzymatic Disruption* • Presenting author: Berkley White, Kansas State University, Manhattan, KS (Berkley P. White, Chelsea K. Dixon, Lisa R. Wilken) 1900874

## **107 Value-Added Chemicals and Products and Lignin Valorization**

Monday, July 8, 9:30am-12:00pm

Location: Northeastern

Sponsored by: ES-220

Moderator: Sushil Adhikari, Auburn University, Auburn, AL

**9:35am** *Valorization of Rendering Animal Proteins to Value-Added Astaxanthin-rich Animal Feed* • Presenting author: Sang Li, Kansas State University, Manhattan, KS (Sang Li, David Ladner, Yi Zheng) 1900398

**9:50am** *Metal Doped Active CaO Catalyst from Waste Eggshells for Micro Algal Biofuel Production* • Presenting author: Nurhan Dunford, Oklahoma State University, Stillwater, OK (Valentina Das, Dhanapati Deka, Nurhan Turgut Dunford, Abhishek Mani Tripathi) 1901381

**10:05am** *Maleic Acid and AlCl<sub>3</sub>-Catalyzed Production of 5-Hydroxymethylfurfural from Glucose* • Presenting author: Jonathan C. Overton, Purdue University, Indianapolis, IN (Nathan Mosier) 1900183

**10:20am** *Co-Products and Biofuels from Guar and Guayule Processing Residues* • Presenting author: Catherine E. Brewer, New Mexico State University, Las Cruces, NM (Meshack Audu, Mostafa Dehghanizadeh, Feng Cheng, Hengameh Bayat, Omar Holguin, Umakanta Jena) 1900361

**10:35am** BREAK

**10:45am** *Synthesis of Hydrochars from Swine Manure* • Presenting author: Praveen Kolar, North Carolina State University, Raleigh, NC (Praveen Kolar, Zac Lentz, John Classen) 1901102

**11:00am** *Production of Char as a Byproduct from Cardboard Waste Treatment* • Presenting author: Sebastian Fricke, McGill University, Montreal, Quebec, Canada (Shiv Prasher) 1901597

**11:15am** *Production of 2,3-Butanediol from Food Waste Using Bacillus licheniformis YNP5-TSU from Yellowstone National Park* • Presenting author: Haibo Huang, Virginia Tech, Blacksburg, VA (Dajun Yu, Nicholas Poe, Joshua O'hair, Suping Zhou, Haibo Huang) 1901814

**11:30am** *Understanding Co-Pyrolysis of Lignin with Silicon Nanoparticles* • Presenting author: Wenqi Li, University of Kentucky, Lexington, KY (Wenqi Li, Yang-Tse Cheng, Jian Shi) 1900775

**11:45am** *Co-Pyrolysis of Lignin and Plastics Using Red Clay as Catalyst in a Micro-Pyrolyzer* • Presenting author: Vivek Patil, Auburn University, Auburn, AL (Sushil Adhikari, Phillip Cross) 1900575

**12:15pm** *Antimicrobial Properties of Lignin Derivatives from Thermochemical Depolymerization* • Presenting author: Ryan Kalinoski, University of Kentucky, Lexington, KY (Ryan Kalinoski, Jian Shi) 1900854

## **108 Safety Considerations in Agriculture**

Monday, July 8, 9:30am-12:00pm

Location: Tufts

Sponsored by: ESH-04; ESH-04/1

Moderator: Gretchen Mosher, Iowa State University, Ames, IA

**9:35am** *Agricultural All-Terrain Vehicle Safety* • Presenting author: Farzaneh Khorsandi, Department of Biological and Agricultural Engineering, University of California, Davis, CA (Farzaneh Khorsandi, Paul Ayers, Gerene Denning, Charles Jennissen, Dee Jepsen, Melvin Myers, Stephen Oesch, Michael Pate, David White, Aaron Yoder) 1901429

**9:50am** *Agricultural Work-Related Fatalities to Non-Working Youth: What Can We Learn?* • Presenting author: Michael Pate, Penn State University, University Park, PA (Serap Gorucu) 1900034

**10:05am** *Measurement of Static Lateral Stability Angle and Roll Moment of Inertia for Agricultural Tractor with Attached Implement* • Presenting author: Van Nang Nguyen, Institute of Agricultural Machinery, Naro, Japan (Van Nang Nguyen, Yasuhiro Harada, Hiroki Takimoto, Kota Shimomoto) 1900312

**10:20am** *Development of Dynamic Mechanism for the Prevention of Tractor Rollover by Employing Active Steering* • Presenting author: Zhen Li, Beijing, China (Zhen Li, Jiahao Qin, Zhongxiang Zhu, Yuefeng Du, Zhenghe Song, Enrong Mao) 1900654

**10:35am** BREAK

**10:45am** *Improving Safety and Health in the Cattle Feedyard Industry—Current Status* • Presenting author: Aaron M. Yoder, PhD, University of Nebraska, Omaha, NE (Aaron M. Yoder, Daniel Kent) 1901498

**11:00am** *Use of Mixed Methods to Identify Worker Safety Hazards on Midwest Agribusiness Construction Sites* • Presenting author: Gretchen Mosher, Iowa State University, Ames, IA (Nurhaizan Mohd Zainudin) 0

**11:15am** *Investigation on the Influence of Different Rear Tracks on the Lateral Stability of Tractor Employing Model Test* • Presenting author: Zhen Li, Beijing, China (Zhen Li, Jiahao Qin, Zhongxiang Zhu, Yuefeng Du, Zhenghe Song, Enrong Mao) 1900655

**11:30am** *Evaluation of the Crush Protection Zone of Three Crush Protection Devices* • Presenting author: Farzaneh Khorsandi, Department of Biological and Agricultural Engineering, University of California, Davis, CA (Farzaneh Khorsandi, Paul Ayers, Eric Fong) 1901457

## **109 Big Data and Data Analysis for Agricultural Applications**

Monday, July 8, 9:30am-12:00pm

Location: Tremont

Sponsored by: ITSC-254

Moderator: Mario R. Mondaca, University of Wisconsin, Madison, WI

**9:35am** *Precision Livestock Farming Big Data for Computer Vision and Machine Learning Applications: PLFBD* • Presenting author: Hugo Milan, Cornell University, Ithaca, NY (Michael T. Gorczyca,

# Monday, July 8

Kristen M. Perano, Gustavo A. B. Moura, Patric A. Castro, Bharath Hariharan, Alex S. C. Maia, Kifle G. Gebremedhin) 1901517

**9:50am** *Supervision and Big Data Application of Agricultural Chemical Inputs Used by Small-Scale Farmers in the Hilly and Mountainous Areas* • Presenting author: Jiayi Huang, Guangdong Institute of Modern Agricultural Equipment, Guangzhou, Guangdong, China (Jiayi Huang, Dachun Feng, Ming Pan, Qiubo Xie) 1900705

**10:05am** *Combine Harvester Unloading Event Inference Using GPS Data* • Presenting author: Yang Wang, Purdue University, West Lafayette, IN (Yaguang Zhang, Dennis Buckmaster, James Krogmeier) 1901286

**10:20am** *Understanding and Incorporating Stakeholder Perspectives in International Engineering: A Phrase Mining and Qualitative Comparative Analysis* • Presenting author: Kelsey Schreiber, University of Illinois-Urbana, Barrington, IL (Kelsey Schreiber, Luis Rodríguez, Ann-Perry Witmer, Brian Dill) 1901425

## **10:35am BREAK**

**10:45am** *Multi-Source Data Analysis in Pear Cold Chain Logistics* • Presenting author: Jingjing Liu, Shihezi University, Shihezi, Xinjiang, China (Jingjing Liu, Zhigang Li, Xu Zhang, Xiaoshuan Zhang) 1900549

**11:00am** *Developing Weather Index-Based Crop Insurance for Small Growers in Paraguay* • Presenting author: Clyde Fraisse, University of Florida, Gainesville, FL (Eduardo Gelcer, Mauricio Karrei, Vinicius Cerbaro, Daniel Perondi) 1900250

**11:15am** *A Cloud-Service Enabled Decision Support Platform for Regional Wheat Harvesting Management* • Presenting author: Tao Lin, Zhejiang University, Hangzhou, Zhejiang, China (Zhixian Lin, Yuqi Jiang, Junda Zhan, Jindi Zeng, Zhenhong Du, Tao Lin) 1901138

**11:30am** *Deep Learning Based Corn Yield Estimation: A Flexible Data-Driven Approach* • Presenting author: Renhai Zhong, Zhejiang University, Hangzhou, Zhejiang, China (Renhai Zhong, Hao Jiang, Jinfan Xu, Tao Lin) 1900702

**11:45am** *Prediction of NO<sub>3</sub>, K, Ca, and Mg Ions in Hydroponic Solutions Using Neural Network Model with an Array of Ion-Selective Electrodes* • Presenting author: Woo-Jae Cho, Seoul National University, Gwanak-gu, Seoul, South Korea (Woo-Jae Cho, Hak-Jin Kim, Dae Hyun Jung, Hee-Jo Han, Young-Yeol Cho) 1901039

**12:00pm** *Detection of Concrete Crack Using Deep Learning and Transfer Learning Technique* • Presenting author: Sangik Lee, Seoul National University, Seoul, South Korea (Sangik Lee, Kyungmo Yang, Jonghyuk Lee, Jungu Lee, Won Choi) 1901042

**12:15pm** *Interpretable Modeling for Yield Trends of Corn and Soybean in the Midwest* • Presenting author: Somali Chaterji, Purdue Univ, W Lafayette, IN (Rakesh Kumar, Dennis Buckmaster, Somali Chaterji) 1900329

## **110 Computational Fluid Dynamics (CFD) Applications in Agriculture**

Monday, July 8, 9:30am-12:00pm

Location: Vineyard

Sponsored by: ITSC-217; PAFS-40; ITSC-254

Moderator: Christopher Choi, University of Wisconsin-Madison, Madison, WI

**9:35am** *Numerical Evaluation of the Indoor Hygrothermal Condition for the Novel Six-Storey Barn* • Presenting author: Xiaoshuai Wang, Zhejiang University, Hangzhou, China (Xiaoshuai Wang, Chao Qin, Jiegang Wu, Ailun Wang, Kaiying Wang) 1901868

**9:50am** *CFD Prediction of Heat Transfer in Heated or Cooled Concrete Floor in Laying Areas for Pig* • Presenting author: Bjarne Bjerg, University of Copenhagen, Denmark (Bjarne Bjerg, Peter Kai) 1900735

**10:05am** *Fast Gas-Solid Flow Simulation for Control of the Pneumatic Conveying System on Air Seeders* • Presenting author: Jason Cousins, University of Saskatchewan, Saskatoon, SK, Canada (Scott Noble) 1901667

**10:20am** *Effects of Baffles on Airflow Patterns, Heat and Mass Transfer in Mechanically Ventilated Dairy Housing Using Computational Fluid Dynamics* • Presenting author: Seunghyeon Jung, University of Wisconsin-Madison, Madison, WI (Seunghyeon Jung, Xiaoshuai Wang, Mario Mondaca, Wey Ling Ong, Christopher Choi) 1901846

## **10:35am BREAK**

**10:45am** *A Large-Scale Computational Fluid Dynamic Evaluation of Tunnel Ventilation Design and Its Effect on the Cow Level Microenvironment* • Presenting author: Wey Ling Ong, University of Wisconsin-Madison, Madison, WI (Mario Mondaca, Christopher Choi, Wey Liang Ong, Nigel Cook) 1901479

**11:00am** *Predicting Dust Cloud Concentration Using CFD-DPM Modeling Approach* • Presenting author: Yumeng Zhao, Purdue University, West Lafayette, IN (Kingsly Ambrose) 1900426

**11:15am** *The Study of Stirring Influence Factors on Pteris Vittata L. Spore Solution for Sowing Operation Based on CFD* • Presenting author: Kang Wu, Zhejiang University, Hangzhou City, Zhejiang Province, China (Kang Wu, Jianping Li, Junyang Chen, Songming Zhu) 1900273

**11:30am** *Assessment of Mesh Types for Modelling Pigs in CFD Simulations* • Presenting author: Mengbing Cao, China Agricultural University, Beijing, China (Mengbing Cao, Guanghui Teng, Yanrong Zhuang, Zhenyu Zhou, Kang Zhou, Chao Zong) 1900671

**11:45am** *Evaluation of Heat Transfer Inside the Phloem of a Tree during Heat Treatment of HLB-Infected Citrus Tree by CFD* • Presenting author: Shirin Ghatrehsamani, University of Florida, Gainesville, FL (Shirin Ghatrehsamani, Yiannis Ampatzidis) 1900801

**NO-SHOW** *Surround Climate Conditions Analysis Using CFD in a Siae waii Green* • Presenting author: Jorge Flores Velazquez, 725, Progreso, Jiutepec Mexico (Fernando Rojano Aguilar, Ernesto Cruz Rodriguez) 1900220

# Monday, July 8

## **111 Discrete Element Modelling (DEM) Applications in Agriculture**

Monday, July 8, 9:30am-12:00pm

Location: Clarendon

Sponsored by: ITSC-217; MS-45

Moderator: John Fielke, University of South Australia,  
Mawson Lakes, Australia

**9:35am** *Improving the Determination of Discrete Element Method (DEM) Parameters for Agricultural Soils* • Presenting author: John Fielke, University of South Australia, Mawson Lakes, Australia (Mustafa Ucgul, Chris Saunders, John Fielke) 1900988

**NO-SHOW** *Soil Compaction under Cattle Hoof Using Discrete Element Modelling (DEM)* • Presenting author: Mohammad Sadek, Cal Poly State University, San Luis Obispo, CA (Mohammad Sadek) 1901160

**10:05am** *Determination of the Physical Properties of Corn and Wheat Kernels for DEM Simulations* • Presenting author: Zhengpu Chen, Purdue University, West Lafayette, IN (Zhengpu Chen, Kingsly Ambrose, Eric Veikle, Carl Wassgren) 1901323

**10:20am** *Calculation of Load Profiles on a Cultivator Tine Using the Discrete Elements Method* • Presenting author: Johannes Bührke, Braunschweig, Niedersachsen, Germany (Florian Schramm, Ludger Frerichs) 1900512

**10:35am BREAK**

**10:45am** *Wear Simulation of Tillage Tools with the Discrete Element Method* • Presenting author: Florian Schramm, Institute of Mobile Machines and Commercial Vehicles, Technische Universität Braunschweig, Braunschweig, Germany (Johannes Bührke, Ludger Frerichs) 1900413

**11:00am** *A Method for Finding the Critical Time Step of the Damped Flexible Fiber DEM Model* • Presenting author: Matthew Schramm, Iowa State University, Ames, IA (Mehari Tekeste, Carol Plouffe, Donald Harby) 1901676

**11:15am** *Modeling the Residue Incorporation Capability of Various Tillage Tools Using Discrete Element Method* • Presenting author: Bob Zhiwei Zeng, University of Manitoba, Winnipeg, Manitoba Canada (Zhiwei Zeng, Ying Chen, Long Qi) 1901358

**11:30am** *Corn-Steel Interaction Force Prediction Accuracy of Discrete Element Method in Paddle Elevator Conveyor* • Presenting author: Mehari Tekeste, Iowa State University, Ames, IA (Mohammad Mousaviraad, Mehari Tekeste, Matthew Darr) 1901669

**11:45am** *ROCKY DEM- CFD Simulation for Realistic Granular Flow in an Aerodynamic Separating Device* • Presenting author: Mahmoud A. Elemam, Research Center of Fluid Machinery Engineering and Technology, Jiangsu university, Jiangsu, China (Mahmoud Ahmed El-Emam, Shi Wei Dong, ling Zhou, Chen Han) 1900387

**12:00pm** *Discrete Element Simulations and Experiments of Soil Disturbance Behaviours as Affected by the Upward Angle of Subsoiler's Wing* • Presenting author: Xuezhen Wang, Northwest A&F University, Yangling, Shaanxi, China (Xuezhen Wang, Ruixiang Zhu, Yuxiang Huang) 1900390

**12:15pm** *DEM Modeling of Corn Silage Harvester Feeding Behavior* • Presenting author: Fan Chengxiao, Shi Hezi University, Shi Hezi, Xinjiang, China (Fan Chengxiao, Li Zhigang, Liu Yangchun, Dong Xin, Wang Meng, Wang Fengzhu) 1900944

## **112 Imaging Technologies for High Throughput Phenotyping Part I**

Monday, July 8, 9:30am-12:00pm

Location: Berkeley

Sponsored by: ITSC-312; MS-48; ITSC-348

Moderator: Haiyan Cen, Zhejiang University, Hangzhou,  
Zhejiang China

**9:35am** *Deep-Learning Feature Extraction Method for Hyperspectral Image Analysis of Nitrogen in Oilseed Rape (Brassica napus L.) Leaves* • Presenting author: Yueming Zhu, Zhejiang University, Hangzhou China (Yueming Zhu, Haiyan Cen, Ahmed Islam El-Manawy, Haiyong Weng, Yong He) 1900541

**9:50am** *UAV-Based High Throughput Phenotyping in Specialty Crops Utilizing Artificial Intelligence* • Presenting author: Yiannis Ampatzidis, University of Florida, Immokalee, FL (Yiannis Ampatzidis, Victor Partel) 1900293

**10:05am** *High-Throughput Image Analysis Framework for Fruit Detection, Localization and Measurement from Video Streams* • Presenting author: Yi-Hsuan Huang, National Taiwan University, Taipei, Taiwan (Ta-Te Lin) 1900487

**10:20am** *Development of a Quick-Install Rapid Phenotyping System* • Presenting author: Roberto Buelvas, McGill University, Montreal, Quebec Canada (Viacheslav Adamchuk) 1900130

**10:35am BREAK**

**10:45am** *Early Prediction of Soybean Traits through Color and Texture Features of Canopy RGB Imagery* • Presenting author: Wenan Yuan, University of Nebraska-Lincoln, Lincoln, NE (Wenan Yuan, Nuwan Kumara Wijewardane, Yufeng Ge) 1900980

**11:00am** *Vegetation Indices Comparison with Green Chromatic Coordinates from Phenocam Images* • Presenting author: Sunoj Shajahan, North Dakota State University, Bismarck, ND (Sunoj Shajahan, Igathinathane Cannayen, John Hendrickson) 1901261

**11:15am** *Evaluation of Cotton Stand Count Using UAV-Based Hyperspectral Imagery* • Presenting author: Aijing Feng, Division of Food Systems and Bioengineering, University of Missouri, Columbia, MO (Aijing Feng, Kenneth Sudduth, Earl Vories, Jianfeng Zhou) 1900807

**11:30am** *Selecting Informative Spectral Bands Using Machine Learning Techniques to Detect Fusarium Head Blight in Wheat* • Presenting author: Ali Moghimi, Department of Bioproducts and Biosystems Engineering, University of Minnesota, St. Paul, MN (Ali Moghimi, Ce Yang, James A. Anderson, Susan K. Reynolds) 1900815

**11:45am** *Detecting Early Signatures of Sorghum and Xanthomonas Holcicola Interaction Using Hyperspectral Imaging* • Presenting author: Sanaz Jarolmasjed, Danforth Plant Science Center, Saint Louis, MO (Sanaz Jarolmasjed, Qi Wang, Noah Falgren, Rebecca Bart, Malia Gehan) 1901190

# Monday, July 8

**12:00pm** *Is it Possible to Estimate Photosynthesis Capacity and Evapotranspiration Rate for Plant Breeding?* • Presenting author: Yufeng Ge, University of Nebraska, Lincoln, NE (Geng Bai, Yufeng Ge, Bryan Levitt, Yi Qi, Gamon John, James Schnable, Xin Qiao, Weizhen Hou, Tala Awada) 1901114

## **113 Machine Vision Applications in Vegetables and Fruits**

Monday, July 8, 9:30am-12:00pm

Location: Arlington

Sponsored by: ITSC-312

Moderator: Shih-Fang Chen, National Taiwan University, Taipei, Taiwan China

**9:35am** *Identifying and Localizing the Disease Spots of Late Blight on Tomato Leaves Using Deep Convolutional Neural Networks* • Presenting author: Hsueh-Hung Cheng, National Taiwan University, Taipei, Taiwan (Yan-Ling Ke, Chu-Ping Lin, Jin-Hsing Huang, Yan-Fu Kuo) 1900445

**9:50am** *Monitoring Growth Rate of Lettuce Using Deep Convolutional Neural Networks* • Presenting author: Jie-Yan Lu, National Taiwan University, Taipei, Taiwan (Chung-Liang Chang, Yan-Fu Kuo) 1900341

**NO-SHOW** *Machine Learning for Classification of Thin-Shell Walnut Cultivars Based on Imaging* • Presenting author: Zhiqiang Zhai, Shihezi University, Shihezi, Xinjiang, China (Zhiqiang Zhai, Kunlin Zou, Ruoyu Zhang) 1901049

**10:20am** *Application of Data Augmentation and Migration Learning in Identification of Diseases and Pests in Tea Trees* • Presenting author: Jiayi Huang, Guangdong Institute of Modern Agricultural Equipment, Guangzhou, Guangdong, China (Jiayi Huang, Mengxi Zeng, Weixia Li, Xiangbao Meng) 1900919

## **10:35am BREAK**

**10:45am** *Design of On-line Detection Device for Grain Breakage of Corn Harvester Based on OpenCV* • Presenting author: Xiaolong Zhu, China Agricultural University, Haidian, Beijing, China (Xiaolong Zhu, Yuefeng Du, Ruijuan Chi, Xiaojie Deng, Zhang Zhen) 1900704

**11:00am** *Vision Intelligence Guided Strawberry Decalycing Machine—Automatic Vision-Guided Intelligent Decalycing Network (AVIDnet)* • Presenting author: Dongyi Wang, University of Maryland, College Park, MD (Dongyi Wang, Robert Vinson, Maxwell Holmes, Gary Seibel, Xuemei Cheng, Yang Tao) 1901905

**11:15am** *Deep Convolutional Neural Networks for Fruit Tree Classification and Spatial Analysis Using Aerial Imagery* • Presenting author: Yu-Fang Hsieh, National Taiwan University, Taipei, Taiwan (Yu-Fang Hsieh, Po-Ting Liu, Pao-Chang Lin, Cheng-Ying Chou) 1901110

**11:30am** *Exploring the Potential of Machine Learning/Vision to Map Subfield Crop Yield Variability in Agricultural Production Systems Using Remote Sensing Data* • Presenting author: L. Michael Griffel, Idaho National Laboratory, Idaho Falls, ID (L. Michael Griffel, Damon S. Hartley, Jessica A. G. Oldemeyer) 1901821

**11:45am** *Temporal Leaf Tracking of Maize Plants Using a Convolutional Neural Network* • Presenting author: Yin Bao, Iowa

State University, Ames, IA (Yin Bao, Lie Tang, Stephen Howell, Steven Whitham) 1901361

**NO-SHOW** *Vision of Multiple Convolutional Features for Apple Contour Detection* • Presenting author: Dandan Wang, Yangling, China (Wang Dandan, Liu Chang, Xiong Hongting, He Dongjian) 1900371

**12:15pm** *Improved Machine Vision System for Robotic Harvesting in Apple Orchards* • Presenting author: Santosh Bhusal, Washington State University, Prosser, WA (Santosh Bhusal, Uddhav Bhattarai, Manoj Karkee, Qin Zhang) 1901046

**12:30pm** *Optimizing Parameters for Image Processing Techniques Using Machine Learning to Detect Powdery Mildew in Strawberry Leaves* • Presenting author: Jaemyung Shin, Dalhousie University, Truro, NS, Canada (Jaemyung Shin, Young K. Chang, Tri Nguyen-Quang, Brandon Heung, Prabakar Ravichandran) 1901347

## **114 Machine Vision for Precision Agriculture and Robotics**

Monday, July 8, 9:30am-12:00pm

Location: Provincetown

Sponsored by: ITSC-312; MS-54

Moderator: Daeun Choi, Penn State University, University Park, PA

**9:35am** *Developing a High Precision Cotton Boll Counting System Using Active Sensing* • Presenting author: Tsunghan Han, Unuversity of Georgia, Athens, GA (Changying Li) 1901343

**9:50am** *Synthetic Images for Weed and Crop Segmentation Based on Deep Learning* • Presenting author: Junfeng Gao, Ghent University, Ghent, East Flanders, Belgium (Junfeng Gao, Michael Pound, Andrew French, Yong He, Tony Pridmore, Jan Pieters) 1900261

**10:05am** *Development of a Multi-Angle Imaging System for Automatic Strawberry Flower Counting* • Presenting author: Hao Gan, University of Florida, Gainesville, FL (Won Suk Lee, Natalia Peres, Clyde Fraisse) 1900325

**10:20am** *Precision Weed Control Robot for Vegetable Fields with High Crop and Weed Densities* • Presenting author: Rekha Raja, University of California Davis, Davis, CA (Rekha Raja, David Slaughter, Steven Fennimore, Mark Siemens) 1900030

## **10:35am BREAK**

**10:45am** *Computer Vision Technology for Identification of Snap Bean Crops Using Systemic Rhodamine B* • Presenting author: Wen-Hao Su, University of California-Davis, Davis, CA (Steven Fennimore, David Slaughter) 1900075

**11:00am** *Improved Kiwifruit Detection Using VGG16 with RGB and NIR Information Fusion* • Presenting author: Zhihao Liu, Northwest A&F University, Xian, China (Zhihao Liu, Yali Feng, Rui Li, Shuang Zhang, Lihui Zhang, Gongpei Cui, Ahmad Al-Mallahi, Longsheng Fu, Yongjie Cui) 1901260

**11:15am** *Understanding Spatial and Temporal Variability in Water Status Indicators in Vineyards* • Presenting author: Sushma Thapa, Washington State University, Prosser, WA (Sushma Thapa, Chenchen Kang, Manoj Karkee, Markus Keller, Qin Zhang) 1900896

**11:30am** *A Vision-Based Navigation Method of Rice Transplanter Based on Monocular Camera* • Presenting author:

# Monday, July 8

Hai Chen, Zhejiang University, Hangzhou, Zhejiang, China (Hai Chen, Yufei Liu, Huangping Lu, Xiaoli Li, Hui Fang) 1900344

**11:45am** *Development of a Carrot Yield Monitoring System Using Machine Vision* • Presenting author: Viacheslav I. Adamchuk, McGill University, Ste-Anne-de-Bellevue, QC, Canada (Jaesung Park, Amanda A. Boatswain Jacques, Viacheslav I. Adamchuk, Maxime Leclerc, Guillaume Cloutier) 1901167

**12:00pm** *Tree Trunk Position Estimation for Accurate Fruit Counts in Apple Yield Mapping* • Presenting author: Thomas Jarvinen, Pennsylvania State University, State College, PA (Daeun Choi, Paul Heinemann, James Schupp, Tara Baugher) 1900918

**12:15pm** *Visible-Infrared Imaging and Microclimate Sensing Derived Fruit Physiology Mapping for Rain Induced Sweet Cherry Cracking Management* • Presenting author: Rakesh Ranjan, Washington State University, Prosser, WA (Rakesh Ranjan, Rajeev Sinha, Guobin Shi, Matthew Whiting, Lav R Khot) 1901262

**12:30pm** *Development and Evaluation of an Automated Apple Tree Pruning System* • Presenting author: Hassan Seyyedhasani, Washington State University, Prosser, WA (Hasan Seyyedhasani, Uddhav Bhattarai, Manoj Karkee, Joe Davidson, Abhisesh Silwal) 1901642

## **115 MS—Machinery Systems POSTER SESSION**

Monday, July 8, 9:30am-12:00pm.

Posters will be displayed for the entire session, but authors will be present at posters as follows:

9:30am-10:45am, authors with ODD numbered posters present

10:45am-12:00pm, authors with EVEN numbered posters present

Location: Gloucester

Sponsored by: MS-48; MS-54; ITSC-318

Moderator: Long He, Penn State University, University Park, PA

**1** *Design of Faba Bean Sowing Machine in Winter Fallow Field* • Presenting author: Cui Tao, China Agricultural University, Beijing China (Ruimei Yang, Tao Cui, Dongxing Zhang, Yitong Du, Hailiang Wu, Huihui Zhao) 1900737

**2** *Discrete Element Method (DEM) for Simulating Draft and Soil Movement with a Winged Narrow Point Opener in Vertisols* • Presenting author: Diogenes Antille, CSIRO Agriculture and Food, Canberra, Australian Capital Territory, Australia (Kojo Atta Aikins, James B. Barr, Troy A. Jensen, Diogenes L. Antille) 1900038

**3** *Potential Utilization of Low Ground Pressure Tire Technology in Cotton Harvesting Equipment* • Presenting author: Diogenes Antille, CSIRO Agriculture and Food, Canberra, Australian Capital Territory, Australia (Diogenes Antille) 1900039

**4** *Method of Control of Precision Seeding of Corns* • Presenting author: Honghao Liu, College of Engineering, China Agricultural University, Beijing China (Gang Wu, Kangyu Gao, Haotun Lyu, Yu Tan, Shixiong Li, Honghao Liu) 1900938

**5** *Control System of Precision Fertilization of Corns* • Presenting author: Honghao Liu, College of Engineering, China

Agricultural University, Beijing China (Gang Wu, Lubo Zhang, Honghao Liu, Yongjun Zheng, Hengtao Ma, Liu Yang) 1901052

**6** *Effect of Conservation and Conventional Tillage in Physical Properties of a Clay Loam Soil under Beans (*Phaseolus vulgaris*) in a Semiarid Area of Mexico* • Presenting author: Martin Cadena-Zapata, University Antonio Narro, Saltillo, Coahuila, Mexico (Karen D. Ordoñez-Morales, Martin Cadena-Zapata, Santos G. Campos-Magaña, Alejandro Zermeño-Gonzalez) 1901801

**7** *Soil Machine Dynamics Research at Iowa State University: Soil-Bin Mobility Test* • Presenting author: Mehari Tekeste, Iowa State University, Ames, IA (Mehari Tekeste, Austin Hamm, Brian Steward, Stuart Birrell, Steven Mickelson, Matthew Schramm) 1901889

**8** *Corn Grain Yield as Influenced by Downforce and Ground Speed of Row-Crop Planters* • Presenting author: Sylvester Badua, Kansas State University, Manhattan, KS (Sylvester Badua, Chinthaka Weerasekara Mudiyansele, Ajay Sharda) 1900885

**9** *Adaptive Test of Precision Sowing of Mung Bean* • Presenting author: Tao Cui, Chian Agricultural University, Beijing, China (Yanan Wei, Tao Cui, Yitong Du) 1900527

**10** *Study on the Effect of Gravity Center Position for Maize Seed on the Performance of Metering Device* • Presenting author: Tao Cui, China Agricultural University, Beijing, China (Hailiang Wu, Tao Cui, Chenlong Fan, Huihui Zhao, Ruimei Yang, Yitong Du) 1900731

**11** *Design and Experiment of Inertia Rocker Impact Compaction Device* • Presenting author: Xiangqian Dong, China Agricultural University, Beijing, China (Chao Zhang, Yapeng Sun, Xiangqian Dong, Jiannong Song, Jicheng Wang, Yang Yu, Chao Wang, Guanghao Xu) 1900262

**12** *Vibration Analysis of Mini-Tiller and Vibration Reduction Design of the Armrest* • Presenting author: Yin Yiyong, China Agricultural University, Beijing China (Yin Yiyong, Xiang Hang, Bai Hanqin) 1900376

**NO-SHOW** *iring Accuracy of Impact Plate and Optical Yield Monitoring Systems When Operating on Varying Terrain* • Presenting author: Ajay Sharda, Kansas State University, Manhattan, KS (Lukas Koch, Ajay Sharda, Ignacio Ciampitti, Donghai Wang) 1901806

**14** *A Low Cost Autonomous Robot for Scouting, Estimating and Picking the Premature Almond Fall (Windfall)* • Presenting author: Akram Gholami, University of California, Merced, CA (Taymaz Homayouni, Arash Toudeshki, YangQuan Chen, Reza Ehsani) 1901004

**15** *Scaling up of BAU-STR Paddy Dryer in Bangladesh and Beyond* • Presenting author: Chayan Kumer Shaha, Bangladesh Agricultural University, Mymensingh, Mymensingh Bangladesh (Md. Monjurul Alam) 1900571

**16** *Ground Autonomous Vehicle Slope Testing for Sloped Crop Field Work* • Presenting author: Chetan Badgular, Kansas State University, Manhattan, KS (Chetan Badgular, Daniel Flippo) 1900849

**17** *Small Autonomous Vehicle Battery and Receptacle System* • Presenting author: Daniel Flippo, Kansas State University, Manhattan, KS (Ajay Sharda, Ed Brokesh) 1900300

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**NO-SHOW** *Monitoring method and Test of Wheat Harvester Loss Rate Based on PVDF Sensor* • Presenting author: Duanyang Geng, Shandong University of Technology, Zibo, Shandong China (Delei Tan, Duanyang Geng, Qian Wang, Xingrui Yu, Yangcheng Liu, Guoliang Su) 1900939

**NO-SHOW** *Dynamic Analysis and Parameter Optimization of Corn Ear-Picking by Vibration* • Presenting author: Duanyang Geng, Shandong University of Technology, Zibo, Shandong China (Qian Wang, Duanyang Geng, Delei Tan, Xingrui Yu, Yangcheng Liu, Guoliang Su) 1900755

**20** *Improvement of Dynamic Stiffness for Vibration Reduction of Electric Off-Road Vehicle Gearbox Housing* • Presenting author: Gwan-Hee Son, Seoul National University, Seoul, Republic of Korea (Seung-Je Cho, Hyun-Woo Han, Ji-Tae Kim, Young-Jun Park) 1900720

**21** *A Study on Reduction of Ride Vibration of Cabin Suspension System in Agricultural Tractor* • Presenting author: Gwan-Hee Son, Seoul National University, Seoul, Republic of Korea (Woo-Jin Chung, Gwan-Hee Son, Hyun-Woo Han, Young-Jun Park) 1900993

**22** *Finite Element Modeling of the Baling Process of Alfalfa in a Round Baler* • Presenting author: Jiajia Fang, Purdue University, West Lafayette, IN (Jiajia Fang, Yong Zhang, Kingsly Ambrose) 1900956

**23** *Optimum Cleaning Brush Parameters for Effective Debris Removal on Commercial Mechanical Wild Blueberry Harvesters* • Presenting author: Karen Esau, Dalhousie University, Truro, Nova Scotia, Canada (Karen Esau, Qamar Zaman, Aitazaz Farooque, Arnold Schumann) 1900452

**24** *Losses of Paddy in Harvesting Practices in Bangladesh* • Presenting author: Md Monjurul Alam, Bangladesh Agricultural University, Mymensingh, Bangladesh (Md. Rostom Ali, Md. Kamrul Hasan, Chayan Kumer Saha, Md. Monjurul Alam) 1900727

**25** *Determination of Seed Rate for Mechanical Transplanting of Hybrid Paddy Variety in Bangladesh* • Presenting author: Md Monjurul Alam, Bangladesh Agricultural University, Mymensingh, Bangladesh (Md. Mosharraf Hossain, Surajit Sarkar, Md. Samiul Basir, Chayan Kumer Saha, Md. Monjurul Alam, Prasanta Kumar Kalita, Alan C. Hansen) 1901177

**26** *A Rapid Design Method for Agricultural Machinery Components* • Presenting author: Min Zhou, China Agricultural University, Beijing, China (Shurong Zhuo, Jian Jianming, Shulin Hou, Min Zhou) 1900133

**NO-SHOW** *Optimal Spraying System for Targeted Applications of Agrochemicals in Potato Cropping System* • Presenting author: Nazar Hussain, University of Prince Edward Island, Charlottetown PEI Canada (Aitazaz Farooque, Arnold Schumann, Qamar Zaman, Bishnu Acharya, Hassan Afzaal) 1900456

**28** *Analysis on Dynamics Characteristics of Vibratory Harvesting for Oil-Tea Camellia Fruit* • Presenting author: Ruiyun Zhou, Zhejiang University, Hangzhou China (Kaizhan Chen, Xiaoqiang Du, Guofeng Zhang, Ruiyun Zhou) 1900254

**29** *Development and Performance Evaluation of Hydraulic Control System for Corn Planter* • Presenting author: Tao Cui,

China Agricultural University, Beijing, China (Huihui Zhao, Tao Cui, Chenlong Fan, Hailiang Wu, Ruimei Yang) 1900788

**30** *Design and Experiment on Reinforced Spiral Threshing and Separating Device* • Presenting author: Teng Yuejiang, I, Zibo, Shandong, China (Yuejiang Teng, Yanpu Chen, Chengqian Jin, Xiang Yin, Hongru Xie, Tingen Wang, Peng Liu, Feiyang Guo) 1900700

**31** *Dynamic Performance Simulation and Verification of the Chain Rake Mulching Film Recycling Machine* • Presenting author: Wensong Guo, China Agricultural University, Beijing, China (Wensong Guo, Xufeng Wang, Bing Lu, Can Hu, Shulin Hou) 1900125

**32** *Implementation of Control System for the Manure Spreader Using Hydraulic System Based on ISO Standard* • Presenting author: Woonchul Ham, Chonbuk National University, Jeonbuk-do, Republic of Korea (Enkbat Batbayar, Sion Kim, Enkhbaatar Tumenjargal, Woonchul Ham) 1900397

**33** *Research on the Flexible Grasping Manipulator for Stacked Bagged Agricultural Materials* • Presenting author: Xiaolong Zhu, China Agricultural University, Haidian, Beijing, China (Xiaojie Deng, Ruijuan Chi, Yuefeng Du, Qingqing Lai, Xiaolong Zhu, Zhangzhen) 1901416

**34** *Research Status and Development Trend of Corn Harvester Threshing Device* • Presenting author: Xiaolong Zhu, China Agricultural University, Haidian, Beijing, China (JingLin Guo, Yuefeng Du, Yanhan Wu, Enrong Mao) 1900701

**35** *Research Progress of Alfalfa Mower Conditioner* • Presenting author: Xinwu Li, China Agricultural University, Beijing, China (Xiaolong Huan, Decheng Wang, Wenpeng Ma, Yin hao Jin, Bingnan Ye, Qingyun Sun, Yunting Hui) 1900060

**36** *Fault Diagnosis of Motorized Spindle based on S-Transform* • Presenting author: Xueyan Zhao, China Agricultural University, Beijing, P. R. China (Chao Chen, Xueyan Zhao) 1900516

**37** *Study on Influence of Modeling Factors on Finite Element Model of Cantilever Beam with Breathing Crack* • Presenting author: Xueyan Zhao, China Agricultural University, Beijing, P. R. China (Dehao Wu, Yuefeng Du, Enrong Mao, Xueyan Zhao) 1900520

**38** *Experimental Studies on Dynamic Characteristics of Cracked Cantilever Beam* • Presenting author: Xueyan Zhao, China Agricultural University, Beijing, P. R. China (Zhaolin Zheng, Zhuo Chen, Gaoliang Shao, Runfeng Wang, Qian Zhang, Xueyan Zhao) 1900635

**39** *Test Method and Anti-Floating Capability Analysis of Washing Airflow Distribution Characteristics of Multi-Rotor Plant Protection UAVs in Suspended State* • Presenting author: Yalei Wu, China Agriculture University, Beijing, China (Yalei Wu, Lijun Qi, Zhenzhen Cheng, Yu Xiao, Zhilun Yang, Wanan Liu, Xinwu Li) 1900683

**40** *Review for The Detection of Crop Rows in the Field Based on Machine Vision* • Presenting author: Yalei Wu, China Agriculture University, Beijing, China (Yu Xiao, Lijun Qi, Yalei Wu, Zhilun Yang, Zhenzhen Cheng, Hao Zhang, Zepeng Yang, Xinwu Li) 1900942

**41** *Spray Deposition and Distribution under Different Canopy Densities Based on FCM-R* • Presenting author: Yalei Wu, China Agriculture University, Beijing, China (Zhenzhen Cheng, Lijun Qi, Yalei Wu, Hao Zhang, Yu Xiao, Zepeng Yang, Xinwu Li) 1900434

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**42** *Double-sided Non-destructive Inspection Android Application of Moldy Maize Based on Digital Image Processing* • Presenting author: Yao Lu, China Agricultural University, Beijing China (Qinglin Wang, Wei Wang, Xin Zhao, Haodong Qin, Wei Wang, Dongxing Zhang) 1901602

**43** *Design and Experiment of Holboellia Latifolia Peeling Machine* • Presenting author: Yao Lu, China Agricultural University, Beijing China (Shuxian Song, Wei Wang, Yao Lu, Beibei Jia, Aijun Dong, Wei Wang, Dongxing Zhang) 1901708

**44** *Growth Identification of Penicillium by Visible/Near-Infrared (Vis/NIR) Hyperspectral Imaging* • Presenting author: Yao Lu, China Agricultural University, Beijing China (Yao Lu, Wei Wang, Xin Zhao, Shuxian Song, Haitao Zheng) 1901601

**45** *Load Sharing Improvement Using Ring Gear Floating for Planetary Gear Set* • Presenting author: Young-Jun Park, Seoul National University, Seoul, Gwanak-Gu, Republic of Korea (Da-Vin Ahn, Gwan-Hee Son, Young-Jun Park) 1900403

**46** *Thermal Comfort Analysis of Agricultural Tractor Cabin by CFD* • Presenting author: Young-Jun Park, Seoul National University, Seoul, Gwanak-Gu, Republic of Korea (Joo Seon Oh, Gwan-Hee Son, Seung-Je Cho, Young-Jun Park) 1900712

**47** *Design and Analysis of Automatic Apple Packing Arm* • Presenting author: Zhou Jing, University of Missouri, Columbia, MO (Feng Binbin, Xiang Rong, Zhou Jing) 1901812

**48** *A New Type of Chrysanthemum Picker* • Presenting author: Rongyan Wang, Beijing China (Rongyan Wang, Zhian Zheng, Baocong Cui, Dalong Jiang, Guangfei Zhu) 1901431

**49** *A Cam-Disc Comb-Tooth Chrysanthemum Picking Device* • Presenting author: Rongyan Wang, Beijing China (Rongyan Wang, Zhian Zheng, Guangfei Zhu, Lei Gao, Baocong Cui) 1901430

**50** *Research Status of Harvesting Machines for Medicinal Flowers* • Presenting author: Rongyan Wang, Beijing China (Rongyan Wang, Zhian Zheng, Guangfei Zhu, Lei Gao, Baocong Cui) 1901432

**51** *Adaptive Lifting Performance Verification Based on the Model of Cotton Top-Cutting Machine* • Presenting author: Huan Song, Yonzong Lu, Jiangsu University, Zhenjiang, Jiangsu China (Huan Song, Yongguang Hu, Yonzong Lu, Weixin Wang, Xia Li) 1900153

**52** *Identifying Module Damage to Mitigate Potential Plastic Contamination* • Presenting author: Lucas Mitchell, North Carolina State University, Raleigh, NC (Jason Ward) 1901657

**53** *Farm Mechanization Trend in Nigeria: Indigenous-Quasi Efforts and Challenges* • Presenting author: Mohammed Othman, NAERLS, Ahmadu Bello University, Zaria, Kaduna Nigeria (Mohammed Othman) 1900328

**NO-SHOW** *Sign and Motion Simulation of Cotton Straw Row-Controlled Harvester Based on SolidWorks* • Presenting author: Xiaojun Gao, China Agricultural University, Beijing China (He Xiaowei, Liu Jinxiu, Xu Yang, GaoXiaojun, Su Yuan, Xia Guoyi) 1901467

**NO-SHOW** *Estimation of Chili Plant Canopy Size Using Image Processing* • Presenting author: Chanchal Gupta, Indian Institute Of Technology Kharagpur, Kharagpur, West Bengal India (Chanchal Gupta, V. K. Tewari, Rajendra Machavaram) 1900758

**NO-SHOW** *Management System for Soil's Temperature and Humidity in Conservation Tillage based on Google Maps/Beidou* • Presenting author: Jiangtao Qi, Jilin University, Changchun, Jilin, China (Jiangtao Qi, Huibin Sun, Hongli Tian, Yang Li, Honglei Jia) 1901697

**57** *Analysis of Design Parameters to Improve the Accuracy of an Oval Flowmeter Based on a Novel Leakage Flow Calculation Method* • Presenting author: Sung Bo Shim, Gyeongsang National University, Jinju, Gyeongsangnamdo, South Korea (YoungJun Park, JuSeok Nam) 1901040

**NO-SHOW** *1 Nitrogen Content Prediction Based on Mutual Information and Bacterial Foraging Algorithm* • Presenting author: Wei Yang, China Agricultural University, Beijing, China (Wei Yang, Wang Xingming, Zhou Peng, Hao Ziyuan, Li Minzan) 1900255

**NO-SHOW** *2 n of Water Content in Lettuce Using NIR Spectroscopic Method* • Presenting author: Yongjin Cho, Chonbuk National University, Jeonju-si, Jeollabuk-do South Korea (Yongjin Cho, Dong-Hoon Lee) 1900270

**60** *Silage Harvest Optimization and Modeling for Increased Transport Vehicle Efficiency* • Presenting author: Brian Luck, University of Wisconsin-Madison, Madison, WI (Dervis H. Gursoy, Jessica L. Drewry) 1901750

**61** *Design and Finite Element Analysis on Cutting Disc Teeth of Corn Root Stubble Cutter* • Presenting author: Dongwei Shao, Jiamusi University, Jiamusi, China (Yaoyao Du, Donghua Jiang, Dongwei Shao, Sijia Liu, Xiangdong Liu, Hongyi Wei) 1901329

**62** *Simulation Analysis and Optimization Design of Corn Root Stubble Crusher* • Presenting author: Dongwei Shao, Jiamusi University, Jiamusi, China (Liang Shan, Dongwei Shao, Donghua Jiang, Weizheng Kong, Jia Yao, Hongyi Wei) 1901325

**63** *Effects of Low Temperature Plasma Treatment on the Content of Formononetin of Astragalus* • Presenting author: Qingyun Sun, China Agricultural University, Beijing, China (Te Xu, Yunting Hui, Decheng Wang, Xu Bai, Huixin Qi, Changyong Shao, Xin Tang, Qingyun Sun, Bingnan Ye) 1900090

**64** *Effects of Hot Air Temperature on Drying Characteristics and Quality of Hybrid Pennisetum (Pennisetum Americanum x P. Purpureum)* • Presenting author: Qingyun Sun, China Agricultural University, Beijing, China (Qingyun Sun, Zhiqin Wang, Decheng Wang, Yong You, Bingnan Ye) 1900076

**65** *Preparing Rice Grain Silage for Feed without Crushing* • Presenting author: Senbonmatsu, Nasushiobara, Tochigi, JAPAN (Tetsuo Kawaide, Hidehiko Inoue, Masanori Tohno, Hisami Kobayashi, Yuko Kamiya, Kentaro Eguchi, Tomoyuki Suzuki) 1900269

**66** *Structural Design and Simulation of Transplanting Manipulator* • Presenting author: Shixiong Li, China Agricultural University, Beijing, China (Zhang Xiao, Yu Tan, Luofeng Zheng, Qingyun Sun, Shixiong Li) 1900649

**67** *Field Experiment of Small Self-Propelled Mower Conditioner* • Presenting author: Tianyi Wang, Texas A&M University, College Station, TX (Bei Wu, Decheng Wang, Guanghui Wang, Changbin He, Hongjian Wu, Chenchen Kang, Bingnan Ye, Qingyun Sun) 1900518

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**68** *Experimental Study on Mechanical Properties of Connections between Alfalfa Leaves and Stems* • Presenting author: Tianyi Wang, Texas A&M University, College Station, TX (Bei Wu, Decheng Wang, Guanghui Wang, Chenchen Kang, Bingnan Ye, Qingyun Sun) 1900510

**69** *Research Status and Development Analysis of Modular Design Technology* • Presenting author: Chengxiao Fan, Shihezi University, Shihezi, Xinjiang China (Huijuan Bai, Shuai Li, Decheng Wang, Xianfa Fang, Kang Niu, Liming Zhou, Qingyun Sun, Chengxia Fan) 1900546

**70** *Design and EDEM Simulation of Fertilizer Stratification and Deep Application Device* • Presenting author: Chengxiao Fan, Shihezi University, Shihezi, Xinjiang China (Huijuan Bai, Shuai Li, Decheng Wang, Xianfa Fang, Kang Niu, Liming Zhou, Shi Xiong, Chengxiao Fan) 1900536

**71** *Design and Experiment of 11CH160 Type Residual Film Recovery Machine* • Presenting author: Hongyi Wei, China Agricultural University, Beijing, China (Hao Fuping, Li Teng, Han Zengde, Hongyi Wei, Bingnan Ye, Qingyun Sun) 1900093

**72** *Dynamic Characteristics Simulation and Tests of Chassis Structure for High Clearance Sprayer* • Presenting author: Hongyi Wei, China Agricultural University, Beijing, China (Tengfei Zhuang, Xuejun Yang, Xiang Dong, Herong Yan, Tie Zhang, Hongyi Wei) 1900515

**73** *Effects of Maize Leaf Aging on Sprayed Droplet Impact and Adhesion* • Presenting author: JohnPaul R. Abbott, ARS-USDA-ATRU, Wooster, OH (Heping Zhu) 1900218

**74** *Developing a Control-Release Nitrogenous Fertilizer by Combination of Biochar and Sodium Alginate* • Presenting author: Lin Wei, South Dakota State University, Brookings, SD (Zhisheng Cen, Lin Wei, Yajun Wu) 1900423

**NO-SHOW** *Development of a Variable Rate Control System for Pesticide Application* • Presenting author: Xiang Yin, Shandong University of Technology, Zibo, Shandong, China (Min Li, Chengqian Jin, Juan Du) 1900464

**76** *A Web Guide System for Aerial Application to Avoid Off-Target Drift Caused by Temperature Inversion through Open-Source Weather Stations* • Presenting author: Yanbo Huang, USDA-ARS, Stoneville, MS (Daniel Fisher) 1900193

**77** *Assessments of Premixing In-Line Injection System Retrofitting on Variable-Rate Orchard Sprayers* • Presenting author: Zhihong Zhang, USDA-ARS, Wooster, OH (Zhihong Zhang, Heping Zhu, Chengsong Hu) 1900346

**78** *Real-Time Plant Health Sensor from Low-Cost and Open-Source Electronics* • Presenting author: Alex J. McLemore, Abraham Baldwin Agricultural College, Tifton, GA (Alex J. McLemore, Erin R. Porter) 1900343

**79** *Detection of Collected Debris during Mechanical Wild Blueberry Harvesting Using Convolutional Neural Networks* • Presenting author: Anup Kumar Das, Dalhousie University, Nova Scotia Canada (Anup Kumar Das, Qamar Zaman, Travis Esau, Aitazaz Farooque, Arnold Schumann) 1900569

**80** *Yield estimation and Mapping of Ripening Citrus Fruit Using Rapid Image Processing in Natural Background* • Presenting author: Arash Toudeshki, University of California, Merced, Merced, CA (Xiaohua Zhang, Reza Ehsani, Arash Toudeshki, Fuxi Shi) 1901387

**NO-SHOW** *Modeling and Remote Sensing Approaches for Site-Specific Estimation of Maize Yield Response to Fertilizer Nitrogen* • Presenting author: Axel Garcia y Garcia, University of Minnesota, Lamberton, MN (Jeffrey Coulter, Axel Garcia y Garcia) 1901649

**82** *Design and Simulation of an Auxiliary Platform for Loading and Unloading in Train* • Presenting author: Dong, Naixi., China Agricultural University, Haidian District, Beijing, China (Dong Naixi, Chi Ruijuan, Cheng Jian, Du Yuefeng, Zhang Zhen, Deng Xiaojie) 1901438

**83** *Revisiting Annual Machine Usage Based upon Used Equipment Available on Dealer Lots* • Presenting author: Edwin Brokesh, Kansas State University, Manhattan, KS (Terry Griffin) 1901472

**84** *Based on DEM-CFD Numerical Simulation of Seed Particle Suspension Velocity Measurement* • Presenting author: Gao Xiaojun, China Agricultural University, Beijing China (Gao Xiaojun, Cui Tao, Xu Yang, Yang Li, Zhang Dongxing, Su Yuan) 1901373

**85** *Design and Test of Zero Speed Throwing Mechanism in the Type of Reversing Wheel Type* • Presenting author: Jingjing Liu, Shihezi University, Shihezi, Xinjiang, China (Huijuan Bai, Shuai Li, Decheng Wang, Xianfa Fang, Kang Niu, Liming Zhou, Zhenhao Han, Jingjing Liu) 1900537

**86** *Analyses of Garlic Stem Strength for Development of Cutting Machine* • Presenting author: Junhee Kim, Kyungpook National University, Daegu, South Korea (Seungmin Woo, Daniel Dooyum uye, Yeongsu Kim, Donghyuck Hong, Yushin Ha) 1900955

**87** *Design of Water and Fertilizer Precision Ratio System Based on Neural Network PID* • Presenting author: Lei Zhang, Xi'an Jiaotong University, Xi'an, Shaanxi, China (Zhengying Wei, Peicun Feng, Qian Zhang, Weibing Jia) 1900560

**88** *Evaluation of On-Line Mixing Uniformity Based on Decolorization* • Presenting author: Ma Jing, Jiangsu University, Zhenjiang, Jiangsu Province, China (Ma Jing, Dong Xiaoya, Qiu Baijing) 1900750

**89** *Analysis of Nitrogen Deficiency of Bean Plant Using Digital Images* • Presenting author: Murilo Mesquita Baesso, FZEA -USP, Pirassununga, São Paulo, Brazil (Murilo Mesquita Baesso, Luisa Leveghin, Edson Sardinha, Alcir José Modolo, Rafael Vieira de Sousa) 1900057

**90** *Object Detection with Convolutional Neural Networks for Real-Time Weed Identification in Wild Blueberry Fields* • Presenting author: Patrick Hennessy, Dalhousie University, Truro, Nova Scotia Canada (Patrick J. Hennessy, Travis J. Esau, Qamar U. Zaman, Kenneth W. Corscadden, Arnold W. Schumann, Aitazaz A. Farooque) 1900420

**91** *Laser Detection of the Boundary of UAV Spray Operation* • Presenting author: Qiu Baijing, Jiangsu University, Zhenjiang, Jiangsu Province, China (Zhao Haoran, Ma Jing, Dong Xiaoya, Chen Jiadong, Qiu Baijing) 1900747

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- 92** *Analysis of Helical Gear Reducer Using Simulation Program KISSsoft* • Presenting author: Seok Pyo Moon, Chungnam National University, Daejeon, South Korea (Seok-Pyo Moon, Kyu-Chul Nam, Tae-Bum Kim, Yeon-Jun Jung, Chang-Hyun Choi, Yong-Joo Kim) 1901038
- 93** *Development of Deep Learning-Based Diagnosis Technology of Crop Disease and Insect Pest in RGB Images* • Presenting author: Suk-Ju Hong, Seoul National University, Seoul South Korea (Suk-Ju Hong, Sangyeon Kim, Ah-Yeong Lee, Yunhyeok Han, Barnabas Abraham Tarakey, Ghiseok Kim) 1901058
- 94** *Mechanization of Smallholders in Sub-Saharan Africa by Agrodealer Development* • Presenting author: Sven Peets, Harper Adams University, Newport, Shropshire, United Kingdom (S. Peets, P.A. Misiewicz, S. Woods, B. Ngwene, J. Burbidge, G.R. Barlow) 1901285
- 95** *Strength Analysis of Driving Gears for 82kW Class Tractor According to Major Agricultural Work in Korea* • Presenting author: Taek-Jin Kim, Chungnam National University, Daejeon, Republic of Korea (Taek-Jin Kim, Yeon-Jun Jung, Md Abu Ayub Siddique, Kyu-Chul Nam, Tae-Bum Kim, Chang-Hyun Choi, Yong-Joo Kim) 1901027
- 96** *Detecting Nitrogen Status of Winter Wheat from Ground Based Measurements and Remote Sensing for Nutrient Management and Optimal Crop Yield* • Presenting author: Travis Ford, University of Maryland Eastern Shore, Princess Anne, MD (Abhijit Nagchadhuri, Madhumi Mitra, Chris Hartman, Jesu Raj Pandya) 1900794
- 97** *Mission Planning and Ortho-Mosaicking of UAS Imagery for Remote Sensing in Precision Agriculture on Winter Wheat and a Subsurface Drip Irrigated Corn Field* • Presenting author: Travis Ford, University of Maryland Eastern Shore, Princess Anne, MD (Abhijit Nagchadhuri, Madhumi Mitra, Chris Hartman, Jesu Raj Pandya) 1900795
- 98** *A Real-Time Route Planning Method Based on Morphological Segmentation for Plant Protection UAVs* • Presenting author: Wu Yalei, Beijing, P.R.China (Yang Zhilun, Xiao Yu, Yang Zepeng, Wu Yalei, Qi Lijun) 1900490
- 99** *Hydraulic Performance Analysis of Pressure-Compensating Emitters Using CFD Method* • Presenting author: Xueli Chen, Xi'an Jiaotong University, Xi'an, Shaanxi Province, China (Zhengying Wei, Caixiang Wei, Chao Ma) 1900916
- 100** *Experimental Study on Physical Properties of Sweet Pepper Picking* • Presenting author: Bingnan Ye, China Agriculture University, Beijing China (Yunting Hui, Guoheng Chen, Bingnan Ye, Qingyun Sun, Xinxing Li, Decheng Wang) 1900072
- 101** *Modal Analysis of Different Shape Knife Based on ANSYS* • Presenting author: Bingnan Ye, China Agriculture University, Beijing China (Bingnan Ye, Yong You, Decheng Wang, Guanghui Wang, Qingyun Sun) 1900285
- 102** *Design and Analysis of a New Type of Pepper Harvester* • Presenting author: Bingnan Ye, China Agriculture University, Beijing China (Yong Yu, Guanghui Wang, Decheng Wang, Qingyun Sun, Bingnan Ye) 1900746
- 103** *Establishment and Parameter Calibration of Simulation Particles of Broad Bean Seeds in EDEM* • Presenting author: Chenlong Fan, China Agricultural University, Beijing China (Yitong Du, Tao Cui, Dongxing Zhang, Yanan Wei, Ruimei Yang, Hailiang Wu) 1900555
- 104** *Experiment on Distribution of Mixture in Longitudinal Axial Flow Threshing Separation Device For Maize* • Presenting author: Chenlong Fan, China Agricultural University, Beijing China (Chenlong Fan, Tao Cui, Dongxing Zhang, Zhe Qu) 1900071
- 105** *Design of Feeding Head Spiral Angle Longitudinal Axis Corn Threshing Separation Device Based on EDEM* • Presenting author: Chenlong Fan, China Agricultural University, Beijing China (Chenlong Fan, Tao Cui, Dongxing Zhang, Zhe Qu) 1900077
- 106** *Pressure Drop during Hops Drying in Nebraska Grown Hops* • Presenting author: David Mabie, University of Nebraska-Lincoln, Lincoln, NE (Michael Kocher, David Jones) 1900450
- 107** *Optimization of Structural Parameters for Under-the-Ground Sugarcane Basecutting* • Presenting author: Fenglei Wang, China Agricultural University, Beijing, Beijing, China (Fenglei Wang, Shaochun Ma, Wenli Ke, Haonan Xing, Jing Bai, Jinzhi Ma, Shili Gao) 1900684
- 108** *Experimental Research on the Feeding Mechanism of Sugarcane Chopper Harvester* • Presenting author: Fenglei Wang, China Agricultural University, Beijing, Beijing, China (Jinzhi Ma, Shaochun Ma, Fenglei Wang, Haonan Xing, Jing Bai, Wenli Ke, Shili Gao) 1900687
- 109** *An Experimental Study on a Specialized Catching Device for Mechanical Harvesting of Apples* • Presenting author: Fenglei Wang, China Agricultural University, Beijing, Beijing, China (Menglong Wang, Shaochun Ma, Haiqian Xing, Fenglei Wang, Haonan Xing, Jing Bai) 1900691
- 110** *Present Situation and Development of Processing Mechanization of Chinese Medicinal Materials* • Presenting author: Guang-Fei Zhu, Beijing, China (Lei Gao, Zhian Zheng, Dalong Jiang, Guangfei Zhu, Shufeng Chen) 1901100
- 111** *Design of a Whole Row Pneumatic Seedling Pick-Up Device for Fully-Automatic Field Transplanters with Reciprocating Movement and Intelligent Control System* • Presenting author: Hanping Mao, Jiangsu University, Zhenjiang China (Guoxin Ma, Hanping Mao, Luhua Han, Kaixuan Zhang, Feng Gao, Yang Liu) 1900212
- 112** *Peanut Threshing and Shelling Machines for Community-Based Peanut Enterprises in Developing Countries* • Presenting author: Jose D. Guzman, Cagayan State University, Tuguegarao City, Cagayan, Philippines (Jose D. Guzman, Marvin C. Petingco, Ayban David P. Dom-oguen) 1901368
- 113** *Basecutting Energy Consumption of Sugarcane Stools Using Contra-Rotating Basecutters* • Presenting author: Shaochun Ma, CAU, Beijing, China (Fenglei Wang, Shaochun Ma, Haonan Xing, Jing Bai, Jinzhi Ma, Wenli Ke) 1900645
- 114** *A Comparison Study on Mechanized Sugarcane Production Modes in China* • Presenting author: Shaochun Ma, CAU, Beijing, China (Jing Bai, Shaochun Ma, Xiaobin Huang, Shihong He, Fenglei Wang, Haonan Xing) 1900644
- 115** *Precise Picking Height Positioning on Wild Blueberry Harvesters Using Electric Linear Actuators* • Presenting author: Travis Esau, Dalhousie University, Truro, Nova Scotia, Canada (Travis Esau, Qamar Zaman, Craig MacEachern, Aitazaz Farooque, Meftah Mohamed) 1900453

# Monday, July 8

**116** *Status Quo and Prospects of Licorice Mechanized Harvesting Technology in China* • Presenting author: Yang Yu, China Agricultural University, Beijing China (Chao Zhang, Jiannong Song, Xiangqian Dong, Jicheng Wang, Yang Yu, Guanghao Xu, Chao Wang, Weishuai Liu, Binbin Zhu) 1901047

**117** *Progress in Mechanized Harvesting of Cassava in China* • Presenting author: Yaohue Zhang, China Agricultural University, HaiDian District, Beijing, China (Guanghao Xu, Jiannong Song, Jicheng Wang, Xiangqian Dong, Yang Yu, Chao Zhang, Weishuai Liu, Binbin Zhu) 1901022

## **116 Natural Resources and Environmental Systems**

### **Distinguished Lecture Series—INVITED**

Monday, July 8, 9:30am-11:00am

Location: Salon I

Sponsored by: NRES-01

Moderator: Srinivasulu Ale, Texas A&M AgriLife, Vernon, TX

**9:30am** *The Importance of Mechanistic and Process-Based Approaches for Analyzing Natural and Environmental Systems under a Variable Climate* • Presenting author: Garey Fox, Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC (Garey Fox) 1901959

**10:00am** *Irrigation 4.0: How Technology and Data Science will Transform Water Management in Response to Climate Variability* • Presenting author: Jay Ham, Irrigation Innovation Consortium, Department of Soil and Crop Sciences, Colorado State University, Fort Collins, CO (Jay Ham) 1901958

**10:30am** *Coping with Increasing Climate Variability and Uncertainty: Is There a Role for Crop Models?* • Presenting author: Gerrit Hoogenboom, Institute for Sustainable Food Systems; Department of Biological and Agricultural Engineering, University of Florida, Gainesville, FL (Gerrit Hoogenboom) 1901957

## **117 ABE Curriculum and Industry Needs in Ecological/Water Resources Engineering: A Panel Discussion**

### **Discussion**

Monday, July 8, 11:00am-12:00pm

Location: Salon I

Sponsored by: NRES-21; NRES-22; NRES-223; NRES-224; NRES-225; NRES-23; NRES-24; NRES-242; NRES-244; NRES-245; NRES-25; NRES-251; NRES-252; NRES-26; NRES-262; NRES-28; EOPD-211

Moderator: Debabrata Sahoo, Woolpert Inc., West Columbia, SC

**11:00am** *Seven Keys for Success as an Ecological Engineer* • Presenting author: Greg Jennings, P.E., Jennings Environmental PLLC; Biological and Agricultural Engineering Department, North Carolina State University, Raleigh, NC (Greg Jennings) 1901971

**11:15am** *Transforming Ecological Engineering Education Using a Hybrid Pedagogical Approach* • Presenting author: Puneet Srivastava, P.E., Director of Water Resources Center: College of Agriculture, Biosystems Engineering Department, Auburn University, Auburn, AL (Puneet Srivastava) 1901969

**11:30am** *Foundational Skills Needed for a Successful Engineering Career: A Consulting Industry Perspective* • Presenting author: Derek Schlea, P.E., LimnoTech, Ann Arbor, MI (Derek Schlea) 1901970

## **NRES Community Update**

Monday, July 8, 12:00pm-1:00pm

Location: Salon I

## **118 Air Emissions from Livestock and Poultry Production**

Monday, July 8, 9:30am-12:00pm

Location: Nantucket

Sponsored by: PAFS-50

Moderator: Lingjuan Wang Li, North Carolina State University, Raleigh, NC

**9:35am** *Emissions of Size-Fractioned Particulate Matter and Ammonia from a Cage-Free Layer Facility in Western Canada*

• Presenting author: Patrick K. McGrath, University of Guelph, Guelph, Ontario, Canada (Patrick K. McGrath, Jaime E. Anderson, Bill J. Van Heyst) 1900068

**NO-SHOW** *Application of PTR-MS on Assessing the Removal Efficiency of Key Odorants Emitted from Animal Wastewater by Using Zr-Metal Organic Frameworks* • Presenting author: Xiaorong Dai, Research Associate, Ningbo, Zhejiang Province, China (Leiping Wang, Jianrong Li, Zun Man, Dezhao Liu, Hang Xiao) 1900497

**10:05am** *Diurnal Measurements of Methane Emissions from Feedyard Pen Surfaces during Spring and Summer in Texas*

• Presenting author: Kenneth Casey, Texas A&M AgriLife Research, Amarillo, TX (Kenneth Casey, David Parker, Heidi Waldrip, Mindy Spiehs, Bryan Woodbury) 1900888

**10:20am** *Review of Legal Requirements on Ammonia and Greenhouse Gases Emissions from Animal Production Buildings in European Countries* • Presenting author: Bjarne Bjerg, University of Copenhagen, Denmark (Bjarne Bjerg, Peter Demeyer, Julien Hoyaux, Mislav Didara, Juha Grönroos, Mélynda Hassouna, Barbara Amon, Thomas Bartzanas, Renáta Sándor, Micheal Fogarty, Sivan Klas, Stefano Schiavon, Violeta Juskiene, Miroslav Radeski, George Attard, André Aarnink, Şey) 1901070

**10:35am** **BREAK**

**10:45am** *Manure Treatment with Acidic Liquid Biowastes for Reducing Greenhouse Gases and Ammonia Emissions*

• Presenting author: Omar Hijazi, Technical University of Munich, Agricultural Systems Engineering, Freising, Germany (Mohamed Samer, Omar Hijazi, Essam Abdelsalam, Jochen G. Wiecha, Kathrin L. M. Ziegler, Heinz Bernhardt) 1900100

**11:00am** *Greenhouse Gas Emissions from Uganda's Cattle Corridor Farming Systems* • Presenting author: Nicholas Kiggundu, Makerere University, Kampala Uganda (Nicholas Kiggundu, Stanley Peter Ddungu, Joshua Wanyama, Denis Mpairwe, Sam Cherotich, Emmanuel Zziwa, Faizal Mutebi, Alessandra Falcucci) 1900418

**11:15am** *Acidification of Outdoor Liquid Manure Storages Causes Long-Term GHG Reductions* • Presenting author: Vera Sokolov, Wilfrid Laurier University and Agriculture and Agri-Food Canada,

# Monday, July 8

Ottawa, ON, Canada (V. Sokolov, A. VanderZaag, J. Habtewold, K. Dunfield, C. Wagner-Riddle, J. J. Venkiteswaran, R. Gordon) 1900768

**11:30am** *Air Quality from Beef Manure from Steers Receiving Moderate or Aggressive Anabolic Steroid Implants* • Presenting author: Mindy Spiehs, USDA-ARS, Clay Center, NE (Mindy J. Spiehs, Bryan L. Woodbury, Kristin E. Hales) 1901881

## **119 Emerging Information Systems for Animal Production Systems**

Monday, July 8, 9:30am-12:00pm

Location: Orleans

Sponsored by: PAFS-40; ITSC-254

Moderator: Joshua Peschel, Iowa State University, Ames, IA

**9:35am** *Individual Animal Identification in Beef Cattle Using Machine Learning* • Presenting author: John M. Long, Oklahoma State University, Stillwater, OK (Yajun Chen, John Long, Ning Wang, Jordan Fischer) 1901489

**9:50am** *Predict Beef Cattle Temperament Using Near-Infrared, Video, and Thermal Imaging Technologies* • Presenting author: Xin Sun, North Dakota State University, Fargo, ND (Xin Sun, William Ogdahl) 1900425

**10:05am** *Classification of Pig Stress Condition Using Paraconsistent Logic* • Presenting author: Irenilza de Alencar Nääs, Paulista University, Sao Paulo Brazil (Jonas Silva, Jair M. Abe, Irenilza A. Nääs, Alexandra S. F. Cordeiro) 1901686

**10:20am** *Automatic Prediction of Stress in Piglets Using Skin Temperature* • Presenting author: Irenilza de Alencar Nääs, Paulista University, Sao Paulo Brazil (Felipe N. da Fonseca, Jair M. Abe, Irenilza de A. Nääs, Alexandra S. F. Cordeiro, Fabio V. Amaral) 1901688

### **10:35am BREAK**

**10:45am** *Image Processing for Analyzing Broiler Feeding and Drinking Behaviors* • Presenting author: Guoming Li, Mississippi State University, Starkville, MS (Guoming Li, Yang Zhao, Daniel Chesser, John W. Lowe, Joseph L. Purswell) 1900165

**11:00am** *On the Use of 3D Animations for Automated Livestock Behavior Characterization* • Presenting author: Joshua Peschel, Iowa State University, Ames, IA (Joshua Peschel) 1901346

**11:15am** *An Imaging System Based on Deep Learning for Monitoring the Feeding Behavior of Dairy Cows* • Presenting author: Cheng Yu Kuan, Taipei Taiwan (Cheng-Yu Kuan, Yu-Chi Tsai, Jih-Tay Hsu, Shih-Torng Ding, Ta-Te Lin) 1901469

**11:30am** *Ranking of Environmental Heat Stressors for Dairy Cows Using Machine Learning Algorithms* • Presenting author: Michael Gorczyca, Cornell University, Ithaca, NY (Kifle Gebremedhin) 1901495

**11:45am** *Development of an Environmental Monitoring and Control System for Weaner Pig Houses* • Presenting author: Yi-Chieh Chiu, National Ilan University, Yi-Lan, Taiwan, ROC (Y. C. Chiu, P. W. Huang, Y. K. Lin, M. Y. Chang) 1900124

**12:00pm** *A Holistic Precision Grass Measurement and Analysis System to Optimize Pasture Based Livestock Production* • Presenting author: Darren J. Murphy, Walsh Fellow, Teagasc,

Moorepark, Fermoy, Co. Cork, Ireland (Darren J Murphy, Bernadette O' Brien, Mohammad Sadegh Askari, Tim McCarthy, Aidan Magee, Rebekah Burke, Michael D Murphy) 1900769

## **120 Indoor Production of Cannabis and Other Medicinal Plants**

Monday, July 8, 9:30am-12:00pm

Location: Falmouth

Sponsored by: PAFS-30

Moderator: Nadia Sabeh, Dr. Greenhouse, Sacramento, CA

**9:35am** *Optimizing Drying Kinetics of Hops and Cannabis* • Presenting author: Mark Lefsrud, McGill University, Hudson, QC Canada (Mark Lefsrud) 1901677

**9:50am** *Different Wavelength Spectrum's Effect on a THC/CBD Phenotype Cannabis Sativa's Biomass, Cannabinoid Yield and Terpene Profile* • Presenting author: Mark Lefsrud, McGill University, Hudson, QC Canada (Victorio Morello, Samuel Bilodeau, Mark Lefsrud) 1901888

**10:05am** *Modeling Irradiance Levels of Horticultural Lighting Systems* • Presenting author: Bo-Sen Wu, McGill University, Ste-Anne-de-Bellevue, Quebec Canada (Bo-Sen Wu, Mark Lefsrud) 1901383

**10:20am** *A Wireless Sensor Network Integrated with Biosensors and Machine Vision for Green House Management* • Presenting author: Emerick Larkin, University of Florida, Gainesville, FL (Melanie Correll, Aditya Singh, Eric McLamore, Emerick Larkin) 1901853

### **10:35am BREAK**

**10:45am** *Power from Fertilizer Using an Osmosis Cell* • Presenting author: Pouyan Pourmovahed, Oakland University, Rochester, MI (Jonathan Maisonneuve) 1901184

**11:00am** *Climate Control for Cannabis: Unique Challenges for a Unique Crop* • Presenting author: Nadia Sabeh, Dr. GreenHouse, Sacramento, CA (Nadia Sabeh) 1901915

**11:15am** *Energy Efficient Desiccant Based System for Drying Agricultural Products* • Presenting author: Irwin R. Donis-Gonzalez, University of California-Davis, Davis, CA (Irwin Donis Gonzalez) 1900922

**11:30am** *Session Wrap Up: Research Challenges for Development of the Cannabis Industry*

## **121 Biochemical Conversion Processes**

Monday, July 8, 9:30am-12:00pm

Location: Boylston

Sponsored by: PRS-280; ES-220

Moderator: Catherine Brewer, New Mexico State University, Las Cruces, NM

**9:35am** *Alcohol Production by New Syngas Fermenting Microorganisms* • Presenting author: Hasan K. Atiyeh, Oklahoma State University, Stillwater, OK (Xiao Sun, Hasan K. Atiyeh, Raymond L. Huhnke, Ralph S. Tanner) 1900249

**9:50am** *Production of Biodegradable Plastics from Organic Waste* • Presenting author: Ke Wang, University of California, Davis, Davis, CA (Ke Wang, Shu Cai, Chang Chen, Julia Fan, Ruihong Zhang) 1900186

# Monday, July 8

**10:05am** *Valorization of Steam Explosion-Pretreated Biosolids for Value-Added Enzymatic Bioproducts* • Presenting author: Can Liu, University of Kentucky, Lexington, KY (Can Liu, Zhi-Wu Wang, Jian Shi) 1900935

**10:20am** *Exogeneous Efflux Pump Expression Increase Robustness Against Biomass Hydrolysates Inhibitors on Clostridium Fermentations* • Presenting author: Pablo Jimenez-Bonilla, Auburn University, AL / Universidad Nacional, Heredia, Costa Rica (Pablo Jimenez-Bonilla, Jie Zhang, David Bliersch, Yifen Wang, Luz Estela Gonzalez-de-Bashan, Yi Wang) 1900470

**10:35am** **BREAK**

**10:45am** *Production of Chlorella Sorokiniana for Animal Feed Application Using Heterotrophic Cultivation* • Presenting author: Allan Chio, UC Davis, Davis, CA (Tyler Barzee, Ruihong Zhang) 1901735

**11:00am** *Suitability of Ensiled Biomass Sorghum as a Lignocellulosic Feedstock for Fermentable Sugar Production* • Presenting author: Ana Zuleta-Correa, North Carolina State University, Raleigh, NC (Ana Zuleta-Correa, Edward E. Godfrey III, Matthew B. Whitfield, Mari S. Chinn) 1901484

**11:15am** *Production of Fungal Biomass from Almond Hulls for Animal Feed Application* • Presenting author: Lin Cao, University of California, Davis, Davis, CA (Lin Cao, Tyler Barzee, Yike Chen, Zhongli Pan, Ruihong Zhang) 1900911

**11:30am** *Alkaline, Acid and Enzymatic Wet Milling Treatments to Improve the Extraction of Natural Rubber from Taraxacum kok-saghyz at Pilot Scale* • Presenting author: David A. Ramirez-Cadavid, The Ohio State University, Wooster, OH (David A. Ramirez-Cadavid, Jesse Rossington, Frederick C. Michel) 1901187

**11:45am** *Screening and Optimization of Ion Exchange Resins for Integration into Biochemical Fermentation System for Enhanced Production of Acetic Acid Using Acetogens* • Presenting author: Supriya C. Karekar, Washington State University, WA (Supriya C. Karekar, Keerthi Srinivas, Birgitte K. Ahring) 1901333

**12:00pm** *Developing a Low-Cost and Scalable Bio-Catalytic Process for Targeted and Effective Insect Control* • Presenting author: Karthikeyan Ramachandriya, GreenLight Biosciences, Inc, Medford, MA (Oscar Pardo Planas, Karthikeyan Ramachandriya, Himanshu Dhamankar, Ify Iwuchukwu, Ray Farmer, Elisha Fielding, Nicholas Skizim, James Abshire, Drew Cunningham, Thais Rodrigues, Suresh Desai, Douglas Boyes) 1901856

**12:15pm** *Structural Characteration of Neutral/Anionic Glucans Produced by Rhizobium Radiobacter and Optimal Fermentation Strategies for Neutral Glucans Production* • Presenting author: Hongtao Zhang, Wuxi, Jiangsu, China (Juanjuan Qu, Hong-Tao Zhang, Xian-chao Zhou, Jing-Yu Yan, Mingyi Zheng, Yuchen Jia, Jianrong Wu, Wengang Chai, Xiao-Bei Zhan) 1901204

## **122 Food Process Engineering Part I**

Monday, July 8, 9:30am-12:00pm

Location: Columbus I

Sponsored by: PRS-703; PRS-701

Moderator: Ewunbua Monono, North Dakota State University, Fargo, ND

**9:35am** *Functional Properties of Size Fractionated Broken Rice Kernels Generated After Milling of Parboiled and Non-Parboiled Rice* • Presenting author: Rebecca Bruce, University of Arkansas, Fayetteville, AR (Griffiths G. Atungulu) 1900082

**9:50am** *Quality of Rough Rice Conveyed in an Eclectically Heated Allothermal Auger System* • Presenting author: Sammy Sadaka, University of Arkansas, Little Rock, AR (Kaushik Luthra, John Magugu) 1900309

**10:05am** *Extrusion for Value-Added Utilization of Spent Grain from Bourbon Distilling and Craft Beer Brewing* • Presenting author: Akinbode A. Adedeji, University of Kentucky, Lexington, KY (Joseph Woome, Akinbode Adedeji) 1900335

**10:20am** *Use of High Pressure Processing to Thaw Raw Poultry Meats* • Presenting author: Mary-Grace Danao, University of Nebraska-Lincoln, Lincoln, NE (Ali Alqaraghuli, Mary-Grace C. Danao, Curtis L. Weller, Joseph L. Baumert, Gary A. Sullivan) 1900462

**10:35am** **BREAK**

**10:45am** *Efficacy of Ozone as Oxidant for Clarification and Disinfection of Sugarcane (Saccharum Officinarum) Juice* • Presenting author: Chirasmitta Panigrahi, PhD scholar, IIT Kharagpur, Kharagpur, West Bengal India (Hari Niwas Mishra, Sirshendu De) 1900824

**11:00am** *Computer Simulation Analyses of Improving Radio Frequency (RF) Heating Uniformity in Peanut Kernels for Pasteurization* • Presenting author: Shuang Zhang, Northwest A&F University, Yangling, Shaanxi, China (Shuang Zhang, Lihui Zhang, Shaojin Wang) 1900475

**NO-SHOW** *Development of Fish Filleting Machine for Rohu (Labeo rohita) Fish* • Presenting author: Jayraj P., Research Scholar, Kharagpur, West Bengal, India (Jayraj P, Rajendra Machavaram) 1900409

## **123 Food Safety Engineering—HYBRID**

Monday, July 8, 9:30am-12:00pm

Location: Columbus II

Sponsored by: PRS-703

Moderator: Steven Walker, US Food and Drug Administration, Bedford Park, IL

**9:35am** *Improved Design of Aluminum Test Cell to Study the Thermal Resistance of Salmonella enterica and Enterococcus faecium in Low-Water Activity Food* • Presenting author: Yuqiao Jin, Washington State University, Pullman, WA (Juming Tang) 1901411

**9:50am** *Inactivation of Fungi on Food and Feed Ingredients Using Selective Infrared Heat Treatment* • Presenting author: Shantae Wilson, University of Arkansas, Fayetteville, AR (Griffiths G. Atungulu, Abass A. Oduola) 1901859

**10:05am** *Development of Simplified Method for Temperature Estimation of Microwave Assisted Pasteurization System (MAPS) Processing* • Presenting author: Yoon-Ki Hong, Washington State University, Pullman, WA (Frank Liu, Zhongwei Tang, Ren Yang, Chandrashekhar Sonar, Juming Tang) 1901458

# Monday, July 8

**10:20am** *Development of a Practical Cold Plasma Food Sanitation Processing System* • Presenting author: Paul Weckler, Oklahoma State University, Stillwater, OK (Paul Weckler, Maria (Li) Ma, Tim Bowser, Sarah Riley, Derek Clinton, Nicholas Holden, Calvin Wynn) 1901549

**10:35am BREAK**

**10:45am** *Degradation of Aflatoxin in Peanuts Using High Voltage Atmospheric Cold Plasma: Degradation Efficacy, Effect on Peanut Quality and Reduced Toxicity* • Presenting author: Hu Shi, Iowa State University, Ames, IA (Kevin Keener) 1900581

**11:00am** *A Mechanistic Model of Plant Stomatal Defense against Bacterial Infiltration* • Presenting author: Mohsen Ranjbaran, Cornell University, Ithaca, NY (Mohsen Ranjbaran, Ashim K. Datta) 1900383

**11:15am** *Understanding Water Activity change in Plant Oil with Temperature* • Presenting author: Ren Yang, Washington State University, Pullman, WA (Ren Yang, Sicheng Sun, Jiwen Guan, Juming Tang) 1901280

**11:30am** *Water Activity Change of Egg Powders at Elevated Temperatures Modeled by Clausius Clapeyron Equation* • Presenting author: Marco Esteban Pérez Reyes, Washington State University, Pullman, WA (Marco Esteban Pérez Reyes, Juming Tang, Mei-Jun Zhu, Gustavo Barbosa Cánovas) 1900674

**11:45am** *Curcumin and Quercetin as Potential Radioprotectors and/or Radiosensitizers for X-ray-based Sterilization of Male Navel Orangeworm Larvae* • Presenting author: Peishih Liang, USDA-ARS Western Regional Research Center, Albany, CA (Ron Haff, Inna Ovchinnikova, Douglas Light, Noreen Mahoney, Jong Kim) 1900096

**12:00pm** *Activated Release of Ethyl Formate for Active Packaging Applications of Fruits and Vegetables* • Presenting author: Amr Zaitoon, University of Guelph, Guelph, Ontario, Canada (Amr Zaitoon, Cynthia Scott-Dupree, Loong-Tak Lim) 1900429

**12:15pm** *Microbial Diversity Changes on Crickets (*Acheta domestica*) during Processing to Cricket Flour* • Presenting author: Oliver Schlüter, Leibniz Inst. Agric. Eng. and Bioeconomy, Potsdam, Brandenburg Germany (Antje Fröhling, Sara Bußler, Julia Durek) 1901164

## **124 Modeling and Optimization in Food Processing and Storage**

Monday, July 8, 9:30am-12:00pm

Location: Salon K

Sponsored by: PRS-703

Moderator: Satyanarayan Dev, Florida A&M University, Tallahassee, FL

**9:35am** *Combined Taguchi Orthogonal and Box-Behnken Optimization of Pre-Cooked Beans Processing Conditions* • Presenting author: Ebenezer Kwofie, McGill University, Ste Anne-de-Bellevue, Quebec Canada (Ebenezer Kwofie, Ogan Mba, Michael Ngadi) 1901791

**9:50am** *Modeling Moisture Movement Characteristics in Rough Rice Subjected to Chilling Environment* • Presenting

author: Soraya Shafiekhani, University of Arkansas, Fayetteville, AR (Soraya Shafiekhani, Griffiths Atungulu) 1901858

**10:05am** *Modeling of the Heat and Moisture Transfer in a Multipurpose Solar Dryer* • Presenting author: Diana Ramirez, Purdue University, West Lafayette, IN (Diana M Ramirez Gutierrez, Klein E. Illelej) 1901241

**10:20am** *Probit or Logit? Which Best GLM Model Represents Prediction of Longevity in Soybean Seeds* • Presenting author: Rute Quelvia de Faria, IFGoiano, Urutaí, GO, Brazil (Amanda Rithieli Pereira dos Santos, Deoclecio Jardim Amorim, Renato Fernandes Cantão, Edvaldo Aparecido Amaral da Silva, Maria Márcia Pereira Sartori) 1900558

**10:35am BREAK**

**10:45am** *Inverse Heat Method to Estimate the Heat Flux in Bread Baking* • Presenting author: Ashis. K. Datta, Agricultural and Food Engineering Department, Indian Institute of Technology Kharagpur, West Bengal India (A. K. Datta) 1900800

**NO-SHOW** *Based on the Hybrid Model of Loquat Fruit Mature Mechanism Research* • Presenting author: Lu Zhoumin, Northwest A&F University, Xian, Shaanxi China (Yang Peihua) 1900486

**11:15am** *Effects of Particle Shape and Size on Discrete Element Method Simulation of Wheat Bulk Density* • Presenting author: Marvin C. Petingco, Kansas State University, Manhattan, KS (Marvin C. Petingco, Mark E. Casada, Ronaldo G. Maghirang, Kingsly Ambrose, Oladiran O. Fasina) 1901636

**11:30am** *A Model of Factors Influencing Grain Traceability Characteristics* • Presenting author: Heather H. Tenboer, Iowa State University, Ames, IA (Heather H. Tenboer, Gretchen Mosher, Charles Hurburgh) 1900594

**11:45am** *Dynamic Vapour Sorption Isotherms of Small Cardamom (*Elettaria cardamomum* Maton)* • Presenting author: Sushreesmita Mishra, Indian Institute of Technology Delhi, New Delhi India (Sushreesmita Mishra, Jatindra Kumar Sahu) 1901811

## **125 Sustainable Food-Water-Energy Nexus**

Monday, July 8, 2:30pm-5:00pm

Location: Salon H

Sponsored by: E-2050; AABFEIO

Moderator: Aavudai Anandhi, Florida A&M University, Tallahassee, FL

**2:35pm** *Role of Engineering for Sustainable Food-Water-Energy Nexus in India* • Presenting author: Indra Mani, Indian Society of Agricultural Engineers, New Delhi, India 1901947

**3:05pm** *Managing Irrigation-Induced Soil Salinity and Waterlogging for Achieving Water and food security—Experiences from Andhra Pradesh, India* • Presenting author: Srinivasulu Ale, Texas A&M AgriLife Research, Vernon, TX (Raghu Babu Movva, Yella Reddy Kaluvai, Satyanarayana Tammineedi) 1901948

**3:35pm BREAK**

**3:45pm** *Sustainable Food-Water-Energy Nexus—Potential Options in Indian Context* • Presenting author: Dharmendra

# Monday, July 8

Saraswat, Department of Agricultural & Biological Engineering, Purdue University, West Lafayette, IN 1902002

**4:15pm** *Sustainable Food-Water Nexus in India for Food Security and Rural Economy* • Presenting author: Rameshwar Kanwar, Department of Agricultural and Biosystems Engineering, Iowa State University, Ames, IA 1902001

**4:45pm** *Will India be Food Secure by 2050?* • Presenting author: Chandra Madramootoo, Bioresource Engineering, McGill University, Montreal, Quebec Canada 1902000

## **126 AOCABFE & NERCITA China Exchange Forum**

**—INVITED**

Monday, July 8, 2:30pm-5:00pm

Location: MIT

Sponsored by: E-2050; AOCABFE

Moderator: Yufeng Ge, University of Nebraska, Lincoln, NE

**2:35pm** *TBD* • Presenting author: Prof. Yong He, College of Biosystems Engineering & Food Science, Zhejiang University, Hangzhou, Zhejiang Province China

**3:00pm** *Five Years, a Little Baijiu and Lots of Discussion to Reach One Data Point: The Development and Progress to Date for the UNL-NWAFU Food Science and Engineering 3+1 Program* • Presenting author: Prof. Curt Weller, Department of Food Science and Technology, University of Nebraska-Lincoln, Lincoln, NE

**3:25pm** *International Research Cooperation between WSU and NWAFU* • Presenting author: Prof. Shaojin Wang, College of Mechanical & Electronic Engineering, Northwest A&F University, Yangling China

**3:50pm** **BREAK**

**4:00pm** *Development of Smart Agriculture in China: Policy and Practice* • Presenting author: Prof. Yingkuan Wang, Chinese Academy of Agricultural Engineering, Beijing China

**4:25pm** *Overview of Agricultural Engineering Program at Nanjing Agricultural University* • Presenting author: Prof. Xiaochan Wang, College of Engineering, Nanjing Agricultural University, Nanjing China

**4:50pm** *TBD* • Presenting author: Prof. Ning Wang, Department of Biosystems and Agricultural Engineering, Oklahoma State University, Stillwater, OK

## **127 Wood-Based Processing, Conversion, and Products**

Monday, July 8, 2:30pm-5:00pm

Location: Boston University

Sponsored by: ASE-12; ES-220

Moderator: Kaushlendra Singh, West Virginia University, Morgantown, WV

**2:35pm** *Application of Thermal Processes to Improve the Quality of Appalachian Hardwood to Promote their Outdoor Applications* • Presenting author: Kaushlendra Singh, West Virginia University, Morgantown, WV0 (Grant Tenant, Connor Crowley, Gloria Oporto, Litha Sivanandna) 1901592

**2:50pm** *Techno-Economic Analysis for a Commercial Scale Rotary Shear System* • Presenting author: David Lanning, Forest Concepts LLC, Auburn, WA (Neal Yancey, Damon Hartley, James Dooley) 1900204

**3:05pm** *Development of a Process Simulation Model for a Forest Biomass Torrefaction and Densification Plant* • Presenting author: Kamalakanta Sahoo, Forest Products Laboratory, Madison, WI (Maryam Manouchehrinejad, Kamalakanta Sahoo, Sudhagar Mani) 1901783

**3:20pm** *High Pressure Treatment to Enhance Poplar Wood Permeability Characteristics* • Presenting author: Kaiya Yan, Zhejiang University, Hangzhou, Zhejiang, China (Kaiya Yan, Aqiang Li, Huanhuan Li, H.S. Ramaswamy, Yong Yu, Songming Zhu, Lihui hu) 1900652

**3:35pm** **BREAK**

**3:45pm** *Investigation of the Use of Micronized Rubber Powder in Wood-Based Composite Particleboard* • Presenting author: John Cole, Mississippi State University, Starkville, MS (John Cole, Jason Street) 1900451

**4:00pm** *Poplar as a Biofiber Reinforcement in Composites for 3D Printing* • Presenting author: Xianhui Zhao, Oak Ridge National Laboratory, Oak Ridge, TN (Xianhui Zhao, Kai Li, Yu Wang, Halil Tekinalp, Erin Webb, Tim Theiss, Soydan Ozcan) 1901279

**4:15pm** *Effect of Bamboo Particles Treated with Different Concentration of NaOH Solutions on Properties of PLA/BP Composites* • Presenting author: Yue Liang, Zhejiang University, Hangzhou China (Yue Liang, Shen Zhang, Ximing Zhang, Hongjian Lin, Xiangqun Qian, Kuichuan Sheng) 1900931

**4:30pm** *Cellulose-Based Polymer Nanohybrids and Their Emerging Applications* • Presenting author: Ki-Taek Lim, Kangwon National University, Chuncheon, Gangwon, Republic of Korea (Ki-Taek Lim) 1901417

**4:45pm** *Corn Distiller's Dried Grains with Solubles (DDGS)—A Functional Material for Binderless Particleboards* • Presenting author: Dilpreet Bajwa, North Dakota State University, Fargo, ND (Dilpreet S. Bajwa, Joshua D. Liaw, Sreekala G. Bajwa) 1901928

## **128 The Future of Ag Systems Management & Technology Programs—RAP**

Monday, July 8, 2:30pm-5:00pm

Location: Salon J

Sponsored by: EOPD 205; EOPD 206

Moderator: Deepak Keshwani, University of Nebraska, Lincoln, NE; Tom Brumm, Iowa State University, Ames, IA

*Do you teach in Ag Systems Management or Technology programs? Are you a department head or program coordinator for these programs? Does your company hire graduates from Ag Systems Management and Technology Programs? If so, join us to discuss the future of Ag Systems Management and Technology Programs. This session will be a moderated RAP discussion to identify challenges and opportunities for our programs. Discussion topics will include emerging career pathways, student recruitment, faculty development, new curriculum needs and*

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student engagement within ASABE. The intended outcome is a white paper to guide efforts within ASABE to support Ag Systems Management or Technology programs.

## **129 Advanced and Drop-In Biofuels Production-Biochemical Approach**

Monday, July 8, 2:30pm-5:00pm

Location: Harvard

Sponsored by: ES-220; PRS-280

Moderator: Yi Wang, Auburn University, Auburn, AL

**2:35pm** *Enhanced Acetone-Butanol-Ethanol Production by Clostridium beijerinckii Using Biochar* • Presenting author: Xiao Sun, Oklahoma State University, Stillwater, OK (Xiao Sun, Hasan K. Atiyeh, Yinka A. Adesanya, Hailin Zhang, Christopher Okonkwo, Thaddeus Ezeji) 1900256

**2:50pm** *Exploring Polycationic Surfaces on the Cell Adsorption Immobilization for Acetone-Butanol-Ethanol (ABE) Fermentation* • Presenting author: Pablo Jimenez-Bonilla, Auburn University, AL / Universidad Nacional, Heredia, Costa Rica (Pablo Jimenez-Bonilla, David Blersch, Yifen Wang, Luz Estela Gonzalez-de-Bashan, Yi Wang) 1901567

**NO-SHOW** *Production of Corn Ethanol and Lignocellulosic Ethanol using Horizontal Reactors: Experimental Comparison and Techno Economic Analysis* • Presenting author: Haider Kadhum, Oregon State University, Corvallis, OR (Haider J. Kadhum, G. S. Murthy) 1900460

**3:20pm** *Enhanced Biogas Yield in Anaerobic Sequencing Batch Reactors Using a Cationic Polymer* • Presenting author: Pius Ndegwa, Washington State University, Pullman, WA (Iftikhar Zeb, Gopi K. Kafle, Xiaoyun Xue) 1901822

**3:35pm BREAK**

**3:45pm** *Study of Chemical Composition and Fuel Properties of Alternative Jet Fuels* • Presenting author: Anamaria Paiva Pinheiro Pires, Washington State University, Pullman, WA (Anamaria Paiva Pinheiro Pires, Yinglei Han, John Kramlich, Manuel Garcia-Perez) 1900023

**4:00pm** *Physical-Chemical Characterization of Cotton Oil Biodiesel for Use in Agricultural Diesel Engines* • Presenting author: Ronald Leite Barbosa, Instituto Federal de Minas Gerais IFMG, Betim, Minas Gerais, Brazil (Adeilson Carvalho, Jackson Barbosa, Carlos Volpato, Pedro Neto, Ronald Barbosa) 1900180

**NO-SHOW** *Impact of Polypyrrole Magnetic (PPy-Fe<sub>3</sub>O<sub>4</sub>) Nanocomposite Additive on Anaerobic Digestion of Okra Waste* • Presenting author: Ugwu Samson Nnaemeka, University of South Africa, Johannesburg South Africa (Ugwu Samson Nnaemeka Enweremadu Christopher Chintua) 1901066

**NO-SHOW** *Improvement of Anaerobic Digestions of African Typha with Rumen Fluid* • Presenting author: Mohammed Othman, NAERLS, Ahmadu Bello University, Zaria, Kaduna Nigeria (Nura Sale, R. Kohn, M. K. Othman) 1901065

**4:45pm** *Ganulation of Clostridium beijerinckii P260 in Continuous Flow Reactors Converting Food Waste to Butanol Simultaneously Recovered through Pervaporation*

*Membrane* • Presenting author: Zhaohui An, Virginia Tech, Manassas, VA (Haibo Huang, Danmeng Shuai, Zhi-Wu Wang) 1900240

**5:00pm** *Butanol Production from Non-Detoxified Switchgrass Hydrolysate Using New Inhibitor Tolerant Strains of Clostridium beijerinckii* • Presenting author: Yinka Adesanya, Oklahoma State University, Stillwater, OK (Yinka A. Adesanya, Hasan K. Atiyeh, Xiao Sun, Christopher Okonkwo, Victor Ujor, Thaddeus Ezeji) 1900257

**5:15pm** *Purification and Biochemical Characterization of Aryl Alcohol Oxidase and Lignin Peroxidase: Lignin-Degrading Enzymes Produced by Engineered Aspergillus nidulans* • Presenting author: Enshi Liu, University of Nebraska-Lincoln, Lincoln, NE (Enshi Liu, Fernando Segato, Rolf A. Prade, Mark R. Wilkins) 1900566

## **130 Thermochemical Conversions of Biomass**

Monday, July 8, 2:30pm-5:00pm

Location: Brandeis

Sponsored by: ES-220

Moderator: Sandun Fernando, Texas A&M University, College Station, TX

**2:35pm** *Production and Recovery of Levoglucosan by Extraction of Cotton-Based Textile-Waste-Pyrolysis Oil* • Presenting author: Anamaria Paiva Pinheiro Pires, Washington State University, Pullman, WA (Anamaria Paiva Pinheiro Pires, Yinglei Han, Rosemary Nicholson, Manuel Garcia-Perez) 1900025

**2:50pm** *Recovering Valuable Bioactive Compounds from Potato Peels via Sequential Hydrothermal Extraction* • Presenting author: Jose S. Martinez-Fernandez, Washington State University, Pullman, WA (Ayca Seker, Maryam Davaritouchaee, Shulin Chen) 1900017

**3:05pm** *Catalytic Fast Co-Pyrolysis of Biomass and Plastic over Sulfonated Carbon-based Catalyst* • Presenting author: Wendy Mateo, Washington State University, Richland, WA (Hanwu Lei, Elmar Villota, Marie Qian, Dengle Duan, Yunfeng Zhao) 1900621

**3:20pm** *Co-Hydrothermal Carbonization of Coal Refuse and Food Waste Blend* • Presenting author: M. Toufiq Reza, Ohio University, Athens, OH (Shanta Mazumder, Kyle McGaughy, Pretom Saha, M. Toufiq Reza) 1900904

**3:35pm BREAK**

**3:45pm** *Hydrothermal Liquefaction of Food Waste: Bio-Crude Oil Characterization, Mass and Energy Balance* • Presenting author: Hengameh Bayat, New Mexico State University, Las Cruces, NM (Hengameh Bayat, Feng Cheng, Mostafa Dehghanizadeh, Nicholas Soliz, Catherine E. Brewer, Umakanta Jena) 1900974

**4:00pm** *Wet Air Oxidation Using Nitrogen Doped Cellulose Char Catalyst to Treat Phenol Contaminated Water Effluent* • Presenting author: Iva Tews, Washington State University, Pullman, WA (Iva Tews, Micahel A. A. Apasiku, Sohrab Haghighi Mood, Kalidas Mainali, Manuel Garcia-Perez) 1901302

**4:15pm** *Enhancement of Aromatic Hydrocarbons from Co-Feeding of Lignocellulosic Biomass with Plastics over Hierarchical Zeolites* • Presenting author: Marie Qian, WSU-Tricities, Richland, WA (Moriko Qian, Hanwu Lei, Elmar Villota, Wendy Mateo, Dengle Duan, Yunfeng Zhao) 1900881

# Monday, July 8

**4:30pm** *Microstructural and Physicochemical Characterization of Forest Residue Derived Biochars* • Presenting author: Oluwatosin Oginni, West Virginia University, Morgantown, WV (Kaushlendra Singh) 1900607

## **131 Advanced Computational Approaches for Solving Agricultural and Biological Engineering Problems**

Monday, July 8, 2:30pm-5:00pm

Location: Northeastern

Sponsored by: ITSC-217; NRES-244; NRES-265; ITSC-230

Moderator: Nourredine Abdoulmoumine, University of Tennessee, Knoxville, TN

**2:35pm** *Quantifying Complex Farmer-Decision Making in Agent Based Models* • Presenting author: Kendra Zeman, University of Illinois, Urbana, IL (Kendra Zeman, Luis F. Rodriguez) 1901666

**2:50pm** *Design of a Comprehensive Fuzzy and Neural Network Scheme for Harvest and Growth Quality Estimation of Lettuce*

• Presenting author: Chung-Liang Chang, Department of Biomechatronics Engineering, National Pingtung University of Science and Technology, Pingtung County, Taiwan R.O.C. (Wei-Lun Fu, Cheng-Chieh Huang) 1900276

**3:05pm** *A Computational Approach to Determine the Parameters that Influence Maize Stem Buckling Failure*

• Presenting author: Christopher J Stubbs, New York University, New York, NY (Christopher J Stubbs, Ryan Larson, Douglas D Cook) 1900260

**3:20pm** *Compact Codes for Advanced Computations*

• Presenting author: Hubert Montas, University of Maryland, College Park, MD (Hubert Montas, Jonathan Resop) 1901371

**3:35pm** **BREAK**

**3:45pm** *Assessing the Impacts of Climate Change on Rice Yield in the Artibonite Valley of Haiti Using DSSAT CERES-Rice Crop Model*

• Presenting author: Floyd Nicolas, Agricultural and Biological Engineering Department, University of Florida, Gainesville, FL (K.W. Migliaccio, G. Hoogenboom, W. R. Eisenstadt, B. Rathinasaba) 1900914

**4:00pm** *Combining Machine Learning with Mechanistic Models to Predict Body Temperatures of Piglets*

• Presenting author: Hugo Milan, Cornell University, Ithaca, NY (Kifle Gebremedhin) 1900431

**4:15pm** *Stochastic Optimization in the Survival Analysis Setting*

• Presenting author: Michael Gorczyca, Cornell University, Ithaca, NY (Kifle Gebremedhin) 1901497

**4:30pm** *Prediction of Radiation Frost Using Support Vector Machine Based on Micrometeorological Data*

• Presenting author: Yongzong Lu, University of California Agriculture and Natural Resources (UCANR), UCCE Imperial County, Holtville, CA (Yongzong Lu, Yongguang Hu, Richard L. Snyder, Kyaw Tha Paw U, Huan Song) 1900519

**4:45pm** *Application of Finite Element Method to Estimate the Bruise Damage of Kiwifruit under Drop Impact Loading*

• Presenting author: Dongdong Du, Zhejiang University, Hangzhou, Zhejiang, PR China (Dongdong Du, Jun Wang, Bo Wang, Fuqiang Yao) 1900242

## **132 Imaging Technologies for High Throughput Phenotyping Part II**

Monday, July 8, 2:30pm-5:00pm

Location: Tufts

Sponsored by: ITSC-312; MS-48; ITSC-348

Moderator: Haiyan Cen, Zhejiang University, Hangzhou, Zhejiang China

**2:35pm** *Geospatial Assessment of Phenotype Predictive Analytics Using Machine Learning Techniques*

• Presenting author: Parisa Sarzaeim, University of Nebraska-Lincoln, Lincoln, NE (Parisa Sarzaeim, Francisco Munoz-Arriola, Alessandro Amaranto, Diego Jarquin, Denise Bradford) 1901655

**2:50pm** *Deep Convolutional Neural Network to Characterize Flowering Dynamics of Angiosperms*

• Presenting author: Yu Jiang, The University of Georgia, Athens, GA (Rui Xu, Rikki Brown, Shangpeng Sun, Liu Jun Li, Jon Robertson, Piyush Pandey, Changying Li, Andrew Paterson) 1901225

**3:05pm** *Development of a Low-cost and Minimally Invasive Root Phenotyping System*

• Presenting author: Zhihang Song, Purdue University, West Lafayette, IN (Zhihang Song, Jian Jin) 1900948

**3:20pm** *Trait Evaluation of Cool-Season Crops Using High-Throughput Phenotyping Technologies*

• Presenting author: Chongyuan Zhang, Department of Biological Systems Engineering, Washington State University, Pullman, WA (Wilson Craine, Rebecca McGee, George Vandemark, James B. Davis, Jack Brown, Scot H. Hulbert, Sindhuja Sankaran) 1901201

**3:35pm** **BREAK**

**3:45pm** *Visualizing Roots In Situ: Development of a Field Deployable Low-Field Magnetic Resonance Imaging Rhizotron*

• Presenting author: G. Cody Bagnall, Texas A&M University, College Station, TX (Cristine L.S. Morgan, Matthew Rosen, Eiichi Fukushima, Karl Stupic, Stephen Altobelli, Mark Conradi, Dean Keuthe, William L. Rooney, John E. Mullet, James L. Heilman) 1901147

**4:00pm** *Development of an Automated Multi-Sensor System for High-Throughput Phenotyping in Greenhouse Environment*

• Presenting author: Tanzeel Rehman, Purdue University, West Lafayette, IN (Tanzeel Rehman, Jian Jin) 1901098

**4:15pm** *Deep Neural Networks for Aphanomyces Root Rot Severity in Lentil*

• Presenting author: Afef Marzougui, Department of Biological Systems Engineering, Washington State University, Pullman, WA (Yu Ma, Rebecca McGee, Sindhuja Sankaran) 1901209

**4:30pm** *Image Processing for High Throughput Phenotyping in Plant Breeding*

• Presenting author: James Kim, Arid-Land Agricultural Research Center, Maricopa, AZ (James Y Kim, John Dyer) 1901885

**4:45pm** *Deriving Vegetation Indices from High-Throughput Images by Using Unmanned Aerial Systems in Soybean Breeding*

• Presenting author: Beichen Lyu, Department of Agricultural & Biological Engineering, Purdue University, West Lafayette, IN (Beichen Lyu, Stuart D. Smith, Yexiang Xue, Keith A. Cherkauer) 1900279

# Monday, July 8

**5:00pm** *Individual Citrus Tree Phenotyping Using Unmanned Aerial System (UAS)* • Presenting author: Anjin Chang, Texas A&M University, Corpus Christi, TX (Anjin Chang, Jinha Jung, Sungchan Oh, Junho Yeom, Akash Ashapure, Murilo Maeda, Juan Landivar) 1901513

**5:15pm** *Field-Based High-Throughput Phenotyping for Maize Plant Using 3D LiDAR Point Cloud Generated with a "Phenomobile"* • Presenting author: Quan Qiu, Beijing Research Center of Intelligent Equipment for Agriculture, Beijing, Beijing, China (Quan Qiu, Na Sun, He Bai, Ning Wang, Yanjun Wang, Zhengqiang Fan, Zhijun Meng, Bin Li, Yue Cong) 1901763

## **133 Machine Vision Applications in Agriculture and Food**

Monday, July 8, 2:30pm-6:00pm

Location: Tremont

Sponsored by: ITSC-312

Moderator: Yan-Fu Kuo, National Taiwan University, Taipei, Taiwan China

**2:35pm** *Counting Bacterial Colony on Agar Plates Using Deep Convolutional Neural Network* • Presenting author: Hong-Ye Lin, Department of Bio-Industrial Mechatronics Engineering, National Taiwan University, Taipei, Taiwan (Szu-Yu Chen, Chia-Lin Chung, Yan-Fu Kuo) 1900485

**2:50pm** *Quantifying Color and Textural Patterns of Petals and Studying their Association with Pollinators: Using Genus *Sinningia* (GESNERIACEAE) as an Example* • Presenting author: Tzu-Ting Hung, National Taiwan University, Taipei Taiwan (Tzu-Ting Hung, Hao-Chun Hsu, Yan-Fu Kuo) 1900443

**3:05pm** *Real-Time Monitoring of Fluidized Bed Drying Using Computer Vision* • Presenting author: Anthony Iheonye, Department of Bioresource Engineering, McGill University, Ste-Anne-de-Bellevue, Quebec, Canada (Yvan Garipey, Vijaya Raghavan) 1901626

**3:20pm** *Development of an Image-Based Food Recognition and Nutritional Status Evaluation System* • Presenting author: Babatunde Onadipe, McGill University, Sainte Anne De Bellevue, Quebec Canada (Michael Ngadi, Ebenezer Kwofie) 1901738

**3:35pm** **BREAK**

**NO-SHOW** *Development of an Algorithm for the Periodic Leaf Movement Analysis of Arabidopsis Plants* • Presenting author: Tanzeel Rehman, Purdue University, West Lafayette, IN (Tanzeel Rehman, Jian Jin) 1901122

**4:00pm** *Morphometric and Colorimetric Evaluation of Paddy during Parboiling Using Image Analysis* • Presenting author: Ashis Kumar Datta, Agricultural and Food Engineering Department, Indian Institute of Technology, Kharagpur, West Bengal, India (Brajesh Kumar Panda, Shanker Lal Shrivastava, Ashis Kumar Datta) 1900984

**4:15pm** *Precise Measurement of Edible Coatings in Quasi-Circular Fruit Using Machine Vision* • Presenting author: Federico Hahn, Universidad Autonoma Chapingo, Texcoco, Edo. Mexico (Federico Hahn, Ángel Hernandez) 1900601

**4:30pm** *Experimental and Numerical Investigations on Breakup Characteristics of Low-Pressure Jet with Different Nozzle Parameters* • Presenting author: Yue Jiang, Jiangsu University,

Zhenjiang, Jiangsu China (Yue Jiang, Hong Li, Daming Zhang, Lin Hua) 1900455

**4:45pm** *Particle Flow Estimation Using High-speed Camera and Optical Flow Method* • Presenting author: Mehari Tekeste, Iowa State University, Ames, IA (Mohammad Mousaviraad, Mehari Tekeste, Joshua Peschel) 1901670

**5:00pm** *Crop Damage Detection from UAS Imagery and Using Deep Learning and Computer Vision Techniques* • Presenting author: Ali Hamidisepehr, NC State University, Raleigh, NC (Ali Hamidisepehr, Jason Ward) 1900563

**NO-SHOW** *Application of Hyperspectral Reflectance Imaging and Deep Convolutional Neural Network to Discriminate the Variety of Corn Seed* • Presenting author: Jun Zhang, Zhejiang University, Hangzhou, Zhejiang Province China (Limin Dai, Zhilin Zhao, Fang Cheng) 1901428

**5:30pm** *Determination of Pigment Contents in Cotton Leaves in Response to Verticillium Wilt Using Hyperspectral Imaging Combined with Deep Learning Model* • Presenting author: Na Wu, Zhejiang University, Hangzhou China (Na Wu, Chu Zhang, Yong He, Chunxiao Mi) 1900514

**5:45pm** *Robotic Imaging-Based Methods for Leaf Segmentation and Growth Tracking in Arabidopsis* • Presenting author: Lirong Xiang, Iowa State University, Ames, IA (Lirong Xiang, Yin Bao, Trevor Nolan, Lie Tang) 1901064

## **134 Material and Molecular Innovations for Chemical and Biological Sensing**

Monday, July 8, 2:30pm-5:00pm

Location: Vineyard

Sponsored by: ITSC

Moderator: Mei He, University of Kansas, Lawrence, KS

**NO-SHOW** *Flexible Carbon Circuits Decorated with Nanoparticles Derived from Landfill Waste for Measuring Small Molecules and Bacteria* • Presenting author: Eric McLamore, University of Florida, Gainesville, FL (Sabah Abdelbasir, Victoria Morgan, Hannah Schmidt, Enoch Kuo, Eric McLamore) 1901759

**2:50pm** *The Effect of Thermal Oxidation on the Performance of Nanostructured Porous Si Optical Biosensors* • Presenting author: Giorgi Shtenberg, Institute of Agricultural Engineering, ARO, the Volcani Center, Bet Dagan, Israel (Giorgi Shtenberg) 1900265

**3:05pm** *Study of Rapid Detection Method of Thiabendazole Pesticide Residue in Fresh Tea Using Surface-Enhanced Raman Spectroscopy* • Presenting author: Lei Lin, Zhejiang University, Hangzhou, Zhejiang Province, China. (Lei Lin, Jianzhong Ma, Pengcheng Nie) 1900709

**NO-SHOW** *RNA Directed Immobilization as a Tool for Design of Porous Si Based Biosensors* • Presenting author: Giorgi Shtenberg, Institute of Agricultural Engineering, ARO, the Volcani Center, Bet Dagan, Israel (Giorgi Shtenberg) 1900266

**3:35pm** **BREAK**

**3:45pm** *An On-Site Fully Integrated Suitcase for *Candidatus Liberibater Asiaticus* Detection Based on Loop-Mediated*

# Monday, July 8

*Isothermal Amplification* • Presenting author: Cui Wu, Zhejiang University, Hangzhou, Zhejiang Province China (Cui Wu, Zhen Wang, Hui Wu, Zhan Lu, Cheng Qian, Shunru Jin, Rui Wang, Zunzhong Ye, Jian Wu, Yibin Ying) 1901001

**4:00pm** *Real-Time Single Nucleotide Polymorphism (SNP) Genotyping Using a RNase-H Loop-Mediated Isothermal Amplification (rh-LAMP) System* • Presenting author: Lena Diaz, University of Hawaii, Honolulu, HI (Daniel Jenkins, Ryo Kubota) 1901570

**4:15pm** *Enhanced Sensitivity in Terahertz Sensing with Nanomaterials* • Presenting author: Ruiyun Zhou, Zhejiang University, Hangzhou China (Ruiyun Zhou, Chen Wang, Wendao Xu, Lijuan Xie) 1900770

**4:30pm** *Rapid Detection and Classification of Fungi Contamination in Rice Grains Based on Electronic Nose with Chemometrics* • Presenting author: Shuang Gu, Zhejiang University, Hangzhou China (Shuang Gu, Jun Wang) 1900507

**4:45pm** *A Novel Feature Selection Framework for Analyzing E-Nose Data: Application to Evaluate the Quality of Chinese Dry-Cured Ham* • Presenting author: Kang Qian, Zhejiang University, Hangzhou, Zhejiang Province China (Kang Qian, Chenyuan Wu, Jiaqing Zhang, Changqing Chen, Zhenbo Wei) 1900680

**5:00pm** *3D Printed Auto-Mixing Chip Enables Rapid Smartphone Diagnosis of Anemia* • Presenting author: Mei He, University of Kansas, Lawrence, KS (Mei He) 1901365

**5:15pm** *Biomarker Detection for High-Throughput Sensing of Soft Rot Disease Detection in Stored Potatoes* • Presenting author: Worasit Sangjan, Washington State University, Pullman, WA (Worasit Sangjan, Afef Marzougui, Lav R. Khot, Brenda Schroeder, Sindhuja Sankaran) 1901406

## **135 Sensors and Control Systems for Precision Agricultural Equipment**

Monday, July 8, 2:30pm-5:00pm

Location: Clarendon

Sponsored by: ITSC

Moderator: Aaron Franzen, South Dakota State University, Brookings, SD

**2:35pm** *Potential of Cyber-Physical Systems in German Dairy Farming* • Presenting author: Martin Hoehendinger, University of Applied Sciences Weihenstephan-Triesdorf, Technical University of Munich, Freising, Bavaria, Germany (Martin Höhendinger, Natascha Schlereth, Maximilian Treiber, Manfred Höld, Jörn Stumpfenhausen, Heinz Bernhardt) 1900221

**2:50pm** *Design and Test on Orchard Air-Assisted Variable Rate Sprayer* • Presenting author: Jixin, JiangSu University, China (Ji Xin, Li Lin, Wang Aichen, Wei Xinhua) 1900370

**3:05pm** *Development of Tractor Power Output Wireless Detection System Based on Virtual Instrument Technology* • Presenting author: Dong Sun, China Agricultural University, Beijing China (Dong Dai, Dong Sun, Shumao Wang, Ling Wang, Yu Wang) 1901569

**3:20pm** *Sensor for Concentration Monitoring at the Nozzle in Direct Injection Sprayer Systems* • Presenting author: Joseph

Dvorak, University of Kentucky, Lexington, KY (Navab Karimi, Joseph Dvorak, Joseph Rounsaville, Tim Stombaugh) 1901695

**3:35pm** **BREAK**

**3:45pm** *Fabrication and Evaluation of a Low-Cost WiFi Soil Moisture Sensor* • Presenting author: Kaelin Saul, North Carolina State University, Raleigh, NC (Jason Ward) 1901823

**4:00pm** *Development of an Open Source Linux Based Operating System for Agricultural Equipment* • Presenting author: Paul Thieme, Purdue University, West Lafayette, IN (Dennis Buckmaster, James Krogmeier) 1901810

## **136 Machinery Data and Task Optimization**

Monday, July 8, 2:30pm-5:00pm

Location: Berkeley

Sponsored by: MS-49; MS-45

Moderator: Brian Luck, University of Wisconsin-Madison, Madison, WI

**NO-SHOW** *Function Analysis and Optimization of Chassis Frame for Silage Harvester* • Presenting author: Zhang, Zhen, China Agricultural University, Beijing, Haidian District China (Zhang Zhen, Chi Ruijuan, Zhang Xueling, Du Yuefeng, Zhu Zhongxiang, Zhang Yubai) 1901437

**2:50pm** *Wild Blueberry Harvest Efficiency of Traditional Small Box and Semi-Automated Bin Handling Systems* • Presenting author: Ahmad Hanmbal Khan, Department of Business and Social Sciences, Faculty of Agriculture, Dalhousie University, Truro, Nova Scotia, Canada (Ahmad Khan, Emmanuel Yiridoe, Travis Esau, Qamar Zaman, Aitazaz Farooque, Prosper Koto) 1900837

**3:05pm** *Analysis of Traction Performance for an Agricultural Tractor According to Soil Moisture Content during Plow Tillage* • Presenting author: Wansoo Kim, Chungnam National University, Daejeon, South Korea (Wan-Soo Kim, Yong-Joo Kim, Seong-Un Park, Kyu-Chul Nam, Chang-Hyun Choi) 1900994

**3:20pm** *Yield Loss and Grade Effects of Peanut Combine Speed Settings* • Presenting author: Benjamin Fogle, Clemson University, Blackville, SC (Benjamin B. Fogle, Kendall Kirk, Warren White, Josey Peele, Dan Anco, Nathan Smith, Michael Plumblee) 1901725

**3:35pm** **BREAK**

**NO-SHOW** *Design and Experimental Optimization of Cleaning System for Peanut Harvester* • Presenting author: Shengsheng Wang, Henan University of Science and Technology, Luoyang, Henan, China (Jiangtao Ji, Xin Jin, Lingxin Geng) 1900513

**4:00pm** *Power and Torque Curves of a Diesel Engine Fueled with Diesel and Soybean Oil Biodiesel Mixtures* • Presenting author: Ronald Leite Barbosa, Instituto Federal de Minas Gerais IFMG, Betim, Minas Gerais, Brazil (Ronald Leite Barbosa, Carlos Eduardo Silva Volpato, Diego José Carvalho Alonso, Fábio Moreira da Silva) 1901525

**4:15pm** *Test of a Diesel Cycle Engine Fueled with Different Proportions of Cotton Oil Biodiesel and Diesel* • Presenting author: Ronald Leite Barbosa, Instituto Federal de Minas Gerais IFMG, Betim, Minas Gerais, Brazil (Geovani Laurindo, Carlos Eduardo Silva Volpato, Pedro Castro Neto, Jackson Barbosa, Ronald Leite Barbosa) 1900381

# Monday, July 8

**4:30pm** *Development of Simulation Model for Electric All-Wheel-Drive Tractor* • Presenting author: Seung-Min Baek, Chungnam National University, Daejeon, Republic of Korea (Seung-yun Baek, Yeon-Jun Jung, Md Abu Ayub Siddique, Kyu-Chul Nam, Tae-Bum Kim, Chang-Hyun Choi, Yong-Joo Kim) 1900992

**4:45pm** *Measurement of Temperature and Pressure in the Biomass Pelletizing Process* • Presenting author: Yiming Li, Penn State University, University Park, PA (Yiming Li, Hojae Yi, Daniel Ciolkosz, Virendra M. Puri) 1901409

**5:00pm** *Strength Analysis for Hydraulic Mechanical Transmission of Agricultural Tractor Using Romax Designer* • Presenting author: Seung-Min Baek, Chungnam National University, Daejeon, Republic of Korea (Seung-Min Baek, Dae-Hyun Lee, Md Abu Ayub Siddique, Kyu-Chul Nam, Tae-Bum Kim, Chang-Hyun Choi, Yong-Joo Kim) 1901025

**5:15pm** *Analysis of Transmission Error for Compound Planetary Gear Reducer by Tooth Profile Modification* • Presenting author: Nam-Gyu Lee, Chungnam National University, Daejeon, Republic of Korea (Dae-Hyun Lee, Yeon-Jun Jung, Md Abu Ayub Siddique, Kyu-Chul Nam, Tae-Bum Kim, Chang-Hyun Choi, Yong-Joo Kim) 1901030

**5:30pm** *Development and Validation of Simulation Model for Three Point-Hitch during Agricultural Operation* • Presenting author: Hyeon-Ho Jeon, Yu-Seong Gu, Dae-ejon, Republic of Korea (Yeon-Jun Jung, Md Abu Ayub Siddique, Kyu-Chul Nam, Tae-Bum Kim, Chang-Hyun Choi, Yong-Joo Kim) 1901032

## **137 Precision Aerial Spray Applications: UAV/Drones and Manned Aircraft**

Monday, July 8, 2:30pm-5:00pm

Location: Arlington

Sponsored by: MS-23/6; MS-54

Moderator: Chris Bursiek, John Deere, Ankeny, IA

**2:35pm** *Best Management Practices for Unmanned Aerial Vehicles (UAVs) Application of Insecticide Products on Rice* • Presenting author: Xuan Li, FMC Stine Research Center, Newark, DE (Xuan Li, John T Andaloro, Edward B Lang, Yafei Pan) 1901493

**2:50pm** *Cotton Height Estimation Using Aerial Imagery from Manned and Unmanned Aircraft* • Presenting author: Chenghai Yang, USDA-ARS, College Station, TX 1900037

**3:05pm** *Drift Potential of Different UAS and Drone Systems* • Presenting author: Randy Price, LSU AgCenter, Alexandria, LA (Randy Price) 1901547

**3:20pm** *Using Flight and Field Datasets with Digital Photogrammetric Systems to Assess the Accuracy of a UAS Sensor Platform for Mapping Geospatial Input Treatment Zones* • Presenting author: Charles A. Collins, North Carolina State University, Raleigh, NC (Gary Roberson, Scott Hale) 1900367

**3:35pm** **BREAK**

**3:45pm** *Assessment of Physical Crop Damage Using UAS Imagery* • Presenting author: Ryan Phillips, NC State University, Raleigh, NC (Jason Ward) 1901476

**4:00pm** *Chemical Spraying Using Unmanned Aerial Vehicle Technology in Wetland Rice Cultivation in Malaysia* • Presenting author: Azmi Yahya, Universiti Putra Malaysia, Serdang, Selangor D.E., Malaysia (Siti Amni Ismail, Azmi Yahya, Ahmad Suhaizi Mat Su, Norhayu Asib, Anas Mohd Mustafah) 1901854

**4:15pm** *Development of a Tethered UAV Sprayer* • Presenting author: Paul Weckler, Oklahoma State University, Stillwater, OK (Paul Weckler, John Long, Ning Wang, Bryce Randall, Spencer Hayward, Matthew Snell, Charles Rufo) 1901548

**4:30pm** *Site Specific Weed Management Mapping System Using Unmanned Aerial Vehicle (UAV)* • Presenting author: Bruen Smith, University of Southern Queensland, Toowoomba, Queensland Australia (Bruen Smith, Livia Faria Defeo, Troy Jensen) 1900207

**4:45pm** *Agricultural Technology Adoption Path of Kansas Farms* • Presenting author: Terry Griffin, Kansas State University, Manhattan, KS (Terry Griffin) 1901288

**5:00pm** *Mapping Infield Variability of Soil Properties Using Different Spatial Data: UAV, Multi-Depth EC, and Aerial Hyperspectral Imagery* • Presenting author: Nuwan Wijewardane, University of Nebraska-Lincoln, Lincoln, NE (Lin Wang, Yinglun Zhan, Trenton Franz, Hongfeng Yu, Yuzhen Zhou, Yeyin Shi, Yufeng Ge) 1900578

## **138 Advances in Aquacultural Engineering—HYBRID**

Monday, July 8, 2:30pm-5:00pm

Location: Provincetown

Sponsored by: NRES-28; NRES-262

Moderators: Steven Hall, North Carolina State University, Raleigh, NC; Muhammed Chowdhury, Texas A&M University, Kingsville, TX

**2:35pm** *Life Cycle Assessment of Aquaponics Systems* • Presenting author: Brendan Higgins, Auburn University, Auburn, AL (David Blersch, Daniel Wells, Terry Hanson) 1900926

**2:50pm** *Modeling Hydrodynamic Effects on Oyster Upweller Systems* • Presenting author: Matthew Campbell, NC State, Raleigh, NC (Steven Hall) 1901515

**3:05pm** *Hurricane Florence and Michael Post-mortem: Engineering Robust Marine Aquaculture Systems for Shellfish Systems and BMPs for High Energy Events* • Presenting author: Steven Hall, NCSU Bio and Ag Engineering, Raleigh, NC (Steven Hall, Matthew Campbell, Melody Thomas, Russell Smith, Nathaniel Eddy) 1901494

**3:20pm** *A Human-Powered Catamaran Fish Feeder System for Small Fish Farmers of Developing Countries* • Presenting author: Ritu Prem, Indian Institute of Technology, Kharagpur, West Bengal India 1901165

**3:35pm** **BREAK**

**3:45pm** *Design Optimization of Perforated Pooled Circular Stepped Cascade Aerator (PPCSA) for Maximum Aeration Efficiency in Aquaculture* • Presenting author: Subha Manash Roy and Rajendra Machavaram, IIT Kharagpur, West Bengal, India (Subha Manash Roy, Rajendra Machavaram) 1900446

# Monday, July 8

**4:00pm** *Microbial Fuel Cell and Membrane Bioreactor Combination Offering an Effective Treatment to Fish Processing Wastewater for Facilitating Water Reuse* • Presenting author: Gourav Dhar Bhowmick, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India (Makarand Madhao Ghangrekar, Arunabha Mitra) 1900438

**4:15pm** *Biochar as Alternative Media for Nitrate Removal from Aquaculture Effluents* • Presenting author: Diplina Paul, North Carolina State University, Raleigh, NC (Diplina Paul, Praveen Kolar, Steven G. Hall) 1900831

**4:30pm** *Improving Nitrification Biofilter Performance with 3D Printed Media* • Presenting author: David Blersch, Auburn University, Auburn, AL (Gabriel Proaño, Andres Carrano) 1901844

**4:45pm** *Industry Needs and Opportunities in Aquacultural Engineering* • Presenting author: Edward D. Aneshansley, Pentair, Marblehead, MA (Ed Aneshansley) 1901931

## **140 Challenges and Solutions to Declining Water Supplies for Irrigation**

Monday, July 8, 2:30pm-5:00pm

Location: Orleans

Sponsored by: NRES-24; NRES-242

Moderators: Chris Henry, University of Arkansas, Stuttgart, AR; Ameneh Tavakol, Kansas State University, Manhattan, KS

**2:35pm** *Recycled Water for Agricultural Irrigation: Developing a Geospatial Decision Analysis Tool* • Presenting author: Masoud Negahban-Azar, University of Maryland, College Park, MD (Masoud Negahban-Azar, Manashi Paul, Adel Shirmohammadi, Hubert Montas) 1901291

**2:50pm** *Can We Use Wastewater to Grow Food?* • Presenting author: Peining Guan, McGill University, Montreal, Quebec, Canada (Jaskaran Dhiman, Shiv Prasher, Peining Guan, Eman ElSayed, Christopher Nzediegwu, Ali Mawof) 1901267

**3:05pm** *The Application of Low-Cost Suspended Growth Process Technology for Mixed Wastewater Treatment and Reuse for Irrigation* • Presenting author: Precious N. Egbuikwem, University of Surrey, Guildford, Surrey, United Kingdom (Precious N. Egbuikwem, Devendra Saroj, Gregory Obiechefu) 1900143

**3:20pm** *A West Texas Study: Irrigating with Treated Municipal Wastewater and Soil Water Holding Capacity* • Presenting author: Sonja Cook, Alan Plummer Associates, Inc., Fort Worth, TX (Amjad Assi, Rabi Mohtar, Cristine Morgan, Anish Jantrania) 1900817

**3:35pm** **BREAK**

**3:45pm** *Role of Aging of Biochar in Reducing Metal Uptake by Potato Plants Irrigated with Wastewater* • Presenting author: Joba Purkaystha, McGill University, Montreal, Quebec, Canada (Christopher Nzediegwu, Shiv Prasher, Eman ElSayed, Jaskaran Dhiman, Ali Mawof, Joba Purkaystha) 1901189

**4:00pm** *An Innovative Approach to Rainwater Harvesting for Irrigation Based on ENSO Forecasts* • Presenting author: Laljeet Sangha, Graduate Research Assistant, Auburn, AL (Jasmeet Lamba, Puneet Srivastava, Hemendra Kumar, Mark Dougherty, Rishi Prasad) 1900941

**4:15pm** *Characterizing Surface Water Use for Irrigation in the Mississippi Delta* • Presenting author: Meredith Brock, Mississippi State University, Mississippi State, MS (Mary Love Tagert, Joel Paz, Lindsey Yasarer) 1901506

**4:30pm** *The Arkansas Irrigation Yield Contest: A Novel Approach to Increasing Adoption of Irrigation Water Management Practices* • Presenting author: Chris Henry, University of Arkansas, Stuttgart, AR (C.G. Henry, D. M. Pickelmann, G. D. Simpson) 1901450

## **141 Environmental and Applied Tracers in Groundwater and Surface Water Systems—HYBRID**

Monday, July 8, 2:30pm-5:00pm

Location: Falmouth

Sponsored by: NRES-21; NRES-224; NRES-25; NRES-252; NRES-253; NRES-28

Moderators: Troy Gilmore, University of Nebraska, Lincoln, NE; Qaisar Saddique, Northwest A&F University, Yangling, Shaanxi China

**2:35pm** *Stable Isotope Ratios of Hydrogen and Oxygen as Tracers of Human Drinking Water in Boston, Massachusetts* • Presenting author: Casey Kennedy, USDA-ARS, East Wareham, MA (Casey Kennedy, Sophie Wilderotter) 1900088

**3:05pm** *Multi-Year Enrichment of the Stable Isotopic Composition of Stream Water from Groundwater Recharge Due to Extreme Precipitation* • Presenting author: David Boutt, Department of Geosciences, UMass-Amherst, Amherst, MA (Stephen Mabee, Qian Yu) 1900843

**3:35pm** **BREAK**

**3:45pm** *Remotely Sensing Sediment Tracers* • Presenting author: Anna Linhoss, Mississippi State University, Starkville, MS (Anna Linhoss, Joby Czarnecki, Sathish Samiappan) 1901826

**4:00pm** *Sidewall Flow in Undisturbed Lysimeters: Experimental Limitation or Asset?* • Presenting author: Mark Williams, USDA-ARS NSERL, West Lafayette, IN (Mark Williams) 1901894

**4:15pm** *Identifying Common Use Pesticides Degradation Byproducts and Pathways* • Presenting author: Jessica Satiroff, University of Nebraska-Lincoln, Omaha, NE (Jessica Satiroff, Tiffany Messer, Aaron Mittelstet, Dan Snow, Matthew Greiner) 1900203

**4:30pm** *Recharge Seasonality Based on Stable Isotope Sampling Nebraska, USA* • Presenting author: Troy Gilmore, University of Nebraska-Lincoln, Lincoln, NE (Mikaela Cherry, Aaron Mittelstet, Didier Gastmans, John Gates) 1901833

# Monday, July 8

## 142 Implementing Water, Energy, and Food Sustainable Development Goals—INVITED

Monday, July 8, 2:30pm-5:00pm

Location: St. Botolph

Sponsored by: NRES

Moderators: Rabi Mohtar, American University of Beirut, Beirut, Lebanon; Bassel Daher, Texas A&M University, College Station, TX; Jordan Muell, Provost & Pritchard Consulting Group, Visalia, CA

**2:30pm** *Water-Energy-Food Nexus Consortium* • Presenting author: Rabi Mohtar, Texas A&M University; American University of Beirut, Beirut, Lebanon 1901988

**2:35pm** *WEF Nexus and SDGs Overview* • Presenting author: Bassel Daher, Texas A&M University, College Station, TX 1901989

**2:45pm** *SDG Implementation Challenges* • Presenting author: Annette Huber-Lee, Stockholm Environment Institute, Somerville, MA 1901990

**2:55pm** *Role of Tools, Data and Assessments* • Presenting author: Elfatih Eltahir, Massachusetts Institute of Technology, Cambridge, MA 1901991

**3:05pm** *Governance and Institutional Challenges* • Presenting author: Kent Portney, Texas A&M University, College Station, TX 1901992

**3:15pm** *Private Sector Role in SDG Implementation* • Presenting author: Debabrata Sahoo, Woolpert Inc, Columbia, SC 1901993

**3:25pm** *Local Scale Action* • Presenting author: TBA 1901994

## 143 Innovations in Irrigation Systems

Monday, July 8, 2:30pm-5:00pm

Location: Yarmouth

Sponsored by: NRES-24; NRES-244

Moderators: Derek Heeren, University of Nebraska, Lincoln, NE; Sumon Datta, Oklahoma State University, Stillwater, OK

**2:35pm** *A Geospatial Tool for Design and Analysis of On Demand Pressurized Water Distribution Systems* • Presenting author: Andre Daccache, University of California Davis, Davis, CA (N. Lamaddalena) 1900044

**2:50pm** *Large Scale Evaluation of a Low Energy Precision Application (LEPA) System Compared to Mid Elevation Spray Application (MESA) on Spearmint and Peppermint* • Presenting author: Troy Peters, Washington State University, Prosser, WA (Behnaz Molaei, Abid Sarwar, Abdelmoneim Mohamed) 1901843

**3:05pm** *The Uniformities of Groundwater-Based Irrigation Systems in Oklahoma and Their Environmental Impacts* • Presenting author: Divya Handa, Oklahoma State University, Stillwater, OK (Divya Handa, Robert S. Frazier, Saleh Taghvaeian, Jason G. Warren) 1900667

**3:20pm** *Software for Energy Consumption Optimization in Center Pivot Irrigation Systems* • Presenting author: Joao Carlos Cury Saad, FCA-UNESP, Botucatu, SP, Brazil (Rafael Ludwig, Joao Carlos Cury Saad) 1900903

**3:35pm** BREAK

**3:45pm** *Assessment of Water Use Efficiency of Membranes in Subsurface Irrigation Systems* • Presenting author: Valeria Almeida Lima, The University of New South Wales, Sydney, NSW, Australia (Valeria Lima, Gregory Leslie, Bruce Sutton, Claudia Keitel) 1900912

**NO-SHOW** *Evaluating the Performance of Rice Paddy under Various Managed Fields to Address Leakages from Paddy* • Presenting author: Oppong Kwabena Paul, Jiangsu University, Zhenjiang, Jiangsu China (Mao Hanping, Ning Yang, Li Lin) 1900132

**4:15pm** *Effects of Different Plastic-Film Mulching Practices on Maize Growth and Yield under Drip Irrigation in Sub-Humid Region of Northeast China* • Presenting author: Jiusheng Li, China Institute of Water Resources and Hydropower Research, Beijing, China (Xiaodong Bo, Jiusheng Li, Yanfeng Li, Jun Wang) 1900467

## 144 Manure Treatment Systems

Monday, July 8, 2:30pm-5:00pm

Location: Hyannis

Sponsored by: NRES-27

Moderators: Linda Schott, University of Idaho, Twin Falls, ID; Ademola Ajayi-Banji, North Dakota State University, Fargo, ND

**2:35pm** *The Impact of Mechanical Solid Separators on the Mitigation of Methane Emissions from Dairy Manure Lagoons* • Presenting author: Abdolhossein Edalati, University of CA, Davis, Davis, CA (Yike Chen, Hamed El-Mashad, Tyler Barzee, Xingjun Lin, Steve Zicari, Ruihong Zhang) 1901702

**2:50pm** *Flushing Liquid Dairy Manure Solid Distribution and Nutrients Associated with Solids of Different Particle Sizes* • Presenting author: Lide Chen, University of Idaho, Twin Falls, ID (Kevin Kruger, Liang Wang, Howard Neibling) 1900138

**3:05pm** *Predicting the Efficiency of Solid Separators on Dairy Farms Using Particle Size Distribution Measured in the Laboratory* • Presenting author: Yike Chen, University of California, Davis, Davis, CA (Abdolhossein Edalati, Tyler Barzee, Hamed El Mashad, Ruihong Zhang) 1901328

**3:20pm** *The Development of an Intermittent-Vacuum-Stripping Assisted Thermophilic Anaerobic Digestion Process for the Liquid Swine Manure Treatment* • Presenting author: Renchuan Zhang, University of Minnesota, St. Paul, MN (Erik Anderson, Min Addy, Yanling Cheng, Paul Chen, Roger Ruan) 1900166

**3:35pm** BREAK

**3:45pm** *The Impact of a Unique, Advanced Multistage Solid-Liquid Separator System on the Mitigation of Methane Emissions from a Dairy Manure Lagoon in California* • Presenting author: Abdolhossein Edalati, University of CA, Davis, Davis, CA (Yike Chen, Hamed El-Mashad, Tyler Barzee, Xingjun Lin, Steve Zicari, Ruihong Zhang) 1901720

**4:00pm** *Pelleting Dairy Manure and Associated Compost to Mitigate Manure-Nutrients Transportation Cost* • Presenting author: Femi Peter Alege, Washington State University, Pullman, WA (Lisa DeVetter, Haiying Tao, Pius Ndegwa) 1900907

# Monday, July 8

**4:15pm** *Combined Anaerobic Digestion (AD) and Nutrient Capture System (NCS) for Energy Production and Nutrients Recovery from Poultry Litter* • Presenting author: Amro Hassanein, Department of Environmental Science and Technology, University of Maryland, College Park, MD (Amro Hassanein, Stephanie Lansing, Andrew Moss) 1901736

**4:30pm** *An Economic Analysis of Solid Separation Technologies on Select California Dairy Farms* • Presenting author: Yike Chen, University of California, Davis, CA (Abdolhossein Edalati, Tyler Barzee, Hamed El Mashad, Ruihong Zhang) 1901327

**4:45pm** *Advanced Treatment of Simulated Effluent from Bio-Treated Piggery Wastewater by a Novel Electrolysis Process* • Presenting author: Duan Yalin, Zhejiang University, Hangzhou Zhejiang China (Jianghui Du, Zhiying Han, Yuyan Cai, Songming Zhu) 1900733

**5:00pm** *Biological Phosphorus Mineralization in Poultry Litter as a First Step Toward Sustainable Nutrient Recycling* • Presenting author: Brendan Higgins, Auburn University, Auburn, AL (Kristin Chaump, Rishi Prasad) 1901134

## **145 National Basin-Scale Water Quality Review: Targets, Trends and Takeaways—INVITED**

Monday, July 8, 2:30pm-5:00pm

Location: Salon I

Sponsored by: NRES-22; NRES-21; NRES-223; NRES-224; NRES-225; NRES-23; NRES-25; NRES-28

Moderators: Sanjay Shukla, University of Florida, Immokalee, FL; Anita Thompson, University of Wisconsin, Madison, WI; Ruth Book, USDA NRCS, Champaign, IL; Margaret Kalcic, Ohio State University, Columbus, OH

**2:10pm** *Three Decades of Restoration Investments in the Chesapeake Bay Watershed are Resulting in Cleaner Waters* • Presenting author: Richard Batiuk, USEPA Chesapeake Bay Program Office (Richard Batiuk) 1901980

**2:35pm** *Greater Everglades Ecosystem* • Presenting author: Wendy Graham, University of Florida, Gainesville, FL (Wendy Graham) 1901981

**3:00pm** *Success in the 70's and Current Challenges for Great Lakes Water Quality, with a Focus on Lake Erie* • Presenting author: Jay Martin, Ohio State University, Columbus, OH (Jay Martin) 1901984

**3:25pm** *Clean Water Issues, Successes, and Trends Are Key Drivers of Puget Sound Ecosystem Recovery* • Presenting author: Scott Redman, Puget Sound Partnership; Science and Evaluation Program, Tacoma, WA (Scott Redman) 1901982

**3:50pm** *Reducing Gulf Hypoxia: Partnerships and Tracking Progress to Meet Goals* • Presenting author: Katie Flahive, USEPA, Washington, DC 1901983

**4:15pm** **BREAK**

**4:20pm** *Summary and Lessons Learned from Basins* • Presenting author: Sanjay Shukla, University of Florida

**4:30pm** *Panel Discussion* • Presenting author: Richard Batiuk, Kati Flahive, Wendy Graham, Jay Martin, Scott Redman

## **147 Agri-Industrial Facility Design and Operation**

Monday, July 8, 2:30pm-5:00pm

Location: Boylston

Sponsored by: PAFS-20; PAFS-07/1; PAFS-20/4; PRS-701; PRS-702; PRS-703

Moderator: Keaton Friesen, MFS/York/Stormor, Grand Island, NE

**2:35pm** *Development of Equations for the Distribution of Seismic Forces in Ground Supported Flat Bottomed Silos and Bins* • Presenting author: Gregory Williams, Facility Engineering Services, Springdale, AR (Tom Gettings, P.E.) 1900258

**2:50pm** *Dense Phase Pneumatic Conveying of White Wheat* • Presenting author: Johnselvakumar Lawrence, Kansas State University, Salina, KS (Anita Barnhart, Raju Dandu) 1901377

**3:05pm** *Effect of Mediterranean Climatic Condition during Aeration and Silo Wall Coating in On-Farm Grain Storage in South Australia* • Presenting author: Shubham Subrot Panigrahi, University of South Australia, Adelaide Australia (Chandra B Singh, John Fielke) 1900976

**3:20pm** *The Effect of Drying Rate and Storage Conditions on the Persistence of Isoflavones in Red Clover Hay* • Presenting author: Rilwan Oyetunji, University of Kentucky, Lexington, KY (Rilwan Oyetunji, Sue Nokes, Michael Flythe) 1900187

**3:35pm** **BREAK**

**NO-SHOW** *search Progress on Long-Haired Rabbit Cage Equipment* • Presenting author: Hongying Wang, China Agricultural University, Beijing, China (Jiyuan Chen, Enze Duan, Nan Jin, Peng Fang, Dandan Kong, Zhongxian Qi, Yi Jia, Qin hao Zhang, Chuchen Chang, Hongying Wang, Qin Tong) 1900314

**4:00pm** *Session Wrap Up: Increasing Industry Involvement in Developing and Managing Standards*

## **148 Precision Animal Management**

Monday, July 8, 2:30pm-5:00pm

Location: Columbus I

Sponsored by: PAFS-40; ITSC-312

Moderator: Yang Zhao, Mississippi State University, Mississippi State, MS

**2:35pm** *Optimal Camera Placement for Visual Sensing of Livestock Animals in Confined Pen Environments* • Presenting author: Joshua Peschel, Iowa State University, Ames, IA (Joshua Peschel) 1901341

**2:50pm** *Application of Elevated Perching Platform and Robotic Vehicle in Broiler Production* • Presenting author: Xiao Yang, Mississippi State University, Starkville, MS (Xiao Yang, Xiaojing Huo, Guoming Li, Joseph L. Purswell, Tom Tabler, Daniel Chesser, Yang Zhao) 1900304

**3:05pm** *Electronic Control for Hog Cooling Pads* • Presenting author: Robert M. Stwalley III, Purdue University Agricultural & Biological

# Monday, July 8

Engineering, West Lafayette, IN (Tyler Field, Morgan Burgett, Allan Schinckel) 1901304

**3:20pm** *Improving Ambient and Attic Temperature Readings in Commercial Broiler Houses* • Presenting author: Jeremiah Davis, Auburn University, Auburn, AL (Jesse Campbell, Kelly Griggs, Dennis Brothers, Carson Edge) 1901174

**3:35pm** **BREAK**

**3:45pm** *Characterization of a Machine Vision System to Assess Gestating Sow Space Usage* • Presenting author: Suzanne Leonard, Iowa State University, Ames, IA (Suzanne Leonard, Hongwei Xin, Tami M. Brown-Brandl, Brett C. Ramirez, John P. Stinn, Anna Johnson, Kai Liu) 1900782

**4:00pm** *Evaluating Avoidance Distance of Broilers Exposed to Aerial Robotic Systems* • Presenting author: Pratik Parajuli, Mississippi State University, Mississippi State, MS (Pratik Parajuli, Yang Zhao, Tom Tabler, Gary Daniel Chesser) 1900924

**4:15pm** *Thermo-Technical Parameters of the Different Bedding Surfaces in Cubicles for Dairy Cows as a Factor of Their Well-Being in Winter and Summer* • Presenting author: Jana Lendelova, Slovak University of Agriculture in Nitra, Slovakia (Jana Lendelova, Stefan Mihina, Miroslav Zitnak, Michaela Nemethova, Lubormir Botto) 1900268

**4:30pm** *Low Cost GPS Receiver Accuracy for Cattle Monitoring* • Presenting author: Gabriel Abdulai, University of Kentucky, Lexington, KY (Ruigang Yang, Jesse Hoagg, Mike Sama, Josh Jackson) 1900818

**4:45pm** *Comparison of Outside Air and Sol-Air Design Temperatures for Estimating Insulation Needs* • Presenting author: Gary Chesser, Mississippi State University, Mississippi State, MS (G.D. Chesser Jr., Joseph L. Purswell, Jeremiah D. Davis, Jason K. Ward, Thomas Tabler, Yang Zhao) 1900197

**5:00pm** *Effect of Feed Form and Feeder Position on Feeding Behavior in Male Broilers* • Presenting author: Joseph Purswell, USDA-ARS Poultry Research Unit, Mississippi State, MS (Joseph L. Purswell, Elizabeth J. Kim, Scott L. Branton) 1901878

**5:15pm** *Comparison of Old and New Evaporative Pads on a Commercial Broiler Farm* • Presenting author: Carson Edge, Auburn University, Auburn, AL (Jeremiah Davis, Jesse Campbell, Kelly Griggs, Joseph Purswell, Dennis Brothers) 1901324

**5:30pm** *Evaluation of Bleed-Off Valves on Mineral Scale, Pad Efficiency, and Water Consumption in Poultry Evaporative Cooling Systems* • Presenting author: John Linhoss, Mississippi State University, Mississippi State, MS (John Linhoss, Joseph Purswell) 1900838

## **149 Spectral Scattering, Fluorescence, and Raman Technology for Food Quality and Safety**

Monday, July 8, 2:30pm-5:00pm

Location: Columbus II

Sponsored by: PRS-701; PRS-703; ITSC-348

Moderator: Jianwei Qin, USDA ARS, Beltsville, MD

**2:35pm** *Detection of trace Harmful Residues in Milk Using Up-Conversion Fluorescence Technology* • Presenting author: Qin Ouyang, Jiangsu Universtiy, Zhenjiang, Jiangsu Province, China (Qin Ouyang, Quansheng Chen, Huanhuan Li, Yan Liu) 1900871

**2:50pm** *Automatic identification Method of Varieties of Pesticide Residues in Fruits* • Presenting author: Yankun Peng, China Agricultural University, Beijing China (Liang Song, Yankun Peng, Yongyu Li, Yan Li, Kuanglin Chao, Jianwei Qin) 1900786

**3:05pm** *Potential of Grain Truck Inspections with a Drone or Go-Pro Camera System* • Presenting author: Daniel Brabec, USDA-ARS, Manhattan, KS (Daniel Brabec, James Campbell, Brandon Rapp) 1901906

**NO-SHOW** : *Haptoglobin Detection Based on Enhanced Fluorescence of Gold Nanoparticles* • Presenting author: Giorgi Shtenberg, Institute of Agricultural Engineering, ARO, the Volcani Center, Bet Dagan, Israel (Giorgi Shtenberg, Narsingh R. Nirala) 1900097

**3:35pm** **BREAK**

**3:45pm** *Rapid nondestructive Qualitative Discrimination of Egg Freshness by VIS/NIR Spectroscopy* • Presenting author: Hubo Xu, China Agricultural University, Beijing, China (Zhixiong Shen, Xiuying Tang, Zhengxuan Li, Jun Dong, Xiaoguang Dong, Hubo Xu) 1900393

**4:00pm** *Maintaining the Predictive Abilities of Tea Moisture Content Models on Different Environment Based on Visible and Near-Infrared Spectroscopy Technique* • Presenting author: Zhenxiong Huang, Fujian Agriculture and Forestry University, Fuzhou, Fujian China (Zhenxiong Huang, Haiyun Li, Lang Liu, Xiaoli Li, Dapeng Ye) 1901013

**4:15pm** *Spatial Frequency Domain Imaging Coupled with Frequency Optimization for Estimating the Optical Properties of Two-Layer Food Products* • Presenting author: Dong Hu, Zhejiang A&F University, Hangzhou, Zhejiang China (Renfu Lu, Yibin Ying) 1900695

**4:30pm** *Comparative Study and Optimization of Near-Infrared Diffuse Reflection and diffuse Transmission of Rice Amylose* • Presenting author: Ya-Chao Liu, China Agriculture University, Beijing China (Ya-chao Liu, Yong-yu Li, Yan-kun Peng, Shuai Yan, Kai-yuan Deng) 1900388

**4:45pm** *Detecting Presence of Chlorpyrifos Methyl Pesticide Residue in Rough, Brown and Milled Rice Using NIR Spectroscopy* • Presenting author: Fatima S. Rodriguez, UPB/USDA, Manhattan, KS (Fatima S. Rodriguez, Paul R. Armstrong, Elizabeth B. Maghirang, Arlene Adviento-Borbe, Erin D. Scully, Frank H. Arthur, Daniel L. Brabec, Kevin F. Yaptenco, Delfin C. Suministrado) 1901907

## **150 Use of Models to Study Crop Drying, Handling and Storage—INVITED**

Monday, July 8, 2:30pm-5:00pm

Location: Salon K

Sponsored by: PRS-702

Moderator: John Lawrence, Kansas State University, Manhattan, KS

**2:35pm** *Mathematical Models as Stored-Grain Ecosystems Management Tools* • Presenting author: Digvir Jayas, University of Manitoba, Winnipeg, MB, Canada (Digvir Jayas) 1901921

**2:55pm** *Storage and Flow of Bulk Solids* • Presenting author: Greg Mehos, Greg Mehos & Associates, Westford, MA (Greg Mehos) 1901920

# Monday, July 8

**3:15pm** *Evolution Rate of Phosphine from Aluminum Phosphide Tablets Using Fluent CFD Model* • Presenting author: Sherif Elsayed, Kansas State University, Manhattan, KS (Sherif Elsayed, Mark Casada, Ronaldo Maghirang) 1901917

## **3:35pm BREAK**

**3:45pm** *Commercial Use of Models to Manage Postharvest Systems for Peanuts* • Presenting author: Chris Butts, USDA ARS, Dawson, GA (Chris Butts) 1901919

**4:05pm** *Discrete Element Methods used in Grain/Seed Processing Industry* • Presenting author: Kingsly Ambrose, Purdue University, West Lafayette, IN (Madhu Kodam) 1901918

**4:25pm** *Mathematical Modeling of Rice Drying Operations* • Presenting author: Bhagwati Prakash, University of Arkansas, Fayetteville, AR (Bhagwati Prakash) 1901916

## **SmartAg Wrap Session**

Monday, July 8, 4:00pm-5:30pm

Location: Nantucket

Moderator: Ajit Srivastava, Michigan State University, East Lansing, MI

*The purpose for the SmartAg Wrap Session is to continue the dialogue between ASABE and IEEE members regarding the creation of a SmartAg international community for the purpose of development, application and transfer of related technologies and innovation.*

## **151 NRES—Natural Resources & Environmental Systems**

### **POSTER SESSION**

Monday, July 8, 5:00pm-7:00pm

Posters will be displayed for the entire session, but authors will be present at posters as follows:

5:00pm-6:00pm, authors with ODD numbered posters present

6:00pm-7:00pm, authors with EVEN numbered posters present

Location: Gloucester

Sponsored by: NRES

Moderator: Srinivasulu Ale, Texas A&M AgriLife, Vernon, TX

**1** *Anaerobic Co-Digestion of Poultry Litter and Wheat Straw Affected by Solids, Free Ammonia, and Carbon/Nitrogen Ratio with Response Surface Analysis* • Presenting author: Jun Zhu, University of Arkansas, Fayetteville, AR (Jun Zhu, Sarah Wu, Jiacheng Shen) 1900026

**2** *Strategy for Addressing Ammonia Inhibitions in Anaerobic Digestion of Food Wastes* • Presenting author: Pius Ndegwa, Washington State University, Pullman, WA (Yiqing Yao, Sifolo Coulibaly) 1901639

**3** *Techno-Economic Analysis of Solid Manure Composting* • Presenting author: Daniel Andersen, Iowa State University, Ames, IA (Jin-Yew Lim, Erica Timmermans, Daniel Andersen) 1901726

**4** *Anaerobic Digestion: Evaluating the New Realities of an Ancient Technology as Feedstock Move from Manure to*

*Biomass* • Presenting author: Daniel Andersen, Iowa State University, Ames, IA (Daniel Andersen) 1901732

**5** *Biosolids-Derived Organomineral Fertilizers from Anaerobic Digestion Digestate: Opportunities for Australia* • Presenting author: Bernadette K. McCabe, Centre for Agricultural Engineering, University of Southern Queensland, Toowoomba, Queensland Australia (Bernadette K. McCabe, D. L. Antille, Serhiy Marchuk, Stephan Tait, Seonmi Lee, Jochen Eberhard, Craig Baillie) 1900192

**6** *Identification and Analysis of Organic Waste Produced from Australian Intensive Livestock Industries: Opportunities for Aggregation and Treatment Via Co-Digestion* • Presenting author: Bernadette K. McCabe, Centre for Agricultural Engineering, University of Southern Queensland, Toowoomba, Queensland Australia (Bernadette K. McCabe, Stephan Tait, Serhiy Marchuk, Seonmi Lee, Dio Antille, Jochen Eberhard, Craig Baillie) 1900170

**7** *Evaluation of the Lag-Phase Reduction during Anaerobic Digestion of Protein for High-Efficiency Biogas Production* • Presenting author: Min-Jee Kim, Kangwon National University, Chuncheon, Gangwon, Republic of Korea (Min-Jee Kim, Sang-Hun Kim) 1901436

**8** *Gross Electrical Energy Production Potential from Agricultural Waste: A GIS-Base Assessment of Anambra State of Nigeria* • Presenting author: Emmanuel Chukwuma, Department of Agricultural & Bioresources Engineering, Nnamdi Azikiwe University, Awka, Anambra State Nigeria (Emmanuel. Chukwuma, Oji Nwoke, Desmond Amaefule) 1900033

**9** *GIS Based Analysis of Plastic Waste Leakage in Parts of Selangor State of Malaysia* • Presenting author: Emmanuel Chukwuma, Department of Agricultural & Bioresources Engineering, Nnamdi Azikiwe University, Awka, Anambra State Nigeria (Chukwuma, E. C, Shariff, A. R. B. M., Hasfalina, C. M., Mohamed, A. A., Abdullah, L. C) 1900079

**10** *Wood Biomass, Its Usages and Environmental Challenges in Nigeria* • Presenting author: Boniface O. Ugwuishiwu, University of Nigeria, Nsukka Nigeria (Jeol N. Nwakaire, Samson N. Ugwu, Samuel O. Uke, Francis Obi) 1900070

**11** *Climate Change and Vulnerability of Engineering Infrastructure: A Critical Review* • Presenting author: Boniface O. Ugwuishiwu, University of Nigeria, Nsukka Nigeria (Emmanuel A, Echiegu, Joel N. Nwakaire, Samson N. Ugwu) 1900069

**12** *The Effect of pH and Ferric Ion on Recalcitrant Dissolved Organic Nitrogen Production from the Thermal Hydrolysis of Biosolids* • Presenting author: Dian Zhang, Virginia Tech, Manassas, VA (Zhi-Wu Wang, Wendell Khunjar) 1900235

**13** *Effectiveness of Pit Additive in Reducing Emissions and Solids* • Presenting author: Cuong Duong, Columbia, MO (Cuong Duong, Teng Teeh Lim, Allen Haipeng Wang) 1900927

**14** *The Impact of a Weeping Wall on the Mitigation of Methane Emissions from a Dairy Manure Lagoon in California* • Presenting author: Abdolhossein Edalati, University of CA, Davis, Davis, CA (Yike Chen, Hamed El-Mashad, Tyler Barzee, Ruihong Zhang) 1901747

# Monday, July 8

- 15** *Cloning of a Novel Ring Cleavage Dioxygenase Responsible for Diphenyl Ether Degradation in Strain Sphingobium SC\_3 and Its Engineering Application Attempt* • Presenting author: Shu Cai, UC Davis, Davis, CA (Shu Cai, Ruihong Zhang) 1901364
- 16** *Phosphorus Removal from Anaerobic Digestion Effluent Filtrate Using Flue Gas Desulfurization (FGD) Gypsum and the Techno-Economic Analysis* • Presenting author: Leipeng Cao, The Ohio State University, Wooster, OH (Fuqing Xu, Leipeng Cao, Harold Keener, Ajay Shah, Yebo Li) 1901577
- 17** *Soil Properties as Effected by Long-Term Land Application of Paunch* • Presenting author: Diogenes Antille, CSIRO Agriculture and Food, Canberra, Australian Capital Territory, Australia (Diogenes L. Antille, Kyra C. O'Sullivan, Bernadette K. McCabe, Serhiy Marchuk, Jochen Eberhard, Seonmi Lee, Craig P. Baillie) 1900047
- 18** *The Influence of Compaction and Organic Fertilizer Incorporated into Sandy Loam Soil on Its Saturated Hydraulic Conductivity in North Eastern Nigeria* • Presenting author: Eli Mamman, University, Maiduguri, Borno, Nigeria (Mamman, Eli) 1901459
- 19** *Antibiotics On Farms from the Farmer Perspective* • Presenting author: Christine Georgakakos, Cornell University, Ithaca, NY (M.Todd Walter) 1901841
- 20** *Synergistic Effect of Cationic Polymer with Hydrogel on Bacterial Reduction in Water Systems* • Presenting author: Zong Liu, Texas A&M University, College Station, TX (Zong Liu) 1901389
- 21** *Multi-Point High Frequency Sampling System to Gain Deeper Insights on the Fate of Nitrate in Artificially Drained Fields* • Presenting author: Wenlong Liu, North Carolina State University, Raleigh, NC (Bryan Maxwell, François Birgand, Mohamed Youssef, George Chescheir, Shiyong Tian) 1901794
- 22** *Measuring the Effect of Sediment E. coli Concentration on Water Quality by Analyzing Spatial and Temporal Data* • Presenting author: Sadia Salam, South Dakota State University, Brookings, SD (Rachel McDaniel, Bruce Bleakley) 1900081
- 23** *Drainage Water Recycling in Central Iowa* • Presenting author: Sam Phillips, Iowa State University, Ames, IA (Sam Phillips, Matthew Helmers, Chris Hay) 1901168
- 24** *Drainage Water Recycling to Increase Crop Yield and Improve Water Quality* • Presenting author: Hossam Moursi, North Carolina State University, Raleigh, NC (Mohamed Youssef, Chad Poole, Lamyaa Negm) 1901229
- 25** *Tile Depth and Spacing Effect on Field-Scale Hydrological Responses and Crop Production* • Presenting author: Hanseok Jeong, University of Illinois, Urbana, IL (Rabin Bhattarai, Richard A. Cooke) 1901264
- 26** *Simulated Effect of Real-time Water Table Management on Hydrology and Crop Yield in Eastern North Carolina* • Presenting author: Ehsan Bagheri, NC State University, Raleigh, NC (Mohamed Youssef, Lamyaa Negm, Chad Poole, George Chescheir, Wayne Skaggs) 1900971
- 27** *Effects of Winter Cover Crops and N Fertilization Rate on Corn Production and N Leaching Loss in the Colder Regions of Southern Minnesota* • Presenting author: Mohammad Anar, University of Minnesota, Lamberton, MN (Vijaya Joshi, Jeffrey Vetsch, Jeffrey Strock, Axel Garia) 1901769
- 28** *Designing Stormwater Control Measures for Maintenance* • Presenting author: Kathleen Balaze, North Carolina State University, Raleigh, NC (Sarah Waichowski, William Hunt III) 1901663
- 29** *Study of Flood Impact in Katy Prairie* • Presenting author: Cynthuja Partheeban, Texas A&M University, Irving, TX (Jaber Fouad, John Jacob) 1901391
- 30** *Permaculture in Rural Panama: Technical Difficulties of Early Adoption* • Presenting author: Roberto Forte, McGill University, Montreal, Quebec Canada (Grant Clark) 1901588
- 31** *Dog Food Compared to Kitchen Waste in Vermicomposting* • Presenting author: Cameryn Taylor, Oklahoma State University, Stillwater, OK (Douglas Hamilton) 1901176
- 32** *Evaluating the Cost-Effectiveness of Low Impact Development Practices in Reducing Urban Stormwater Runoff Quantity Using the Soil and Water Assessment Tool* • Presenting author: Siyu Li, University at Albany, SUNY, Albany, NY (Yaoze Liu) 1900259
- 33** *Performance Evaluation of SWAT and HSPF Models for Nutrient Yield in Big Sunflower River Watershed* • Presenting author: Avay Risal, Department of Agricultural and Biological Engineering, Mississippi State University, Mississippi State, MS (Prem B. Parajuli, Ying Ouyang) 1900106
- 34** *Antibiotic Residues in Soil and Runoff from Dairy-Manure Applied Fields Subject to Varied Rainfall* • Presenting author: Talia Leventhal, The Pennsylvania State University, State College, PA (Heather Gall, Lou Saporito, Kyle Elkin, Tamie Veith, Peter Kleinman) 1901817
- 35** *Impact of Silver Nanoparticle Presence in Wastewater on Heavy Metal Transport in Soil and Radish Plants* • Presenting author: Tianai Zhou, McGill University, Montreal, Quebec, Canada (Tianai Zhou, Shiv Prasher, Saji George, Jennifer Ronholm, Danielle Donnelly, Ali Mawof, Peining Guan) 1901468
- 36** *Comparing Soil Moisture Retention In Soils Managed For Cotton Production And Managed Using Conservation Verses Conventional Practices* • Presenting author: Gary Hawkins, University of Georgia, Watkinsville, GA (Rachel Collier, Ernest Tollner) 1901454
- 37** *Evaluation of Alternative Management Practices in Northeastern Dairy Agroecosystems: Edge-of-Field Hydrologic and Nutrient Fluxes.* • Presenting author: Cameron Twombly, University of Vermont, Burlington, VT (Joshua Faulkner, Stephanie Hurley) 1900889
- 38** *Assessing the Effects of Biofuel Crops on Streamflows and Water Quality in Northern Lake Erie Watershed, Ontario* • Presenting author: Fahimeh Jafarianlari, University of Guelph, Guelph, Ontario Canada (Fahimeh Jafarianlari, Prasad Daggupati) 1901662
- 39** *Estimation of Auto-Irrigation Water Using APEX model* • Presenting author: Soohong Kim (Seoro Lee, Gwanjae Lee, Soohong Kim, Jounggun Kim, Kyoungjae Lim) 1901073

# Monday, July 8

**40** *Assessment of Agricultural Drought Monitoring and Early Warning Using a Suite of Satellite-Based Drought Indices in East Asia* • Presenting author: Won-Ho Nam, Hankyong National University, Anseong, Republic of Korea (Won-Ho Nam, Dong-Hyun Yoon, Hee-Jin Lee, Eun-Mi Hong, Taegon Kim, Dae-Eui Kim, Tsegaye Tadesse, Mark Svoboda, Michael Hayes) 1900744

**41** *Effects of Tillage and Manure Type on Nitrogen and Phosphorus Losses through Surface Runoff from Winter Manure Application* • Presenting author: Laxmi Prasad, University of Wisconsin Madison, Madison, WI (Anita Thompson, Francisco Arriaga, Peter Vadas) 1900355

**42** *Impact of Surface Runoff Rate on Stream Water Quality* • Presenting author: Hakkwan Kim, Seoul National University, Pyongchang, Gangwon, South Korea (Sunsook Jang, Hyunseo Ji, Jiyong Choi) 1900506

**43** *Analysis of the Effect of Water Quality Improvement on Seomgang and South Han River by Securing the Flow during Dry Season* • Presenting author: Seoro Lee, Kangwon National University, Gangwondo South Korea (Seoro Lee, Gwanjae Lee, Yujin Choi, Jonggun Kim, Kyoungjae Lim) 1901079

**44** *Analysis of Non-point Pollution Loads Variety Depending on Application on NPS Reduction Facility Scenarios* • Presenting author: Yujin Choi, Kangwon National University, Chuncheon, Gangwon South Korea (Yujin Choi, Gwanjae Lee, Dongseok Yang, Geon woo Park, Jonggun Kim, Kyoungjae Lim) 1901093

**45** *Use of ENSO Forecasts to Withdraw Water Sustainably from Streams for Irrigation* • Presenting author: Laljeet Sangha, Graduate Research Assistant, Auburn, AL (Jasmeet Lamba, Puneet Srivastava, Hemendra Kumar, Mark Dougherty, Rishi Prasad) 1901191

**46** *Using Ensemble Precipitation Forecasts to Improve Hydrologic Risk Assessments at River Crossings* • Presenting author: Daniel Gambill, USACE ERDC-CERL, Champaign, Illinois (Francina Dominguez, Daniel Gambill, Heidi Howard, Praveen Kumar) 1901193

**47** *Water Quality Index Assessment of Old Brahmaputra River Water in Bangladesh* • Presenting author: Sumon Datta, Oklahoma State University, Stillwater, OK (Zahida Muyen, Sharmin Akthar, Siddikur Rahman) 1901258

**48** *Effluents from Dyeing Industries: Quality and Agricultural Reuse Potential* • Presenting author: Sumon Datta, Oklahoma State University, Stillwater, OK (Zahida Muyen, Moktar Hossain, Siddikur Rahman) 1901246

**49** *Suitability Assessment and Mapping to Support Development of Resilient Communities and Livelihoods in Selected Vulnerable Communities in Cagayan Province* • Presenting author: Junel B. Guzman, Cagayan State University, Tuguegarao City, Cagayan, Philippines (Junel Guzman) 1901804

**50** *Comparison of CROPGRO-FRM in RZWQM2 and DSSAT for Simulating Alfalfa Growth and Evapotranspiration in Southern Colorado* • Presenting author: Huihui Zhang, USDA-ARS, Fort Collins, CO (Huihui Zhang, Liwang Ma, Rob Malone, Allan Andales, Kurt Christian Kersebaum) 1901924

**51** *Simulating the Effects of Collaborative Adaptive Rangeland Management Strategies in Semi-Arid Rangelands of the Western*

*North American Great Plains* • Presenting author: Liwang Ma, USDA-ARS, Fort Collins, CO (L. Ma, J.D. Derner, R.D. Harmel, D.J. Augustine, P.N.S. Bartling, C. Zilverberg, J.R. Williams, H. Wilmer, L.M. Porensky, D. Hoover, D. Blumenthal, J. Tatarko, M. Fernandez-Gimenez, J.D. Scasta, David D. Briske, J.P. Ritten) 1901926

**52** *Modeling the Effectiveness of Management Actions to Offset Potential Future Changes in Microbial Water Quality* • Presenting author: Rory Coffey, ORISE participant at U.S. EPA Office of Research and Development, Washington D.C. (Rory Coffey, Jon Butcher, Brian Benham, Thomas Johnson) 1901930

**53** *Does Cover Crop Mitigate Climate Extremes Impact on System Water Use Efficiency in a Maize-Soybean Cropping System?* • Presenting author: Yizhuo Li, Auburn University, Auburn, AL (Yizhuo Li, Di Tian, Gary Feng, Liping Feng) 1901927

**54** *A Low Cost Mechanized Tube Well Installer* • Presenting author: Robert M. Stwalley III., Purdue University Agricultural & Biological Engineering, West Lafayette, IN (Robert Stwalley III) 1901319

**55** *Implications of Potential Introduction of New High-Value Vegetable Crops in the Irrigated Central Washington State* • Presenting author: Fidel Maureira, Washington State University, Pullman, WA (Fidel Maureira, Eduardo Ramos-Real, Kirti Rajagopalan, Jennifer Adam, Claudio Stockle) 1901541

**56** *Evaluation of Sprinkler Irrigation System Hydraulic Performance Effect on Soil Crusting* • Presenting author: Junping Liu, Jiangsu University, Zhenjiang City, Jiangsu Province, China (Junping Liu, Isaya Kisekka, Tao Li) 1900277

**57** *Direct Seeded Guayule Grown in Arizona under Furrow and Subsurface Drip Irrigation* • Presenting author: Diaa Eldin M. Elshikha, University of Arizona, Tuscon, AZ (Diaa Eldin M. Elshikha, Peter M. Waller, Douglas J. Hunsaker, David Dierig, Sam Wang, Mark V. Cruz, Kevin F. Bronson, Matthew E. Katterman) 1900040

**58** *Improving Operational Performance of Irrigation Canal Network System for Drought Risk Management Using Hydraulic Model* • Presenting author: Tae-Hyun Ha, Korea Rural Community Corporation, Daejeon, Republic of Korea (Tae-Hyun Ha, Won-Ho Nam, Jong-Won Do, Seung-Yong Lee, Eui-Yup Jung, Kwang-Ya Lee) 1900983

**59** *Effects of Fertigation Spilts through Center Pivot on the Growth and Yield of Winter Wheat* • Presenting author: Weixia Zhao, China Institute of Water Resources and Hydropower Research, Beijing, China (Weixia Zhao, Jiusheng Li, Yanfeng Li) 1900706

**60** *Comparison of Surface and Subsurface Water Distribution Uniformities under Center Pivot Irrigation System for Sugarcane in Colombia* • Presenting author: Christian J. Mendoza, Cenicana, San Antonio, Valle del Cauca Colombia (Christian Mendoza, Javier Carbonell, Jhon Lasso) 1900785

**61** *Effects of Different Irrigation and Fertilization Treatments on Tomato Growth and Water Distribution and Fertilizer Distribution Uniformity in Greenhouse* • Presenting author: Weibing Jia, Xi'an Jiaotong University, Xi'an city, Shan Xi Province China (Weibing Jia, Zhengying Wei, Yubin Zhang, Lei Zhang, Qian Zhang, Peicun Feng) 1900784

**62** *Effect of Phosphorus Fertigation on Clogging in Drip Emitters Applying Saline Water* • Presenting author: Jun Wang,

# Monday, July 8

China Institute of Water Resources and Hydropower Research, Beijing, China (Xiaoqi Yang, Zhen Wang, Jiusheng Li, Yanfeng Li, Hongquan Liu, Jun Wang) 1901127

**63** *Irrigation Water Use Efficiency and Crop Water Productivity under Smallholder Shared Center Pivot Irrigation Systems in Rwanda* • Presenting author: Ankit Chandra, University of Nebraska-Lincoln, Lincoln, NE (Ankit Chandra, Lameck Odhiambo, Nick Brozovic, Ellen Emanuel) 1900848

**64** *Developing an Operational Framework for Implementing Precision Irrigation Management in Almonds by Integrating Remote Sensing, Proximal Sensing and GIS in iCrop* • Presenting author: Jingyuan Xue, Land Air and Water Resources, UC Davis, Davis, CA (Isaya Kisekka) 1900084

**65** *Water Dynamics in Cropland Fields under Rain-Fed and Different Types of irrigation Practices* • Presenting author: Hemendra Kumar, Auburn University, Auburn, AL (Laljeet Sangha, Puneet Srivastava, Jasmeet Lamba, Guilherme Morata, Luca Bondesan, Brenda V. Ortiz) 1901788

**66** *Corn Irrigation in the Upper Midwest U.S.* • Presenting author: Axel Garcia y Garcia, University of Minnesota, Lamberton, MN (Axel Garcia y Garcia, Jeffrey Strock, Shuhui Liu) 1901744

**67** *Evaluation of Irrigation Termination Effects on Cotton Yield and Water Use Efficiency under Deficit Irrigation Strategies in the Texas High Plains* • Presenting author: Sushil Kumar Himanshu, Texas A&M Agrilife Research, Vernon, TX (Sushil Kumar Himanshu, Srinivasulu Ale, Nina Omani, James Bordovsky, Kelly Thorp, Edward Barnes) 1900799

**68** *Simulating Soil Moisture Fluctuations under Irrigated Crops Using HYDRUS Model* • Presenting author: Mukesh Mehata, Oklahoma State University, Stillwater, OK (Saleh Taghvaeian, Sumon Datta, Daniel Moriasi) 1901217

**69** *Evaluation of Twelve Wind Drift and Evaporation Loss (WDEL) Empirical Models through Field Experimentation under the Climatic Conditions of Prosser, Washington* • Presenting author: Abid Sarwar, Washington State University, Prosser, WA (Abid Sarwar, Troy R. Peters, Abdelmoneim Mohamed) 1901235

**70** *Estimation of Soil Water Contents under Fountain Irrigation Using HYDRUS* • Presenting author: Jongsoon Kim, Pusan National University, Miryang, Kyungnam, South Korea (Donghyun Kim, Jongsoon Kim, Soon Hong Kwon, Ki-Yeol Jung, Sang Hun Lee) 1900634

**71** *Identification of Soil Hydraulic Properties Based on micro-GA Algorithm and Simulation of Soil Water Movement under Drip Irrigation* • Presenting author: Kefeng Zhang, Ningbo Institute of Technology, Ningbo, Zhejiang Province China (Binbin Liu, Huixia Jin) 1900694

**72** *Irrigation Dampens Interannual Variability in U.S. Agriculture by Over 40%* • Presenting author: Meetpal Kukal, University of Nebraska-Lincoln, Lincoln, NE (Suat Irmak) 1900868

**73** *Optimal Irrigation Management System Based on Hydraulic Analysis of Irrigation Canal* • Presenting author: Jong-Won Do, Korea Rural Community Corporation, Daejeon, Republic of Korea (Jong-Won Do, Won-Ho Nam, Kwang-Ya Lee, Tae-Hyun Ha, Seung-Yong Lee, Eui-Yup Jung) 1900967

**74** *Sediment Fingerprinting to Determine the Source of Suspended Sediment in an Urbanized Watershed* • Presenting author: Kritika Malhotra, Auburn University, Auburn, AL (Kritika Malhotra, Ash Abebe, Jasmeet Lamba) 1900632

**75** *Assessing the Variability of Erodibility Parameters at a Regional Scale: A Case Study from the North Carolina Piedmont Region* • Presenting author: Alexis Swanson, North Carolina State University, Raleigh, NC (Alexis Swanson, Celso F. Castro-Bolinaga, Periann Russell) 1901290

**76** *Getting to the Root of Erosion: A Case Study to Estimate Streambank Erosion* • Presenting author: Emily M. Darr, North Carolina State University, Raleigh, NC (Celso Castro-Bolinaga, Ilona Peszlen, Periann Russell) 1900950

**77** *An Integrated Modeling Approach to Evaluate the Effects of Dam Removal on River Corridors through the Lens of the Watershed* • Presenting author: Abhinav Sharma, North Carolina State University, Raleigh, NC (Celso Castro-Bolinaga, Natalie Nelson) 1900982

**78** *Evaluating the Effect of Zayanderud River Drying up on the Underground Water Quality (Case Study: Najafabad and Isfahan Plain)* • Presenting author: Farzaneh Khorsandi, Department of Biological and Agricultural Engineering, University of California, Davis, CA (Zohreh Khorsandi, Farhad Mokhtari, Farzaneh Khorsandi) 1901012

**79** *A Study on the Effect of Reduced Water Amount on Downstream Watershed Due to the Dam Construction* • Presenting author: Gwanjae Lee, Kangwon National University, Chuncheon, Gangwon-do South Korea (Seoro Lee, DongSeok Yang, Kyoung Jae Lim, Jonggun Kim) 1901076

**80** *Assesment of Mutual Relationship among the Soil Heavy Metals around the Mining Areas* • Presenting author: Jinling Zhao, Anhui University, Hefei, Anhui Province China (Jinling Zhao, Linsheng Huang, Dongyan Zhang) 1900508

**81** *Planting Native Perennial Grasses in Multifunctional Riparian Buffers for Water Quality and Farm Profit* • Presenting author: Steph Herbstritt, Penn State, University Park, PA (Steph Herbstritt, Deb Nardone, Suzy Yetter, Armen Kemanian, Tom L. Richard) 1900586

**82** *Challenges and Opportunities in Sustainable Agroecosystems in the Florida Panhandle* • Presenting author: Johnny Grace, USDA-Forest Service, Tallahassee, FL (J.M. Grace III, Y. Ouyang, A. Swamy, L. Ngatia, O.S. Mbuya) 1901882

**83** *Bioremediation of Naphthalene Contaminated Landfill Leachate: An Evaluation of Different Soils for Degradation Potential* • Presenting author: Steven White, Oregon State University, Corvallis, OR (Ganti Murthy) 1901462

**84** *A Meta-Analysis on the Impact of Nitrification Inhibitor and Manure Application Timing on Corn Yield and NO<sub>3</sub>-N Loss in the Midwestern US* • Presenting author: Alyvia Steenhoek, Iowa State University, Ames, IA (Daniel Andersen, Jin Yew-Lim) 1901752

## Monday, July 8

**85** *Evaluation of Soil Carbon Sequestration in Conservation Agriculture Production and Tillage Systems in Cambodia Using SWAT* • Presenting author: Nareth Nut, Royal University of Agriculture, Phnom Penh, Cambodia (Nareth Nut, Manuel R. Reyes, Jaehak Jeong, Gilbert C. Sigua, R Srinivasan, Kieu N. Le, Sarann Ly, Florent Tivet, Vira Leng, Lytour Lor, Sakdanuphol Chan) 1901572

**86** *Selecting BMP Locations Based on the Relationship Among Stream Order, Land Use and Water Contaminants Using SWAT* • Presenting author: Johann Vera, Purdue University, West Lafayette, IN (Bernard Engel, Indrajeet Chaubey) 1901407

**87** *Crop Water Requirements, Biomass and Grain Yields Estimation for Upland Rice Using CROPWAT, AQUACROP and CERES Simulation Models* • Presenting author: Christopher Akinbile, Federal University of Technology, Akure, Ondo Nigeria (Ayotunde Ogundipe, Raphael Davids) 1900196

**88** *Ephemeral Gully Erosion Modeling and Surveying with Close-Range Digital Photogrammetry* • Presenting author: Md Atiqul Islam, Kansas State University, Manhattan, KS (Md Atiqul Islam, Chinthaka Weerasekara, Yan Zhou, Aleksey Y. Sheshukov) 1901426

### 6<sup>th</sup> Decennial National Irrigation Symposium

## *Beyond 2020, Vision of the Future...*

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**Nov. 30-Dec. 4, 2020**      **San Antonio, TX**

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# Tuesday, July 9

Coffee and tea are available in the Exhibit Hall on Monday and Tuesday 9:00am-11:00am and 2:00pm-4:00pm, and Wednesday 7:00am-9:30am.

## **201 Biologically Inspired Micro/Nanoengineering Systems—INVITED**

Tuesday, July 9, 9:30am-12:00pm

Location: Salon H

Sponsored by: ASE-08

Moderators: Jangho Kim, Department of Rural and Biosystems Engineering, Chonnam National University, Gwangju, Republic of Korea; Jin-Woo KIM, Department of Biological & Agricultural Engineering, University of Arkansas, Fayetteville, AR

*Biologically inspired micro- and nanoengineering systems are unique platforms inspired by complex structures and functions of living systems such as animals, plants, and humans. Combining the traditional agriculture and biological engineering principles and techniques with the innovative micro- and nanotechnologies, biologically inspired engineering systems can provide new solutions in local, national and global challenges of agriculture and biological fields. This session will focus on the recent advances in the design, fabrication, and applications of such biologically inspired micro- and nanoengineering systems for advanced agriculture and biological fields to enhance economic well-being and quality of life.*

**9:35am** *Bio-inspired, Sprayable and Rechargeable Antimicrobial Coatings to Improve Food Safety* • Presenting author: Minglin Ma, Cornell University, Ithaca, NY 1901875

**10:00am** *Development of Natural Resource-Derived Biomaterials Using Nano- and 3D Printing Technologies* • Presenting author: Hoon Seonwoo, Department of Industrial Machinery Engineering, Suncheon National University, Suncheon, Republic of Korea 1901870

**10:25am** *Natural Resource-Based Nanohybrids in Food & Biomedical Applications* • Presenting author: Ki-Taek Lim, Kangwon National University, Chuncheon, Gangwon, Republic of Korea 1901876

**10:50am** **BREAK**

**11:00am** *Multiscale Biomimetic Approaches for Engineering Living Systems* • Presenting author: Jangho Kim, Department of Rural and Biosystems Engineering, Chonnam National University, Gwangju, Republic of Korea 1901873

**11:25am** *New Targets and Nanotechnology-Enabled Strategies to Induce Browning of Adipocytes for the Treatment of Obesity* • Presenting author: Di Huang, Department of Animal Sciences, Bindley Bioscience Center, West Lafayette, IN (Di Huang, Mario Alberto, Shihuan Kuang, Meng Deng) 1901871

## **202 Curriculum Design and Student Success**

Tuesday, July 9, 9:30am-12:00pm

Location: Regis

Sponsored by: EOPD-203

Moderator: Amy Kaleita, Iowa State University, Ames, IA

**9:35am** *An Evaluation of Professional Development Needs of College Agricultural Students* • Presenting author: Curtis Langley, Tarleton State University, Stephenville, TX (Michaela Bram) 1901835

**9:50am** *Higher Education Institutions Can Change the World* • Presenting author: Roula Bachour, American University of Beirut, Beirut, Lebanon (Roula Bachour, James French, John Kennelly, Jose Zaglul, Fadlo Khuri, Rabi Mohtar) 1901095

**10:05am** *Lessons Learned by INFEWS-ER's Virtual Resource Center for Transdisciplinary Graduate Student Training at the Nexus of Food, Energy, and Water* • Presenting author: Richard Koelsch, University of Nebraska-Lincoln, Lincoln, NE (Richard Koelsch, Luis F. Rodríguez, Shannon Banner, John Classen, Dan Cotton, Alison Deviney, Jill Heemstra, Jacek Koziel, Deanne Meyer, Anna-Maria Marshall, Anand Padmanabhan, Daniel Steward) 1900876

**10:20am** *Growing Community and Innovation at the Student Farm through an Undergraduate Engineering Design Project* • Presenting author: Jennifer Mullin, UC Davis, Davis, CA (Katharina Ullmann, James Muck) 1901265

**10:35am** **BREAK**

**10:45am** *Environmental Systems Management: From Lecture to Flipped to Online* • Presenting author: Natalie Carroll, Purdue University, W. Lafayette, IN 1900048

**11:00am** *Alumni, Faculty and Employer Insights into Agricultural Operations Management Curricula* • Presenting author: Jonathan Watson, University of Florida, Gainesville, FL (Adam Watson, Kati Migliaccio, Wendell Porter) 1901449

**11:15am** *Leveraging Student Capstone Teams to Conceptualize and Implement Improvements in the Undergraduate Laboratory* • Presenting author: Gretchen Mosher, Iowa State University, Ames, IA (Steven D. Bell, Timothy A. Shepherd, Stuart J. Birrell) 1900657

**11:30am** *The Impacts of Education and Public Outreach on Effective Management of On-Site Wastewater Treatment Systems in Texas* • Presenting author: Gabriele Bonaiti, Texas A&M University, College Station, TX (Askarali Karimov, Ryan Gerlich, Anish Jantrania) 1900599

**11:45am** *Cultivating PhD Scientists in a Pre-Med Undergraduate Environment: Creating a Community of Scholarship and Removing Institutional Barriers* • Presenting author: Daniela S. Jones, North Carolina State University, Raleigh, NC (Daniela S. Jones, Devyn D. Gillette, Paige E. Cooper, Raquel Y. Salinas, Jennifer L. Hill, Sheryllynn J. Black, Daniel J. Lew, Dorian A. Canelas) 1900107

# Tuesday, July 9

## **203 Advances in Biomass Preprocessing**

Tuesday, July 9, 9:30am-12:00pm

Location: Salon K

Sponsored by: ES-220; MS-23/7/2

Moderator: Jaya Shankar Tumuluru, Idaho National Laboratory, Idaho Falls, ID

**9:35am** *Coupling Mechanical Size Reduction with Dry Chemical Pretreatment through Ball Milling: Lignocellulosic Biomass Based Sugars with a New Delignification Approach* • Presenting author: Mohammadali Azadfar, Washington State University, Pullman, WA (Galen Herz, Cecile Cardinalli, Michael Wolcott) 1900161

**9:50am** *Impact of Moisture Content and L/D Ratio on the Pelleting Characteristics of 75% pine+25% Switchgrass Blend in a Pilot Scale Ring Die Pellet Mill* • Presenting author: Jaya Shankar Tumuluru, Idaho National Laboratory, Idaho Falls, Idaho, MS (Jaya Shankar Tumuluru, Matthew Dee, Dana Scouten) 1900336

**10:05am** *Effect of Ultrasonic Pretreatment on the Chemical Composition and Pellet Quality of Camelina Straw* • Presenting author: Onu, Onu Olughu, University of Saskatchewan, Saskatoon, Saskatchewan, Canada (Lope Tabil, Tim Dumonceaux) 1901538

**10:20am** *Optimization of Microbial Pretreatment of Camelina Straw and Switchgrass in a Solid State Fermentation System to Produce Solid Biofuel Pellets and Bioethanol* • Presenting author: Cuong Dao, University of Saskatchewan, Saskatoon, Saskatchewan Canada (Cuong Dao, Lope Tabil, Edmund Mupondwa, Tim Dumonceaux) 1901268

**10:35am BREAK**

**10:45am** *Thermal Properties of Microwave-Assisted Torrefied Pellets from Agricultural Residues* • Presenting author: Obiora Agu, University of Saskatchewan, Saskatoon, Saskatchewan Canada (Lope G. Tabil, Edmund Mupondwa) 1900936

**11:00am** *Quench Coating of Water Resistant Binders to Improve the Durability of Torrefied Biomass Pellets* • Presenting author: Jaya Shankar Tumuluru, Idaho National Laboratory, Idaho Falls, Idaho, MS (Nalladurai Kaliyan, Maryam Manouchehrinejad, Kamalakanta Sahoo, Jaya Shankar Tumuluru, Sudhagar Mani) 1901768

**11:15am** *Drying Biomass Feedstock Materials in a Down-Draft Belt Dryer* • Presenting author: David Lanning, Forest Concepts LLC, Auburn, WA (Christopher Lanning, James Slosson, James Dooley, Jordan Whitt) 1900826

**11:30am** *Determination of Fundamental Mechanical Properties and Modeling the Flow Behavior of Biomass Feedstocks Using the Cubical Triaxial Tester* • Presenting author: Hojae Yi, The Pennsylvania State University, University Park, PA (Virendra Puri, Christopher Lanning, James Dooley) 1900929

**11:45am** *Wear and Why? How Ash Elements Can Help Define Wear Profiles of Biomass Feedstocks* • Presenting author: Jeffrey A. Lacey, Idaho National Laboratory, Idaho Falls, ID (Jeffrey A. Lacey, John E. Aston, Sergio Hernandez, Vicki S. Thompson, Mary S. Intwan, Kyungjun Lee, Jun Qu) 1901446

**12:00pm** *Effect of Wet Explosion Pretreatment in Enhancing Biogas Production of Wheat Straw* • Presenting author: Muhammad Usman Khan, Washington State University, Richland, WA (Muhammad Usman Khan, Birgitte Kiaer Ahring) 1900910

**NO-SHOW** *Development of Pre-Treatment Chamber for Biofuel PRODUCTION* • Presenting author: B.A Adelekan, Federal College of Agriculture, Ibadan, Oyo State Nigeria (A.I. Bamgboye, B.A. Adelekan) 1901522

## **204 Renewable Energy Resources and Technologies**

Tuesday, July 9, 9:30am-12:00pm

Location: Boston University

Sponsored by: ES-210

Moderator: Hongjian Lin, University of Minnesota, St. Paul, MN

**9:35am** *Comprehensive Evaluation of a Landscape Fabric Based Solar Air Heater in a Pig Nursery* • Presenting author: Sanjay B. Shah, North Carolina State University, Raleigh, NC (Li Yu, Sanjay Shah, Mark Knauer, Mike Boyette, Larry Stikeleather) 1901499

**9:50am** *Life Cycle Assessment of Biogas Production in Small-Scale in Columbia* • Presenting author: Omar Hijazi, Technical University of Munich, Agricultural Systems Engineering, Freising, Germany (Omar Hijazi, Sonja Mettenleiter, Mohamed Samer, Essam Abdelsalam, Jochen G. Wiecha, Kathrin L. M. Ziegler, Heinz Bernhardt) 1900099

**10:05am** *The Mixing Power Required for Hydrolysis and Fermentation of Lignocellulosic Biomass in Horizontal and Vertical Reactor: Experimental and Technoeconomic Analysis* • Presenting author: Haider Kadhum, Oregon State University, Corvallis, OR (Haider J. Kadhum, G. S. Murthy) 1900459

**10:20am** *Fuel Cell Grade Hydrogen Gas Production from Corn* • Presenting author: Ozge Nayman Tiryaki (Ozge Nayman Tiryaki, Sibel Irmak) 1901818

**10:35am BREAK**

**10:45am** *Production of Cardboard Based Char for Improved Agricultural Productivity in Northern Remote Regions with Some Energy Recovery* • Presenting author: Sebastian Fricke, McGill University, Montreal, Quebec, Canada (Shiv Prasher) 1901596

**NO-SHOW** *Effects of Microbial Pretreatment on Delignification of Camelina Straw and Switchgrass to Enhance Enzymatic Hydrolysis* • Presenting author: Cuong Dao, University of Saskatchewan, Saskatoon, Saskatchewan Canada (Cuong Dao, Lope Tabil, Edmund Mupondwa, Tim Dumonceaux) 1901270

**NO-SHOW** *Conductive Ink Printed  $Co_3O_4$  and  $Fe_3O_4$  – Ideal *Catnoae* Catalyst for Microbial Fuel Cell to Improve Bio-Energy Recovery* • Presenting author: Gourav Dhar Bhowmick, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India (Harish K Verma, Makarand Madhao Ghangrekar) 1901057

**11:30am** *Bio-Oil Production by Intermediate Pyrolysis Using an Auger Reactor: Optimization through Response Surface Methodology (RSM)* • Presenting author: Brenda Alvarez Chavez, McGill University, Sainte-Anne-de-Bellevue, QC, Canada (Stéphane Godbout, Joahnn Palacios, Étienne Le Roux, Vijaya Raghavan) 1901728

# Tuesday, July 9

**11:45am** *Effect of Crop and Machine Parameters on Mechanical Harvesting of Paddy* • Presenting author: Arjya Utkalini Sahoo, Research Scholar, IIT Kharagpur, Kharagpur, West Bengal, India (Arjya Utkalini Sahoo, Hifjur Raheman) 1901067

**NO-SHOW** *Optimization of Energy Requirements for Thin Layer Drying of Pepper Slices* • Presenting author: Nnaemeka Nwakuba, Michael Okpara Uni. Of Agric. Umudike, Umuahia, Abia State Nigeria (Nnaemeka Nwakuba, Gladys Asonye, Sabbas Asoegwu) 1900018

**12:15pm** *Optimization of Applied Voltage for Electrochemical Hydrogen Sulfide Removal from Biogas* • Presenting author: Hongjian Lin, Zhejiang University, Hangzhou China (Hongjian Lin) 1901566

## **205 Strategies for Safety Communication and Education**

Tuesday, July 9, 9:30am-12:00pm

Location: MIT

Sponsored by: ESH-04/1; EOPD-205; EOPD-208; ESH-04/1

Moderator: Gretchen Mosher, Iowa State University, Ames, IA

**9:35am** *Tractor Operation and Safety Program for Women in Agriculture* • Presenting author: Dee Jepsen, The Ohio State University, Columbus, OH

**9:50am** *NIFA Funding Opportunities for Agricultural Safety and Health* • Presenting author: Salah Issa, USDA NIFA, Washington, DC (Salah Issa, Bradley Rein, Steven Thomson) 1901922

**10:05am** *Intersects and Disconnects for Worker Safety and Pig Welfare during Different Pork Production Stages* • Presenting author: Heather Vanheeswijk, University of Illinois, Plainfield, IL (Heather N. Vanheeswijk, Angela R. Green-Miller) 1901405

**10:20am** *Safety in Agriculture for Youth: Maintaining a National Clearinghouse* • Presenting author: Aaron M. Yoder, PhD, University of Nebraska, Omaha, NE (Aaron M. Yoder, Alyssa Damke) 1901500

## **10:35am BREAK**

**10:45am** *Development of Test Method for Measuring Assistive Torque of the Powered Exoskeleton for Farming* • Presenting author: Masahiro Tanaka, NARO, Saitama-city, Saitama, Japan (Masahiro Tanaka, Yutaka Kikuchi, Satoru Umeno) 1900990

**11:00am** *Developing and Testing an Autonomous All-Terrain Vehicle to Experimentally Simulate Rollover Accidents* • Presenting author: Hsiao-Yang Chou, University of California-Davis, Davis, CA (Hsiao-Yang Chou, Farzaneh Khorsandi) 1901456

**11:15am** *Preliminary Analysis on the Agricultural Production Technological Growth Impact on Agricultural Safety and USDA NIFA Contributions to a Safer Workplace* • Presenting author: Salah Issa, USDA NIFA, Washington, DC (Salah Issa, Bradley Rein, Steven Thomson) 1901923

**11:30am** *Strategies for an Agricultural Safety Instructor Outreach and Communications Program* • Presenting author: Michael Pate, Penn State University, University Park, PA

## **206 ITSC—Information Technology, Sensors & Control Systems POSTER SESSION**

Tuesday, July 9, 9:30am-12:00pm

Posters will be displayed for the entire session, but authors will be present at posters as follows:

9:30am-10:45am, authors with ODD numbered posters present

10:45am-12:00pm, authors with EVEN numbered posters present

Location: Gloucester

Sponsored by: ITSC-01

Moderator: Daniel Jenkins, University of Hawaii, Honolulu, HI

**1** *A Feature Extraction Approach Based on Hough Transform to Estimate Growth Responses of Leaf Lettuce* • Presenting author: Chung-Liang Chang, Department of Biomechanics Engineering, National Pingtung University of Science and Technology, Pingtung County, Taiwan R.O.C. (Wei-Lun Fu) 1900275

**2** *Detection of Three Fruit Maturity Stages in Wild Blueberry Fields Using Deep Learning Artificial Neural Networks* • Presenting author: Craig MacEachern, Dalhousie University Faculty of Agriculture, Bible Hill, Nova Scotia Canada (Arnold W. Schumann, Negar S. Mood, Perseveranca D.K. Mungofa, Craig MacEachern, Qamar U. Zaman, Travis Esau) 1900533

**3** *Investigating the Development of Aspergillus flavus Inoculated on Maize Kernels Using Visible and Near Infrared Hyperspectral Imaging* • Presenting author: Yi Wang, UC Davis, Davis, CA (Beibei Jia, Wei Wang, Xinzhi Ni, Yi Yang, Xin Zhao, Hongzhe Jiang) 1901603

**4** *Deriving Vegetation Indices from High-Throughput Images by Using Unmanned Aerial Systems in Soybean Breeding* • Presenting author: Beichen Lyu, Department of Agricultural & Biological Engineering, Purdue University, West Lafayette, IN (Beichen Lyu, Stuart D. Smith, Yexiang Xue, Keith A. Cherkauer) 1900280

**5** *Designing a Perception System for Safe Autonomous Operations in Agriculture* • Presenting author: Changjoo Lee, Sensor-Technik Wiedemann GmbH, Kaufbeuren, Bayern, Germany (Changjoo Lee, Stefan A Lang, Heinz Bernhardt) 1900696

**6** *Model Fusion for Non-destructive Prediction of Intramuscular Fat in Pork Loin Using Hyperspectral Imaging* • Presenting author: Christopher Kucha, McGill University, Ste Anne de Bellevue, Quebec Canada (Christopher Kucha, Li Liu, Michael Ngadi) 1901866

**7** *Nondestructive Detection of S-Ovalbumin Content during Eggs' Storage Using Visible/Near-Infrared Spectroscopy* • Presenting author: Dandan Fu, College of Engineering, Huazhong Agricultural University, Wuhan, Hubei China (Dandan Fu, Qiaohua Wang, Meihu Ma, Sheng Gao, Yixiao Ma) 1901243

**8** *An Application of Face Recognition Based on Gaussian Processes* • Presenting author: Qingyun Sun, China Agricultural University, Beijing, China (Feixiang Zhang, Weifeng He, Xueru yu, Qingyun Sun) 1901521

## Tuesday, July 9

- 9** *Kinematics Analysis and Simulation of Greenhouse Vegetable Transplanting Robot* • Presenting author: Shixiong Li, China Agricultural University, Beijing, China (Haotun Lyu, Lina Zhang, Luhai Chen, Zhang Xiao, Shixiong Li, Yu Tan) 1901029
- 10** *Greenhouse Intelligent Recognition and Replanting Control System Based on Machine Vision* • Presenting author: Shixiong Li, China Agricultural University, Beijing, China (Zhang Xiao, Xingxing Liu, Shixiong Li, Gang Wu, Yu Tan) 1901021
- 11** *Design and Implementation of Biogas Production Monitoring System* • Presenting author: Xingxing Liu, China Agricultural University, Beijing China (Haotun Lyu, Honghao Liu, Shixiong Li, Xingxing Liu, Yu Tan, Jianping Li) 1901017
- 12** *Automatic Recognition of Potato Germ Based on AdaBoost Algorithm* • Presenting author: Xingxing Liu, China Agricultural University, Beijing China (Liu Yang, Luhai Chen, Fang Tian, Shixiong Li, Yu Tan) 1901019
- 13** *Method of Identification of Crop Nutrition Status Based on Convolutional Neural Network* • Presenting author: Xiaolong Li, China Agricultural University, Beijing China (Haoyun Lyu, Xiaolong Li, Zi Zheng, Shenghui Yang, Xingxing Liu, Yongjun Zheng) 1901014
- 14** *Development of a Raspberry Pi Based Pest Detection Device for Use in Livestock Feed Storage Systems* • Presenting author: Hidehiko Inoue, Institute of Agricultural Machinery NARO, Saitama-shi, Saitama-ken, Japan (Hidehiko Inoue) 1900337
- 15** *Research on Relative Height Detection System of Plant Protection UAV Based on Kalman Filter* • Presenting author: Shenghui Yang, China Agricultural University, Haidian District, Beijing, China (Jianping Li, Qinghao Liu, Hongchao Wang, Zi Zheng, Shenghui Yang, Yongjun Zheng) 1901023
- 16** *CFD Models and Verification of the Downwash Airflow of an Eight-Rotor UAV* • Presenting author: Shenghui Yang, China Agricultural University, Haidian District, Beijing, China (Shenghui Yang, Xingxing Liu, Bingtai Chen, Shixiong Li, Yongjun Zheng) 1901018
- 17** *Measurement of Moisture Content of Peanut (*Arachis hypogaea* Linn.) Using Near Infrared Hyperspectral Imaging Technique* • Presenting author: Jose D. Guzman, Cagayan State University, Tuguegarao City, Cagayan, Philippines (Jose D. Guzman, Jennyfer D. Rabanera) 1901366
- 18** *Sensorsystems in German Dairy Farming—Aspects of Hardware Design and Sustainability* • Presenting author: Heinz Bernhardt, Technical University of Munich, Freising, Germany (Josef Bauerdick, Maximilian Treiber, Martin Höhendinger, Omar Hijazi, Natascha Schlereth, Heinz Bernhardt) 1900739
- 19** *Using Artificial Neural Networks to Differentiate Spectral Signatures of Potato Plants Infected with Potato Virus Y* • Presenting author: L. Michael Griffel, Idaho National Laboratory, Idaho Falls, ID (L. Michael Griffel, Donna Delparte, Paul Bodily) 1901827
- 20** *Design of Software of Prescription Map for Precise Fertilization* • Presenting author: Liu Honghao, China Agricultural University, Beijing, China (Li Shixiong, Chen Yuhang, Wan Chang, Liu Honghao, Zheng Yongjun, Yang Liu) 1901048
- 21** *Development on a New Free-Drilling Stage Cementing Tool* • Presenting author: Yin Yiyong, China Agricultural University, Beijing China (Yin Yiyong, Bai Hanqin, Xiang Hang) 1900375
- 22** *Design and Laboratory Experiment of a New Downhole Vibration Cementing Tool* • Presenting author: Yin Yiyong, China Agricultural University, Beijing China (Liu Binhui, Bian Weikun, Feng Yusi, Yuan Xiong, Li Junpeng, Yin Yiyong) 1900374
- 23** *Wireless Monitoring System of Working Load of Tractors Based on ZigBee* • Presenting author: Li Xiaolong, China Agricultural University, Beijing, China (Lyu Haotun, Zheng Zi, Zhang Ran, Tan Yu, Liu Xingxing, Li Xiaolong, Li ShiXiong) 1900732
- 24** *LAN-Based Monitoring System for Agricultural Device Load* • Presenting author: Li Xiaolong, China Agricultural University, Beijing, China (Yang Liu, Chen Xingwang, Zhang Ran, Tan Yu, Li Xiaolong, Li Jianping) 1901024
- 25** *Florida Polytechnic University's Intelligent Garden—Phase II* • Presenting author: Melissa Morris, Florida Polytechnic University, Lakeland, FL (Melissa Morris, Beverly Butler, Grant Percy, Nicoleta Hickman) 1901491
- 26** *Designing Reliability Sensor for the Maintenance of CNC Machines and Agricultural Machinery* • Presenting author: Osarenren John O, Bronx, New York (Osarenren, J.O) 1901546
- 27** *Using UAV and Thermal/Multispectral Imagery to Determine Soil Moisture in Red River Valley* • Presenting author: Talon Mack, North Dakota State University, Fargo, ND (Talon Mack, Paulo Flores, Xinhua Jia, Xin Sun) 1901455
- 28** *Hydraulic System Simulation of Ditching Depth Automation Control* • Presenting author: Liu Xingxing, China Agriculture University, Beijing, China (Wan Chang, Tan Yu, Yi Xiaokang, Liu Xingxing, Ma Xueting, Liu Honghao) 1901062
- 29** *Developing an Advanced Multi-Parameter Monitoring System for Wireless Real-Time Monitoring and Traceability of Chilled Chicken in Cold Chain* • Presenting author: Xinwu Li, China Agricultural University, Beijing, China (Xinwu Li, Mira Trebar, Xue Liu, Zhenbo Li, Yalei Wu, Xiaoshuan Zhang) 1901140
- 30** *Optimized Faster R-CNN for Fruit Detection of Strawberry Harvesting Robot* • Presenting author: Yang Yu, China Agricultural University, Beijing China (Yang Yu, Kailiang Zhang, Dongxing Zhang, Li Yang, Tao Cui) 1901123
- 31** *Prediction of Quality Attributes of Chicken Breast Fillets by Using Hyperspectral Imaging Technique Combined with Deep Learning Algorithm* • Presenting author: Yi Yang, China Agricultural University, Beijing China (Yi Yang, Wei Wang, Hong Zhuang, Seung-chul Yoon, Brian Bowker, Hongzhe Jiang) 1901301
- 32** *Discrimination of Cotton Plants Damaged by Cotton Bollworm of Different Instars Based on Electronic Nose Use* • Presenting author: Yuting Dai, Zhejiang University, Hangzhou, Zhejiang, China (Yuting Dai, Bo Zhou, Jun Wang) 1900521
- 33** *Enhancing Charge Transport in Enzymatic Bio-Electrodes Using Iron-Sulfur-Based Molecular Wires* • Presenting author: Aishwarya Mahadevan, Texas A&M University, College Station, TX (Aishwarya Mahadevan, Sandun Fernando) 1901647

## Tuesday, July 9

- 34** *Sub-surface Water Sampling Cartridge Design for Unmanned Aerial Vehicles* • Presenting author: Ali Koc, Clemson University, Clemson, SC (Cengiz Koparan, Bulent Koc) 1900816
- 35** *Development of an Image-based System to Assess Nutrient Contents of Food* • Presenting author: Babatunde Onadipe, Bioresource Engineering Department, Sainte Anne de Bellevue, Quebec Canada (Michael Ngadi, Ebenezer Kwofie) 1901773
- 36** *High Sensitive Raman Imaging for Rapid and Nondestructive Analysis of Powdered Food* • Presenting author: Byoung-Kwan Cho, Chungnam National University, Daejeon South Korea (Santosh Lohumi, Oh-Tae Kwon) 1900384
- 37** *Data Analytics for Effective Stored Grain Management* • Presenting author: Clairmont Clementson, Purdue University, West Lafayette, IN (Klein Ileleji) 1901242
- 38** *Development of a Machine Vision Algorithm for Japanese Apricot Fruit Detection and Size Estimation Using 3D Point Cloud* • Presenting author: Daeun Choi, Dept. of Ag and Bio Engineering, Penn State University, University Park, PA (Hyuck-Joo Kim, Won Suk Lee, Gyeong Jang) 1901348
- 39** *Fast Measurement of Nutritive Values in Soybean Using Reflective Hyperspectral Imaging* • Presenting author: Dandan Fu, Huazhong Agricultural University, Wuhan China (Dandan Fu, Jianfeng Zhou, Andrew Scaboo) 1900386
- 40** *Comparison of Prediction Models of Sugar Content Based on Species, Regions, and Spectral Resolutions for Hardy Kiwis (*Actinidia arguta*)* • Presenting author: Giyoung Kweon, Gyeongsang National University, Jinju, Gyeongnam, South Korea (Sangyoon Lee, Youngki Park, Jaekyeong Yang) 1901041
- 41** *Spectral Difference Analysis and Identification of Different Maturity Blueberry Fruit Based on Hyperspectral Imaging Using Spectral Index* • Presenting author: Hao Ma, Henan University of Science and Technology, Luoyang City, Henan Province China (Ma Hao, Zhao Kaixuan, Jin Xin, Ji Jiangtao, Qiu Zhaomei) 1900503
- 42** *Precision Irrigation Strategies for Sustainable Potato Production in Prince Edward Island* • Presenting author: Hassan Afzaal, University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada (Altazaz Farooque, Qamar Zaman, Bishnu Acharya, Travis Esau, Nazar Hussain) 1900380
- 43** *Development of High Throughput Phenotyping System for Plant Breeding* • Presenting author: James Kim, Arid-Land Agricultural Research Center, Maricopa, AZ (James Y Kim, Hussein Abdel-Haleem, Alison Thompson, John Dyer) 1901884
- 44** *Roadmap to High Throughput Phenotyping* • Presenting author: James Kim, Arid-Land Agricultural Research Center, Maricopa, AZ (James Y Kim, John Dyer) 1901886
- 45** *Prediction of Apple Fruitlet Drop by Vis-NIR Spectroscopy* • Presenting author: Jenny Orlova, Technion- Israel Institute of Technology, Haifa, Israel (Raphael Linker, Boris Spektor) 1900407
- 46** *Reconstruction of Three-dimensional Model of Peach Tree* • Presenting author: Jiangtao Qi, Jilin University, Changchun, Jilin, China (Jiangtao Qi, Hongli Tian, Huibin Sun, Linhuan Zhang, Yang Li) 1901709
- 47** *Automatic Food Sample Evaluation Using a Combined 785 and 1064 nm Raman Spectral Imaging System* • Presenting author: Jianwei Qin, USDA ARS, Beltsville, MD (Jianwei Qin, Moon S. Kim, Kuanglin Chao, Jeehwa Hong, Insuck Baek, Sagar Dhakal, Byoung-Kwan Cho) 1901896
- 48** *Anticipatory Defence for Agricultural Drought Forecasting and Warning System Using a Real Time Water-Level* • Presenting author: Jong-Won Do, Korea Rural Community Corporation, Daejeon, Republic of Korea (Jong-Won Do, Bo-Sung Koh, Kwang-Ya Lee, Tae-Hyun Ha, Seung-Yong Lee, Eui-Yup Jung) 1900965
- 49** *Classification of Different Freeze-Damaged Corn Seed Using Hyperspectral Reflectance Imaging Combined with Deep Convolutional Neural Network* • Presenting author: Jun Zhang, Zhejiang University, Hangzhou, Zhejiang Province China (Limin Dai, Zhilin Zhao, Fang Cheng) 1900743
- 50** *Non-Destructive Determination of Crude Fiber in Food and Agricultural By-Products* • Presenting author: Junhee Kim, Kyungpook National University, Daegu, South Korea (Seungmin Woo, Junhee Kim, Yeongsu Kim, Tusan Park, Yushin Ha) 1900959
- 51** *Canopy Structural Patterns for Identifying Stress and Yield Variability in Tobacco and Sorghum* • Presenting author: Kellyn Montgomery, NC State, Raleigh, NC (Josh Henry, Helena Mitsova) 1901336
- 52** *Automated Bioreactor System with Physical Cues for Controlled Stem Cells* • Presenting author: Ki-Taek Lim, Kangwon National University, Chuncheon, Gangwon, Republic of Korea (Ki-Taek Lim) 1901418
- 53** *Use of Handheld Near Infrared Spectrometer and Partial Least Squares Regression to Quantify Metanil Yellow Adulteration in Turmeric Powder* • Presenting author: Mary-Grace Danao, University of Nebraska-Lincoln, Lincoln, NE (Isaac Rukundo, Mary-Grace C. Danao, Curtis L. Weller, Randy L. Wehling, Kent M. Eskridge) 1900458
- 54** *Performance Evaluation of Two Commercially Available Produce Quality Spectrometers* • Presenting author: Md Abdul Momin, University of California, Davis, CA (Constantino Valero, Irwin Donis Gonzalez) 1900247
- 55** *Unmanned Aerial Vehicle (UAV) Based Remote Sensing for Monitoring Cassava (*Manihot Esculenta* Crantz) Growth and Development* • Presenting author: Milton Valencia, CIAT, Pamira, Valle del Cauca, Columbia (Milton Orlando Valencia, Alejandro Vergara, Diego Guzman, Michael Gomez Selvaraj) 1901972
- 56** *On-Line Monitoring of FDM Based on Machine Vision* • Presenting author: Min Zhou, China Agricultural University, Beijing, China (Min Zhou) 1900211
- 57** *Proximal Sensing of Grape Soluble Solids Content* • Presenting author: Peter Schaare, Plant and Food Research, Hamilton, Waikato New Zealand (Peter Schaare) 1900208
- 58** *Development of Portable NIR Spectrum for On-line Quality Detection of Agricultural Products* • Presenting author: Quansheng Chen, Jiangsu University, Zhenjiang, Jiangsu China (Quansheng Chen, Huanhuan Li, Zhiming Guo) 1900364

## Tuesday, July 9

- 59** *Spatially Resolved Spectroscopy Coupled with a Spectral Difference Technique for Predicting Internal Quality of Peaches* • Presenting author: Renfu Lu, USDA/ARS/MWA/SBRU, Michigan State University, East Lansing, MI (Yuping Huang, Renfu Lu) 1900433
- 60** *Comparison of UAV-Based Thermal Imaging for Locating Drain Tile Outlets in Overgrown Drainage Ditches* • Presenting author: Robert Freeland, University of Tennessee, Knoxville, TN (Robert Freeland, Barry Allred, Luis Martinez, DeBonne Wishart, Greg Rouse) 1901879
- 61** *FT-IR Spectroscopic Method Coupled with Chemometrics for Detection of Chemical Adulterants in Spice Powder* • Presenting author: Sagar Dhakal, USDA-ARS, Beltsville, MD (Sagar Dhakal, Walter Schmidt, Jianwei Qin, Moon Kim, Kuanglin Chao) 1901895
- 62** *Phosphorene-Gold Nanocomposite Based Microfluidic Aptasensor for the Detection of Okadaic Acid* • Presenting author: Saipriya Ramalingam, University of Guelph, Guelph, Ontario Canada (Saipriya Ramalingam, Ashutosh Singh) 1901185
- 63** *Near Infrared (NIR) Spectroscopy for Rapid Analysis of Chemical Composition of Corn Stover* • Presenting author: Seyed Hashem Mousavi Avval, The Ohio State University, Wooster, OH (Ajay Shah) 1901660
- 64** *Coffee Flavor Prediction: Using Deep Learning Methods on Near-Infrared Spectroscopy (NIRS)* • Presenting author: Shih-Fang Chen, National Taiwan University, Taipei Taiwan (Yu-Tang Chang, Shu-Pin Hung, Chih-Cheng Lu, Jia-Hung Peng, Shih-Fang Chen) 1901099
- 65** *Air-Driven Lens Clearing for Visual Sensing in Agricultural Environments* • Presenting author: Sierra Young, North Carolina State University, Raleigh, NC (Joshua Peschel) 1901139
- 66** *Advancing Remote Manipulation with Unmanned Aerial Vehicles for Agricultural Applications* • Presenting author: Sierra Young, North Carolina State University, Raleigh, NC (Joshua Peschel, Ryan Lanciloti) 1901153
- 67** *NIR-Based Fruit Ripeness Sensor Embodiments Using Low-Cost LEDs and Photodiodes* • Presenting author: Sim Harbert, Georgia Tech Research Institute, Atlanta, GA (Samarthya Bhatnagar, Melissa Gordon, Cindy Hall, Dennis Hernandez, Angus MacLean, Margarite Picone, Tynan Purdy, Hyoungjun Sim, Giancarlo Tissot, Ai-Ping Hu) 1900580
- 68** *Predicting Soil Properties Using a VNIR Library: Comparison of Modeling Techniques* • Presenting author: Suresh Thapa, University of Nebraska-Lincoln, NE (Nuwan Wijewardane, Abbas Atefi, Yufeng Ge, Hongfeng Yu) 1901733
- 69** *NIR/MIR Spectroscopy in Tandem with Chemometrics for Rapid Identification and Evaluation of Potato Variety and Doneness Degree* • Presenting author: Wen-Hao Su, University of California-Davis, Davis, CA (Serafim Bakalis, Da-Wen Sun) 1900120
- 70** *Advanced Applications of Near/Mid-Infrared (NIR/MIR) Imaging Spectroscopy for Rapid Prediction of Potato and Sweet Potato Moisture Contents* • Presenting author: Wen-Hao Su, University of California-Davis, Davis, CA (Serafim Bakalis, Da-Wen Sun) 1900121
- 71** *Research on Control Strategy Combining Autonomous Navigation and Multitasking for Greenhouse Operating Platform* • Presenting author: Xiangqian Dong, China Agricultural University, Beijing, China (Chao Wang, Jiannong Song, Xiangqian Dong, Yu Chen) 1900629
- 72** *Ambient and Laboratory Evaluation of Two Low-cost Particulate Matter Sensors* • Presenting author: Yi Liang, University of Arkansas, Fayetteville, AR (Yi Liang, Zack Wofford) 1900168
- 73** *Determination and Evaluation of Quality and Safety for Fruit Using Spectroscopic and Imaging Techniques* • Presenting author: Zhiming Guo, Jiangsu University, Zhenjiang, Jiangsu China (Quansheng Chen, Xiaobo Zou, Qin Ouyang, Jiwen Zhao) 1900317
- 74** *Detection of Salmon Quality by Impedance Properties and Chemometrics* • Presenting author: Zongbao Sun, Jiangsu University, Zhenjiang, Jiangsu Province, China (Zongbao Sun, Liming Liang, Xiaobo Zou, Xiaojing Yan, Tianzhen Wang, Yiwei Xu, Xiaoyu Liu, Junkui Li) 1900805
- 75** *Advances of Computational Fluid Dynamics (CFD) in Agricultural and Biosystems Engineering* • Presenting author: Wey Ling Ong, University of Wisconsin-Madison, Madison, WI (Wey Ling Ong, Chahinez Dab, Seunghyeon Jung, Christopher Choi) 1901845
- 76** *Research on Recognition Methods of Pomelo Fruit Hanging on Trees Based on Machine Vision* • Presenting author: Jie Liu, Huazhong Agricultural University, Wuhan, Hubei, China (Xie Hang, Dai Ning, Yang Xiaoju, Zhan Kun, Liu Jie) 1900411
- 77** *Recognition of Cutting Region for Pomelo Picking Robot Based on Machine Vision* • Presenting author: Jie Liu, Huazhong Agricultural University, Wuhan, Hubei, China (Dai Ning, Xie Hang, Yang Xiaoju, Zhan Kun, Liu Jie) 1900412
- 78** *Automatic Crop Recognition Based on Geometric Appearance for a Non-Chemical Robotic Weed Control System in a Tomato Field* • Presenting author: Rekha Raja, University of California Davis, Davis, CA (Rekha Raja, David Slaughter, Steven Fennimore) 1900028
- 79** *Review of Vision Systems Application on Yield Mapping* • Presenting author: Shirin Ghatrehsamani, University of Florida, Gainesville, FL (Shirin Ghatrehsamani, Yiannis Ampatzidis) 1900804
- 80** *Image-Based Automated Trap Surveillance for Coconut Rhinoceros Beetle* • Presenting author: Daniel Jenkins, University of Hawaii, Honolulu, HI (Daniel Jenkins, Michael Melzer, Shizu Watanabe) 1901674
- 81** *Detection of Miconia calvescens DC in Hawaiian Forests with Convolutional Neural Networks* • Presenting author: Daniel Jenkins, University of Hawaii, Honolulu, HI (Roberto Rodriguez, James Leary, Daniel Jenkins, Ryan Perroy) 1901672
- 82** *Establishment of Nozzle Static Atomization and Droplets Rebound Model for Forest Barrier Treatment* • Presenting author: Wang Yaxiong, Beijing Forest University, Beijing, China (Wang,Yaxiong, Kang, Feng, Li, Wenbin) 1900793

**Tuesday, July 9**

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# Tuesday, July 9

## 83 *Numerical Simulation on the Asymmetric Irrigation*

*Sprinkler Jets with LES Method* • Presenting author: Lin Hua, Jiangsu University, Zhenjiang, Jiangsu, China (Lin Hua, Hong Li, Yue Jiang) 1901068

## 84 *Fruit Yield Prediction Using Artificial Intelligence*

• Presenting author: Duke Bulanon, Northwest Nazarene University, Nampa, ID (Tanner Tracht, Garrison Cizmich, Joseph Bulanon, Brice Allen) 1900583

## 85 *Pine Seedlings Detection and Tallying Using Deep Neural Networks*

• Presenting author: Kadeghe Fue, University of Georgia, Tifton, GA (Kadeghe Fue, Gina Bishop, Glen Rains) 1900776

## 86 *Semantic Segmentation of Crop and Weed Using an Encoder-Decoder Network under Uncontrolled Outdoor*

*Illumination* • Presenting author: Aichen Wang, Jiangsu University, Zhenjiang, Jiangsu China (Yifei Xu, Xinhua Wei) 1901033

## 87 *A New Turfgrass Coverage Evaluation Method Based on Two-Stage K-Means Color Classifier*

• Presenting author: Ping Xu, Hangzhou Dianzi University, Hangzhou, Zhejiang, China (Ping Xu, Ning Wang, Xian Zheng, Guangjun Qiu, Bin Luo) 1901754

## 88 *Determining the Shape of the Cordon for Automated Green Shoot Thinning in Vineyards Using Semantic Segmentation-based*

*Deep Learning Networks* • Presenting author: Yaqoob Majeed, Washington State University, Prosser, WA (Yaqoob Majeed, Xin Zhang, Longsheng Fu, Manoj Karkee, Qin Zhang) 1901314

## 89 *Probabilistic Localization of Autonomous Vehicles Inside Orchard Rows*

• Presenting author: Zhenghao Fei, University of California, Davis, Davis, CA (Stavros Vougioukas) 1900378

## 90 *Development of Automatic Milking in Germany*

• Presenting author: Heinz Bernhardt, Technical University of Munich, Freising, Germany (Heinz Bernhardt, Martin Höhendinger, Anja Gräff, Omar Hijazi, Manfred Höld, Matthias Reger, Jörn Stumpfenhausen) 1900127

## 91 *Plant-Stand Count and Spatial Distribution Mapping from UAV Images*

• Presenting author: S. Sunoj, North Dakota State University, Fargo, ND (S. Sunoj, C. Igathinathane, P. J. Flores, H. Sidhu, E. Monono, D. Wiesenborn, D. Archer) 1901259

## 92 *A Novel Farmland Boundaries Extraction and Obstacle Detection Method Based on Unmanned Aerial Vehicle*

• Presenting author: Wang Aichen, Jiangsu University, Zhenjiang, Jiangsu Province China (Zhang Min, Li Lin, Wang Aichen, Wei Xinhua) 1900369

## 93 *Unmanned Aerial Vehicle Based Remote Sensing for Detection of Cranberry Insect Pests*

• Presenting author: Brian Luck, University of Wisconsin-Madison, Madison, WI (Jessica L. Drewry, Elissa M. Chasen, Shawn A. Steffan) 1901761

## 94 *Using Flight and Field Datasets with Digital Photogrammetric Systems to Assess the Accuracy of a UAS Sensor Platform for Mapping Geospatial Input Treatment Zones*

• Presenting author: Charles A. Collins, North Carolina State University, Raleigh, NC (Gary Roberson, Scott Hale) 1900366

## 95 *Estimating Forage Dry Matter and Nutritive Value Using UAV- and Ground-Based Sensors—A Preliminary Study*

• Presenting author: Chin Nee Vong, Division of Food Systems and Bioengineering, University of Missouri, Columbia, MO (Chin Nee Vong, Jianfeng Zhou, Joshua A. Tooley, Harley N. Naumann, John A. Lory) 1900556

## 96 *Power Tethered UAS Network for Automated Indefinite Data Acquisition to Assist Agricultural Management and Production*

• Presenting author: Daniel Anthony Rico, University of Nebraska—Lincoln, Lincoln, NE (Francisco Munoz Arriola, Carrick Detweiler) 1901690

## 97 *Radiometric Accuracy of UAV-Based Image Mosaics with Automatic vs. Manual Exposure Settings*

• Presenting author: G. Cody Bagnall, Texas A&M University, College Station, TX (J. Alex Thomasson, Chao Sima, Cristine L.S. Morgan, Chenghai Yeng) 1901152

## 98 *Development of Automatic Variable Rate Spraying System for Low Altitude Unmanned Aerial Vehicles*

• Presenting author: Han Guo, Zhejiang University, Hangzhou, Zhejiang Province, China (Fei Liu, Feng Cao, Jiangang Shen, Xiaolong Li, Yong He) 1900991

## 99 *Predicting Quality and Yield of Growing Alfalfa from a UAV*

• Presenting author: Joseph Dvorak, University of Kentucky, Lexington, KY (Joseph Dvorak, Luis Felipe Pampolini, Hasan Seyyedhasani, Josh Jackson, Ben Goff, Michael Sama) 1901698

## 100 *Characterization of NDVI Red to NDVI Blue in Crops with Low Cost UAV and Drone Systems*

• Presenting author: Randy Price, LSU AgCenter, Alexandria, LA (Dustin Harrell) 1901544

## 101 *In-Situ Calibration of UAS Thermal Imagery*

• Presenting author: Ryan Phillips, NC State University, Raleigh, NC (Jason Ward) 1901477

## 102 *UAV Image-Based Weed Detection in Grassland Toward Site-Specific Weed Control*

• Presenting author: Ryo Sugiura, NARO, Tsukuba, Ibaraki, Japan (Ryo Sugiura, Kazufumi Fujiwara) 1900620

## 103 *Virtual Reality Poultry Debone Cutting Optimization*

• Presenting author: Simeon Harbert, Georgia Tech Research Institute, Atlanta, GA (Simeon Harbert, Louise Zhuang, Konrad Kahlin, Stephanie Richter, Wayne Daley) 1901751

## 104 *Automatic Plot Extraction in Field Crop Trials Using Digital Image Processing from UAV Images*

• Presenting author: Sunoj Shajahan, North Dakota State University, Bismarck, ND (Sunoj Shajahan, Igathinathane Cannayen, Paulo Flores) 1901263

## **207 Automated Agricultural Field Machinery Data**

### **Collection, Analysis, and Utilization**

Tuesday, July 9, 9:30am-12:00pm

Location: Harvard

Sponsored by: MS-58; MS-54

Moderator: Aaron Franzen, South Dakota State University, Brookings, SD

## **9:35am Development of Tractor Three-Point Hitch Type**

*Dynamometer (I)—Kinematic Analysis* • Presenting author: Hyo-Geol Kim, Korea Institute of Industrial Technology, Gimje, Jeollabuk-do, Republic of Korea (Yeon-Soo Kim, Sung-Bo Shim, Young-Joo Kim, Sang-Dae Lee) 1900209

# Tuesday, July 9

**9:50am** *The Performance Analysis of Tactile and Ultrasonic Sensors for Planting, Fertilizing, and Cultivating Cover Crops*

• Presenting author: Nadia Delavarpour, NDSU, Fargo, ND (Sulaymon Eshkabilov, Thomas Bon, John Nowatzki, Sreekala Bajwa) 1901247

**10:05am** *Prediction of Implement Hydraulic Power Requirements for Small Grain Planting Field Operation*

• Presenting author: Gabriel Stoll, University of Nebraska-Lincoln, Lincoln, NE (Joe Luck, Santosh Pitla) 1901198

**10:20am** *Tractor Instrumentation System for Characterizing Mixed Mode Tractor Power States*

• Presenting author: CheeTown Liew, University of Nebraska-Lincoln, Lincoln, NE (CheeTown Liew, Santosh Pitla, Rodney Rohrer, Joe Luck, Roger Hoy) 1901487

**10:35am BREAK**

**10:45am** *Investigating Effects of Interaction of Single Tine and Rotating Tine Mechanism with Soil on Weeding Performance Using Simulated Weeds*

• Presenting author: Safal Kshetri, Iowa State University, Ames, IA (Jafni J. Jiken, Brian L Steward, Lie Tang, Mehari Tekeste) 1901537

**11:00am** *Design of Plying Traction Output Device*

• Presenting author: Liu Jingjing, Shihezi University, Shihezi, Xinjiang, China (Shuai Li, Huijuan Bai, Jianing Wang, Haodong Yue, Pufei Yang, Jingjing Liu) 1900441

**11:15am** *Draught Prediction Models for Tillage Tines in Two Prominent Agricultural Soils in Borno State, Nigeria*

• Presenting author: Eli Mamman, University, Maiduguri, Borno, Nigeria (Eli Mamman) 1900391

**11:30am** *The Effect of Width and Rake Angle on Draught and Soil Failure Patterns of Model Chisels Furrowers*

• Presenting author: Eli Mamman, University, Maiduguri, Borno, Nigeria (Eli Mamman) 1900392

**11:45am** *Determinants of Farmers' Willingness to Invest in Agricultural Machinery Cooperatives*

• Presenting author: Lijun Xu, Zhejiang A&F University, Hangzhou, Zhejiang China (Yang Zidong) 1901086

**12:00pm** *Experiment Research on Mechanical Properties of Soybean Stalk*

• Presenting author: Teng Yuejiang, I, Zibo, Shandong, China (Yuejiang Teng, Chengqian Jin, Xiang Yin, Hongru Xie, Yanpu Chen, Feiyyang Guo, Peng Liu) 1900707

## **208 Crop and Soil Sensing**

Tuesday, July 9, 9:30am-12:00pm

Location: Brandeis

Sponsored by: MS-54; MS-45

Moderator: Lav Khot, Washington State University, Prosser, WA

**9:35am** *Development of a Vehicular Soil EC Measuring System*

• Presenting author: Hongyi Wei, China Agricultural University, Beijing, China (Hongyi Wei, Fanjia Meng, Xiu Wang, Wei Ma, Wei Sun) 1901581

**9:50am** *Development of Measurement System for Crop SPAD Index and Soil-Organic-Matter Based on the Color Sensor*

• Presenting author: Jiangtao Qi, Jilin University, Changchun, Jilin, China (Jiangtao Qi, Viacheslav Adamchuk, Huibin Sun, Marie-Christine Marmette, Md Saifuzzaman, Hongli Tian, Eko Leksono, Jaesung Park) 1901031

**10:05am** *Proximal Sensing of Crop Surface Albedo with Multispectral Imaging Sensors On Board Ground-Based Platform*

• Presenting author: Fidel Moreira, Washington State University, Pullman, WA (Fidel Moreira, Abhilash Chandel, Behnaz Molaei, Lav Khot, Troy Peters, Claudio Stockle) 1901685

**10:20am** *Initial Results of Using Canopy Reflectance and Distributed Sensor Stations to Monitor Crop Damaging Events*

• Presenting author: Dalyn McCauley, University of Idaho, Moscow, ID (Jason Kelley) 1901805

**10:35am BREAK**

**10:45am** *Using SPOT 7 Satellite Imagery For Nitrogen Fertilizer Management In Oil Palm Plantations*

• Presenting author: Abdul Rashid Mohamed Shariff, Universiti Putra Malaysia, Serdang, Selangor, Malaysia (Mohamad Yadegari, Abdul Rashid Mohamed Shariff, Siti Khairunniza Bejo) 1901583

**11:00am** *Using Soil Moisture Sensors to Understand In-Field Soil Moisture Variability*

• Presenting author: Mary Love Tagert, Mississippi State University, Mississippi State, MS (Mary Love Tagert, Blade Hodges, Joel Paz, Dennis Reginelli) 1901508

**NO-SHOW** *Assessing the Canopy Temperature of Tomato Plants under Deficit Irrigation through Infrared Thermal Imaging*

• Presenting author: Ikram Ullah, Jiangsu University, Zhenjiang, Jiangsu China (Ikram Ullah, Mao Hanping, Ning Yang, Wei Yazhou, Fiaz Ahmad Azeem, Noman Ali Buttar) 1901619

**11:30am** *Use of Thermal Imagery to Identify Stress in Crops Grown in Various Environments and Soil Types*

• Presenting author: Ajay Sharda, Kansas State University, Manhattan, KS (Harman Singh Sangha, Ajay Sharda, William Schpaugh, Deon van der Merwe) 1901809

**NO-SHOW** *Measurement and Analysis the Influence Factors of Soil-Tire Interface 3D Contact Area on Soil-Bin*

• Presenting author: Chunxia Jiang, Anhui Science and Technology University, Chuzhou, Anhui China (Chunxia Jiang, Zhixiong Lu, Shrini K. Upadhyaya, Feng Chen) 1900489

**12:00pm** *Off-Highway Vehicle Testing Facility at Iowa State: Soil-Machine Dynamics Laboratory*

• Presenting author: Brian L. Steward, Iowa State University, Ames, Iowa (Mehari Z. Tekeste, Brian L. Steward, Stuart J. Birrell) 1901758

**12:15pm** *Impact of Planter Closing Wheels on Corn Emergence in No-Till Cropping Systems*

• Presenting author: Jessica Drewry, University of Wisconsin-Madison, Madison, WI (Brian Luck) 1901427

**12:30pm** *The Influence of Rice Husk Incorporated into Sandy Loam Soil before Tractor Traffic on Growth and Yield of Sorghum in Northeastern Nigeria*

• Presenting author: John Ohu, Maiduguri, Borno State, Nigeria (Eli Mamman, Yohanna Dzivama) 1901501

# Tuesday, July 9

## **209 Pesticide and Fertilizer Application Technology, Formulation, and Environmental Effects**

Tuesday, July 9, 9:30am-12:00pm

Location: Northeastern

Sponsored by: MS-23/6; MS-54

Moderator: Adam Barlow, John Deere Des Moines Works, Ankeny, IA

**9:35am** *Evaluation of Spray Deposition and Off-Target Loss in Apple Orchard with an Air-Blast Sprayer Retrofitted with Intelligent Spray Control System* • Presenting author: Heping Zhu, USDA-ARS ATRU, Wooster, OH (Huseyin Guler, Heping Zhu, Kyusuk You, Zhihong Zhang, JohnPaul Abbott, Shaoqing Cui, Erdal Ozkan) 1900201

**9:50am** *Design and Performance Experiment of Fertigation Equipment Using Solid Fertilizer* • Presenting author: Zhiyang Zhang, Jiangsu University, Zhenjiang, Jiangsu, China (Zhiyang Zhang, Hong Li, Chao Chen, Huameng Xia) 1901003

**10:05am** *Test Methods Not Yet Covered by EN ISO 16122—Micro Granular Applicators and Slug Pellet Applicators* • Presenting author: Keith Hawken, Peterborough, United Kingdom (Keith Hawken) 1900530

**10:20am** *Evaluating Various Methods for Developing Management Zones and How They Relate to Soil Fertility Levels* • Presenting author: Alexander Coleman, Clemson University, Blackville, SC (Alexander Coleman, Kendall Kirk, Michael Plumblee) 1901714

**10:35am BREAK**

**10:45am** *Droplet Impact and Adhesion as Related to Quantified Industry Surface Roughness Parameters* • Presenting author: JohnPaul R. Abbott, ARS-USDA-ATRU, Wooster, OH (Heping Zhu) 1900217

**11:00am** *Design and Experiment of Pneumatic Conveying Seeder with No-Tillage for Simultaneous Seeding of Wheat Seed and Fertilizer* • Presenting author: Duanyang Geng, Shandong University of Technology, Zibo, Shandong China (Xingrui Yu, Duanyang Geng, Qian Wang, Yangcheng Liu, Delei Tan, Guoliang Su, He Ke) 1900753

**11:15am** *Spray Deposition and Coverage on Nursery Trees with Laser-Guided Variable-Rate Spray Application* • Presenting author: Heping Zhu, USDA-ARS, Wooster, OH (Kyusuk You, Heping Zhu, Huseyin Guler, Zhihong Zhang, JohnPaul Abbott, Shaoqing Cui) 1900224

**11:30am** *Integration of Premixing In-Line Injection System into Variable-Rate Orchard Spraying Systems* • Presenting author: Zhihong Zhang, USDA-ARS, Wooster, OH (Zhihong Zhang, Heping Zhu, Chengsong Hu) 1900345

**11:45am** *Measurement of Granular Fertilizer Particles Using Image Processing for Spread Distribution Evaluation* • Presenting author: John Fulton, Ohio State University, Columbus, OH (Max Dignan, Richard Colley III, Elizabeth Hawkins, Scott Shearer) 1901828

**12:00pm** *Solid Set Canopy Delivery Spray Systems for High-Density Fruit Production: Comparison of Off-Target Deposition*

*Using Various Strategies Over 2 Field Seasons* • Presenting author: Mark Ledebuhr, Application Insight, LLC, Lansing, MI (Matthew Grieshop, Mark Ledebuhr, Keith Koonter) 1901712

**12:15pm** *Graphene as a New Way to Accelerate Plant Growth* • Presenting author: Sunho Park, Chonnam National University, Gwangju, Republic of Korea (Sunho Park, Daun Kim, Sujin Kim, Yonghyun Gwon, Jangho Kim) 1901077

**251 Soil-Plant-Machine Dynamics and Systems Simulation**  
Tuesday, July 9, 9:30am-12:00pm

Location: Tufts

Sponsored by: MS

Moderator: Paula Misiewicz, Harper Adams University, Newport, Shropshire United Kingdom

**9:35am** *Tire Inflation Pressure and Tillage Effects on Soil Compaction and Crop Development in Silty Clay Loam Soil in the Midwestern United States* • Presenting author: Md Rayhan Shaheb, Harper Adams University, Newport, Shropshire, UK (Md Rayhan Shaheb, Tony E. Grift., Edward Dickin, David R. White, Richard J. Godwin, Paula A. Misiewicz) 1901979

**9:50am** *Yield Impacts of Large Central Fill Planters and Tractors on Pinch Rows* • Presenting author: Andrew Klopfenstein, The Ohio State University, Columbus, OH (Andrew Klopfenstein, Richard Colley III, Ryan Tietje, Chris Wiegman, John Fulton, Scott Shearer) 1901181

**10:05am** *Variability in Tractive Performance Data of Agricultural Tractor Drive Tires* • Presenting author: Thomas Way, USDA-ARS, Auburn, AL (Tadashi Kishimoto, Mehari Tekeste) 1901664

**10:20am** *Calibration of the Draft Force Model for Multiple Tool Tillage Implements* • Presenting author: Andrew Klopfenstein, The Ohio State University, Columbus, OH (Andrew Klopfenstein, Scott Shearer) 1901137

**10:35am BREAK**

**10:45am** *Development of Tractor Bicycle Model with Ride Vibration* • Presenting author: Masahisa Watanabe, Tokyo University of Agriculture and Technology, Fuchu, Tokyo, Japan (Kenshi Sakai) 1900264

**11:00am** *Design and Experiment of Rotary Nail Tooth Type Residual Plastic Mulch Recycling Machine* • Presenting author: Wensong Guo, China Agricultural University, Beijing, China (Wensong Guo, Xufeng Wang, Bing Lu, Can Hu, Panfeng Zhang, Shulin Hou) 1900126

**11:15am** *Techno-Economic Performance of Conservation Agriculture Machinery for Planting Soybean in the Coastal Region of Bangladesh* • Presenting author: Md Monjurul Alam, Bangladesh Agricultural University, Mymensingh, Bangladesh (M A Mottalib, M A Hossain, M I Hossain, M N Amin, M M Alam) 1900574

**11:30am** *Pipeline Right-Of-Way Construction Activities Impact on Soil Compaction* • Presenting author: Mehari Tekeste, Iowa State University, Ames, IA (Mehari Z. Tekeste, H. Mark Hanna, Erica Neideigh, Elnaz Ebrahimi-Mollabashi, Robert E. Horton) 1901699

# Tuesday, July 9

## **210 Advances in Applying and Evaluating Hydrologic and Water Quality Models**

Tuesday, July 9, 9:30am-12:00pm

Location: Tremont

Sponsored by: NRES-21

Moderators: Derek Schlea, Limno Tech, Britton, MI; Ritesh Karki, Auburn University, Auburn, AL

**9:35am** *Modeling the Effect of Crop Rotation and Tillage Operations on Sugarbeet Production Using Root Zone Water Quality Model (RZWQM2)* • Presenting author: Mohammad Anar, University of Minnesota, Lamberton, MN (Mohammad Anar) 1900579

**9:50am** *Mathematical Modeling of Deep-Bed Biofiltration to Describe Contaminant Control and Headloss Development* • Presenting author: Yewei Sun, Virginia Tech, Manassas, VA (Ramola Vaidya, Wendell Khunjar, Erik Rosenfeldt, Meric Selbes, Christopher Wilson, Charles B. Bott, Zhi-Wu Wang) 1900236

**10:05am** *Modeling the Capacity of Wetting and Drying Cycles to Enhance Denitrification in Woodchip Bioreactors* • Presenting author: Francois Birgand, NC State University, Raleigh, NC (S. Tian, B. M. Maxwell, M. A. Youssef, F. Birgand, L. A. Schipper, L. E. Christianson, M. J. Helmers, G. M. Chescheir, D. J. Williams) 1901771

**10:20am** *Assessment of USGS DEMs for Modeling Pothole Inundation in the Prairie Pothole Region of Iowa* • Presenting author: Pawan Upadhyay, Iowa State University, Ames, IA (Pawan Upadhyay) 1900226

**10:35am** **BREAK**

**10:45am** *Evaluation of the Water Erosion Prediction Project (WEPP) Model for Quantifying Subsurface Drainage Flow* • Presenting author: Josept Revuelta, Purdue University, West Lafayette, IN (Bernard A. Engel, Dennis C. Flanagan) 1900777

**11:00am** *Glyphosate in Freshwater Water System* • Presenting author: Pramod Pandey, UC Davis, Davis, CA (Pramod Pandey, Jeffrey Caudill, Sarah Lesmeister, Yawen Zhang, Marie Stillway, Krista Hoffmann, Patricia Gilbert, Michael Kwong, Yi Wang, Patrick Wikham, Latika Singh, Swee Teh) 1901339

**11:15am** *Ensuring that Good Model Performance Statistics Correspond to Sound Model Science: A Case Study in Minnesota* • Presenting author: Anurag Mishra, DSI, LLC, Edmonds, WA (Paul B. Duda, Anthony S. Donigian, Paul Hummel, John Imhoff, Chuck Regan) 1900906

**11:30am** *Relationships between Coefficients of Determination and Correlation, Bias, and Regression* • Presenting author: Hubert Montas, University of Maryland, College Park, MD (Hubert Montas, Adel Shirmohammadi, Masoud Negahban-Azar, Paul Leisnham) 1901248

**11:45am** *Impact of Calibration Objective Function on the Performance of the Hydrological Model* • Presenting author: Vamsikrishna Vema, Purdue University, West Lafayette, IN (Cicily Kurian, Athira P, K P Sudheer, Indrajeet Chaubey) 1900184

**12:00pm** *Some Considerations on the Modeling of Flow and Transport in Heterogeneous Environments* • Presenting author: Hubert Montas, University of Maryland, College Park, MD (Hubert Montas, Adel Shirmohammadi) 1901376

## **211 Advances in Drainage Design, Monitoring, and Modeling**

Tuesday, July 9, 9:30am-12:00pm

Location: Vineyard

Sponsored by: NRES-23

Moderators: Vinayak Shedekar, Ohio State University, Columbus, OH; Rohith An, IIT Madras, Chennai India

**9:35am** *SWAT+: Simulating Drainage Water Management on a Field Scale* • Presenting author: Abhinav Sharma, North Carolina State University, Raleigh, NC (Rachel McDaniel) 1900986

**9:50am** *Effects of Sivicultural Drainage on Wetland Hydrology—Lessons from the Pine Woods* • Presenting author: R. Wayne Skaggs, North Carolina State University, Raleigh, NC (Devendra Amatya, George (Chip) Chescheir) 1901819

**10:05am** *Evaluation of Various Nutrient Loss Reduction Strategies Using DRAINMOD-DSSAT from Fields with Tile Drainage System* • Presenting author: Shailendra Singh, University of Illinois, Urbana, IL (Rabin Bhattarai, Lamyaa Negm, Mohamed Youssef) 1901162

**10:20am** *Drainage Hydrology of an Intensively Cropped Peat Soil* • Presenting author: Chandra Madramootoo, McGill University, Ste. Anne de Bellevue, Quebec Canada (Chandra A. Madramootoo) 1901861

**10:35am** **BREAK**

**10:45am** *Nitrogen Balance as an Environmental Performance Indicator for Drained Cropland in Iowa* • Presenting author: Christopher Hay, Iowa Soybean Association, Ankeny, IA (Peter Kyverryga, Adam Kiel, Anthony Seeman) 1901305

**11:00am** *Assess Effectiveness of Salt Removal by a Subsurface Drainage with Bundled Crop Straws in Coastal Saline Soil Using HYDRUS-3D* • Presenting author: Peirong Lu; Zhanyu Zhang; Hohai University, Nanjing, Jiangsu, China (Peirong Lu, Zhanyu Zhang, Zhuping Sheng, Mingyi Huang) 1900840

**11:15am** *Assessing the Effects of Subsurface Drainage on Downstream Flooding in an Agricultural Dominated Watershed* • Presenting author: Vaishali Sharda, Kansas State University, Manhattan, KS (Vaishali Sharda, Laurent Ahiablame, Esther Mosase, Daniel Moriasi) 1901452

**11:30am** *Analyzing Winter Cover Crop Impacts on Soil Nitrogen Dynamics Using DSSAT Model* • Presenting author: Rishabh Gupta, University of Illinois at Urbana-Champaign, IL (Rabin Bhattarai, Richard T. Roth, Shalamar D. Armstrong) 1901392

**11:45am** *Towards Improving the DNDC model for Simulating Soil Hydrology and Tile Drainage* • Presenting author: Ward Smith, Agriculture and Agri-Food Canada, Ottawa, Ontario, Canada (Ward Smith, Zhiming Qi, Brian Grant, Wentian He, Andrew VanderZaag, Craig F. Drury, Chin S. Tan, Matthew Helmers) 1901842

**NO-SHOW** *Simulated Hydrological Response and Agricultural Productivity to Tile Spacing and Depth at the Field and Watershed Scales* • Presenting author: Hanseok Jeong, University of Illinois, Urbana, IL (Shailendra Singh, Younggu Her, Rabin Bhattarai) 1901266

# Tuesday, July 9

**12:15pm** *DRAINMOD Simulation of Macropore Flow: Model Modification and Field Testing* • Presenting author: Manal Askar, NC State University, Raleigh, NC (Manal H. Askar, Mohamed A. Youssef, George M. Chescheir, Lamyaa M. Negm, Kevin W. King, R. Wayne Skaggs, Ehsan Ghane) 1900692

## **212 Anaerobic Digestion**

Tuesday, July 9, 9:30am-12:00pm

Location: Clarendon

Sponsored by: NRES-27; PRS-707

Moderators: Doug Hamilton, Oklahoma State University, Stillwater, OK; Mahmoud Shehata, North Carolina State University, Raleigh, NC

**9:35am** *Impact of Process Parameters on Methane and Biogas Yield in Solid-State Anaerobic Co-Digestion: A Review*

• Presenting author: Anthony Amori, University of Nebraska-Lincoln, Lincoln, NE (Ademola Ajayi-Banji, Olayinka Omotosho) 1900721

**9:50am** *Bio-Methane Potential Testing Methodologies—A Review* • Presenting author: Sarah Daly, Purdue University, West Lafayette, IN (Ji-Qin Ni) 1900875

**10:05am** *Effect of NaOH-Pretreated-Cornstover and Dairy Manure on Biogas Production in Solid-State Anaerobic Co-Digestion* • Presenting author: Ademola Ajayi-Banji, Agricultural & Biosystems Engineering Department in North Dakota State University, Fargo, ND (Shafiqur Rahman) 1900622

**10:20am** *Effects of Biochar and Activated Carbon on Anaerobic Digestion of a Nitrogen-Rich Organic Waste—Swine Manure*

• Presenting author: Wei Liao, Michigan State University, East Lansing, MI (Meicai Xu, Sibel Uludag-Demirer, Adam Smerigan, Di Fang, Lixiang Zhou, Yan (Susie) Liu, Wei Liao) 1901635

## **10:35am BREAK**

**10:45am** *Process Intensification of Anaerobic Digestion through Temperature Phased Anaerobic Digestion and Thermal Hydrolysis Pretreatment* • Presenting author: Dian Zhang, Virginia Tech, Manassas, VA (Tom Broderick, Mary Strawn, Hari Santha, Zhi-Wu Wang) 1900234

**11:00am** *Food Waste Co-Digestion in Germany and the United States: From Lab to Full-Scale Systems and Associated Policy Implications and Barriers* • Presenting author: Stephanie Lansing, University of Maryland, College Park, MD (Benedikt Hülsemann, Abhinav Choudhury, Jenna Schueler, Maria Sol Lisboa, Carlton Poindexter, Hans Oechsner) 1901632

**11:15am** *Economic Analysis of Producing Solid and Liquid Biofertilizers from Anaerobic Digestates* • Presenting author: Tyler Barzee, University of California Davis, Davis, CA (Abdolhossein Edalati, Hamed El-Mashad, Ruihong Zhang) 1900595

**11:30am** *Characteristics and Biomethane Potentials of Field Residues of Fruits and Vegetables* • Presenting author: Chang Chen, Beijing University of Chemical Technology, Beijing, China (Chang Chen, Fanfan Cai, Guangqing Liu, Ruihong Zhang) 1901571

**11:45am** *Effect of Metal Nanoparticles on Anaerobic Digestion*

• Presenting author: Amro Hassanein, Department of Environmental

Science and Technology, University of Maryland, College Park, MD (Amro Hassanein, Stephanie Lansing, Rohan Tikekar) 1901659

**12:00pm** *Anaerobic Treatment of Hydrothermal Aqueous Product for Enhanced Energy Recovery from Wet Biomass*

• Presenting author: Ana Martin-Ryals, University of Florida, Gainesville, FL (Ana Martin-Ryals, Lance Schideman) 1901382

**12:15pm** *Coupling Anaerobic Digestion and Vermicomposting to Extract Bioenergy and Nutrients from Food- and Yard-Waste*

• Presenting author: Pius Ndegwa, Washington State University, Pullman, WA (Sifolo Coulibaly, Yiqing Yao) 1901640

## **213 BMPs and Water Quality: Modeling**

Tuesday, July 9, 9:30am-12:00pm

Location: Berkeley

Sponsored by: NRES-22; NRES-21; NRES-225; NRES-23; NRES-25; NRES-26; NRES-28

Moderators: Paula Steiner, USDA NRCS, Lansing, MI; Kira Hansen, University of Florida, Immokalee, FL

**9:35am** *Quantification and Simulation of Nutrient Sources at Watershed Scale in Mississippi* • Presenting author: Avay Risal, Department of Agricultural and Biological Engineering, Mississippi State University, Mississippi State, MS (Prem B. Parajuli) 1900105

**9:50am** *Perennial Buffer Strips: Economic Opportunity with Established Markets* • Presenting author: Veronika Vazhnik, Idaho National Laboratory, Idaho Falls, ID (Lisa Schulte Moore, Tom L. Richard) 1900394

**10:05am** *Shifting Demographics: Modeling the Impact of Future Changes in the Farming Community within the Maumee River Watershed*

• Presenting author: Jeffrey Kast, The Ohio State University, Columbus, OH (Jeffrey Kast, Jay Martin, Margaret Kalcic, Robyn Wilson, Doug Jackson-Smith, Anna Apostel, Grey Evenson) 1900110

**10:20am** *Modeling the Effects of Land Use and Agricultural Management on Nutrient Loss, Atrazine and E. coli*

*Concentrations in a Watershed Using SWAT* • Presenting author: Olufemi Abimbola, University of Nebraska-Lincoln, Lincoln, NE (Olufemi Abimbola, Aaron Mittelstet, Tiffany Messer, Elaine Berry) 1901350

## **10:35am BREAK**

**10:45am** *Comparison of Structural and Non-Structural Field Level Best Management Practices on Kettle Creek Paired Watershed, Canada*

• Presenting author: Narayan Shrestha, University of Guelph, Guelph, Ontario Canada (Narayan Kumar Shrestha, Prasad Daggupati, Ramesh P. Rudra, Rituraj Shukla) 1900603

**11:00am** *Assessment of Riparian Buffers' Effectiveness in Controlling Nutrient and Sediment Loads as a Function of Buffer Design, Site Characteristics and Upland Loadings* • Presenting author: Fei Jiang, Pennsylvania State University, State College, PA (Fei Jiang, Heather Gall, Tamie Veith, Raj Cibin, Patrick Drohan) 1901516

**11:15am** *Impact of Field-Scale Best Management Practices on Jeannette Creek Watershed, Ontario Canada*

• Presenting author: Ramesh P. Rudra, University of Guelph, Guelph, ON Canada (Rituraj Shukla, Ramesh P. Rudra, Prasad Daggupati, Pradeep K. Goel, Narayan Kumar Shrestha) 1901836

# Tuesday, July 9

**11:30am** *Optimizing Management Approaches to Reduce Nutrient and Sediment Runoff from Dairy Farms in Central Pennsylvania* • Presenting author: Ryan Barnes, Penn State, University Park, PA (Ryan Barnes, Heather E. Gall, C. Alan. Rotz, Tamie L. Veith, Herschel A. Elliott, John T. Tyson, John E. Watson) 1901552

**11:45am** *Preferential Flow in Vegetative Filter Strips and Riparian Buffers: Experimentation and Numerical Modeling* • Presenting author: Lucie Guertault, NC State University, Raleigh, NC (Lucie Guertault, Garey Fox, Rafael Munoz-Carpena, Todd Halihan, Derek Heeren, Bin Gao) 1900036

**12:00pm** *Physically-Based Representation of Saturated Riparian Buffer Processes in Soil and Water Assessment Tool* • Presenting author: Cibin Raj, Department of Agricultural and Biological Engineering, The Pennsylvania State University, State College, PA (Cibin Raj, Jeffrey Arnold, Dan Jaynes Dan, Philip Gassman, Thomas Isenhardt Thomas) 1901802

## 214 Erosion Control Research and Case Studies

Tuesday, July 9, 9:30am-12:00pm

Location: Arlington

Sponsored by: NRES-22; NRES-223

Moderators: Dennis Flanagan, USDA ARS NSERL, West Lafayette, IN; Carolyn Jones, USDA NRCS, Vacaville, CA

**9:35am** *Estimating Sediment Transport Capacity for Overland Flow* • Presenting author: Shuyuan Wang, Purdue University, West Lafayette, IN (Shuyuan Wang, Dennis Flanagan, Bernard Engel) 1900251

**9:50am** *Hydrologic and Erosion Impacts of Weather and Management Conditions in the US Northwest Wheat and Range Region: WEPP Simulation* • Presenting author: Joan Wu, Washington State University, Puyallup, WA (Joan Q. Wu, M. Samrat Dahal) 1901309

**10:05am** *WEPP and RUSLE2 Erosion Prediction Comparisons* • Presenting author: Dennis C. Flanagan, USDA-Agricultural Research Service, National Soil Erosion Research Laboratory, West Lafayette, IN (Dennis C. Flanagan, Robert R. Wells, Anurag Srivastava, Ryan P. McGehee, James R. Frankenberger, Bernard A. Engel) 1901785

**10:20am** *Analysis of a Market Assessment Survey to Help Promote Lake Restoration of Lake Bosomtwe and Increased Livelihoods for Smaller-Holder Farmers* • Presenting author: Robert M. Stwalley III., Purdue University Agricultural & Biological Engineering, West Lafayette, IN (Grace Baldwin, Robert M. Stwalley III) 1901379

## **10:35am BREAK**

**10:45am** *North American Project to Evaluate Soil Health Measurements* • Presenting author: Elizabeth Rieke, Soil Health Institute, Morrisville, NC (Elizabeth Rieke, Paul Tracy, Cristine Morgan, Wayne Honeycutt) 1901701

**11:00am** *Critical Conservation Practices Identified by CEAP Modeling for Sustainable Watershed Management* • Presenting author: Xiuying Wang, Blackland Research and Extension Center, Temple, TX (Xiuying Wang, Kate Behrman, Mari-Vaughn Johnson, Lee Norfleet) 1901893

**11:15am** *Evaluation of Various Products for Sediment Perimeter Barrier* • Presenting author: Jacob Wood, University of Illinois, Urbana-Champaign, IL (Rabin Bhattarai) 1901282

**11:30am** *Prediction of Soil Erosion of Imo State Soils by Their Infiltration Rates* • Presenting author: Gregory Obiechefu, Imo State Polytechnic, Umuagwo, Imo Nigeria (Gregory Obiechefu, Kodak Emerson, Precious Egbuikwem) 1900428

**11:45am** *The Susceptibility of Two Agricultural Soils Incorporated with Inorganic Fertilizer to Splash under Simulated Rainfall* • Presenting author: John Ohu, Maiduguri, Borno State, Nigeria (Eli Mamman) 1901460

**NO-SHOW** *Assessment of Erosion Problems: Case Study of Auchi, Edo State in Nigeria* • Presenting author: E. O. Atanda, Auchi Polytechnic, Auchi, Edo State, Nigeria (E.O. Atanda, M.A. Enaboifo, D. A.Okodugha) 1900052

## 215 Innovative Water Quality and Hydrologic Monitoring and Analysis

Tuesday, July 9, 9:30am-12:00pm

Location: Provincetown

Sponsored by: NRES-21; NRES-28

Moderators: Debabrata Sahoo, Woolpert Inc., West Columbia, SC; Brock Kamrath, North Carolina State University, Raleigh, NC

**NO-SHOW** *Low-Cost, Facile, and Rapid Nanosensors for Establishing a Participatory Monitoring Program on Mercury Exposure in Rural Colombia* • Presenting author: Eric McLamore, University of Florida, Gainesville, FL (Victoria Morgan, Kelli McCourt, Diana Vanegas, Lisseth Casso-Hartmann, Irene Vélez-Torres, Eric McLamore) 1901762

**9:50am** *Classifying Origin of crude oil Using Raspberry Pi and Paper Microfluidic Chip* • Presenting author: Soo Chung, Department of Biosystems Engineering, Tucson, AZ (Soo Chung, Christian Jennings, Sean Perea, Un Hyuk Yim, Jeong-Yeol Yoon) 1901512

**10:05am** *Pesticide Exposure in Recreational Lakes* • Presenting author: Tiffany Messer, University of Nebraska-Lincoln, Lincoln, NE (Mary Keilhauer, Tiffany L. Messer, Dan Snow, Aaron Mittelstet) 1900181

**10:20am** *Quantifying Transport and Fate Dynamics of Sediment Nitrogen in a Backwater Wetland Using High Resolution Sensing* • Presenting author: Ciara Pickering, University of Kentucky, Lexington, KY (William Ford) 1900567

## **10:35am BREAK**

**10:45am** *Fuzzy-Logic Based Approach for E. coli Load Prediction in Cascading Dams* • Presenting author: Olufemi Abimbola, University of Nebraska-Lincoln, Lincoln, NE (Olufemi Abimbola, Aaron Mittelstet, Tiffany Messer, Elaine Berry) 1901351

**11:00am** *A Meta-Analysis of Water Quality Studies in the Ochlockonee River Basin* • Presenting author: Mikela R. Pryor, Florida A&M University, Tallahassee, FL (Aavudai Anandhi, Anjali Sharma) 1901719

**NO-SHOW** *Temporal Stability of Fecal Indicator Bacteria in a PA Creek Using Empirical Orthogonal Functions* • Presenting author:

# Tuesday, July 9

Eunmi Hong, Kangwon National University, Gangwon, Korea (Yakov Pachepsky, Cary Coppock) 1901591

**11:30am** *Monitoring Hydrogeological Changes at a Newly Commissioned Intensive Cattle Feeding Operation* • Presenting author: Crystal Rinas, University of Saskatchewan, Saskatoon, Saskatchewan, Canada (Terrance Fonstad) 1901413

**11:45am** *How Frequent Is Enough? Water Quality Data Cases* • Presenting author: Niroj Aryal, NC A&T State University, Greensboro, NC (Michele Reba) 1900554

## **216 Nutrient Removal, Recovery and Recycle**

Tuesday, July 9, 9:30am-12:00pm

Location: Nantucket

Sponsored by: NRES-28

Moderators: Lordwin Jeyakumar, Agriculture & Agri-Food Canada, Allahabad, Uttar Pradesh India; Faezeh Eslamian, McGill University, Montreal, Quebec Canada

**9:35am** *Free Ammonia Inhibition as a Means of Suppressing Nitrite Oxidizing Bacteria in Differently Sized Granules Treating Agricultural Wastewater* • Presenting author: Zhi-Wu Wang, Virginia Tech, Manassas, VA (Yewei Sun, Zhaohui An, Charles B. Bott, Zhi-Wu Wang) 1900449

**9:50am** *Novel Adsorbents for the Removal and Recovery of Soluble Reactive Phosphorus* • Presenting author: Kevin Kelly, McGill University, Sainte Anne de Bellevue, Quebec, Canada (Kevin Kelly, Zhiming Qi) 1901478

**10:05am** *Reverse Osmosis Treating Cured Meat Processing Wastewater for Removal of Inorganic Nutrients and Salt* • Presenting author: Kelsey Henderson, The Ohio State University, Columbus, OH (Karen Mancl) 1900350

**10:20am** *Feasibility Analysis of Phosphorus Recovery from Corn Dry Grind Industry* • Presenting author: Ankita Juneja, University of Illinois, Urbana, IL (Ankita Juneja, Roland Cusick, Vijay Singh) 1900923

**10:35am** **BREAK**

**10:45am** *Life Cycle Assessment of Land-Applied Wastewater Biosolids in Canada* • Presenting author: Elissa Saliba, McGill University, Montreal, Quebec, Canada (O. Grant Clark, Michael Y. Boh) 1901212

**11:00am** *Pilot-Scale Evaluation of the Effects of Settling Velocity-Based Selection and Feast/Famine Conditions on Continuous Flow Aerobic Granulation* • Presenting author: Yewei Sun, Virginia Tech, Manassas, VA (Bob Angelotti, Matt Brooks, Zhi-Wu Wang) 1900237

**11:15am** *Fertilizer Value of Human Excreta: An Estimate for Canada* • Presenting author: Michael Boh, McGill University, Ste-Anne-de-Bellevue, Quebec Canada (Michael Y. Boh, Osborne G. Clark) 1901483

**11:30am** *Nitrogen and Phosphorus Flows in Ontario's Food Systems* • Presenting author: Michael Boh, McGill University, Ste-Anne-de-Bellevue, Quebec Canada (Michael Y. Boh, Osborne G. Clark) 1901481

**11:45am** *Closing the Loop on Wastewater Treatment and Sustainable Agriculture: Nutrient Recovery and Reuse Opportunities with Duckweed* • Presenting author: Rachel Brennan, Penn State University, University Park, PA (Benjamin Roman) 1901717

**12:00pm** *Green Fertilizer Production from Air and Water by a Novel Electrical Discharge Process* • Presenting author: Bishal Thapa (Sarah Wu, Bishal Thapa) 1901582

**12:15pm** *Multimodal Algal Bacterial Bioprocess for Treatment of Municipal Wastewaters* • Presenting author: Ganti S Murthy, Oregon State University, Corvallis, OR (Durga Madhab Mahapatra, Ganti S Murthy) 1900981

## **217 Sustainable Irrigation Management**

Tuesday, July 9, 9:30am-12:00pm

Location: Orleans

Sponsored by: NRES-24; NRES-244

Moderators: Vivek Sharma, University of Wyoming, Powell, WY; Sushil Himanshu, Texas A&M AgriLife Research, Vernon, TX

**9:35am** *Plant Density, an Important Factor in Advancing Irrigation Management of Maize* • Presenting author: Freddie Lamm, Kansas State University, Colby, KS (Freddie Lamm) 1901166

**NO-SHOW** *Crop Evapotranspiration, Irrigation Water requirement and Water Productivity of Maize from Meteorological Data under Semiarid Climate* • Presenting author: Koffi Djaman, New Mexico State University, Farmington, NM (Kevin Lombard, Suat Irmak) 1900112

**10:05am** *Effect of Deficit Irrigation on Dry Bean Soil Moisture Dynamics, Evapotranspiration, Yield and Water Use Efficiency in Inter-Mountain Region of Wyoming* • Presenting author: Vivek Sharma, University of Wyoming, Powell, WY (Vivek Sharma) 1901203

**10:20am** *Evaluation of Deficit Irrigation Scheduling Strategies for Cotton to Cope with Declining Water Availability in the Southern High Plains* • Presenting author: Sushil Kumar Himanshu, Texas A&M Agrilife Research, Vernon, TX (Sushil Kumar Himanshu, Srinivasulu Ale, James Bordovsky, Murali Darapuneni) 1900798

**10:35am** **BREAK**

**10:45am** *Irrigation Advisory Service: A Comprehensive Solution Toward Sustainable Water Management for Rice Production in the Philippines* • Presenting author: Manuel Jose C. Regalado Philippine Rice Research Institute (PhilRice), Munoz Science City, Nueva Ecija, Philippines (Manuel Jose C. Regalado, Sudhir Yadav, Kristine Samoy-Pascual, Jovino L. De Dios, Gio Karlo Evangelista, Marvelin L. Rafael, Jade D. Dorado, Romeo J. Cabangon) 1900677

**11:00am** *Economic Analysis of Deficit Irrigation in Sugarcane Farming: Nchalo Estate, Chikwawa District, Malawi* • Presenting author: Derek M. Heeren, University of Nebraska-Lincoln, Lincoln, NE (Mavuto M. Banda, Derek M. Heeren, Derrel L. Martin, Francisco Munoz-Arriola, László G. Hayde) 1900852

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**11:15am** *Impact of Variable and Fixed Rate Irrigation and Fertigation Strategies on Maize Grain Yield, Evapotranspiration and Water Use Efficiency* • Presenting author: Vasudha Sharma, University of Minnesota, Saint Paul, MN (Vasudha Sharma, Suat Irmak) 1901485

**11:30am** *Integrated Soil Moisture and Canopy Temperature Sensing System for Irrigation Scheduling* • Presenting author: Sandeep Bhatti, University of Nebraska Lincoln, Lincoln, NE (Sandeep Bhatti, Arti Kumari, Arjamadutta Sarangi, Ravinder Kaur, Derek M. Heeren, Man Singh, Christopher M. U. Neale, Derrel L. Martin) 1900708

## **218 Vulnerability Assessment of Land Resources for Sustainable Development—INVITED**

Tuesday, July 9, 9:30am-12:00pm

Location: Salon J

Sponsored by: NRES-26

Moderators: Aavudai Anandhi, Florida A&M University, Tallahassee, FL; Asmita Murumkar, Ohio State University, Columbus, OH

**9:30am** *Vulnerability of Land Resources for Sustainable Development—Accomplishment in the Past 3 Years* • Presenting author: Aavudai Anandhi, Biological Systems Engineering Program, Florida A&M University, Tallahassee, FL (Vijayalakshmi) 1901962

**9:55am** *Sustainable Development in the Context of Irrigation* • Presenting author: Kati Migliaccio, Department of Agricultural and Biological Engineering, University of Florida, Gainesville, FL 1901999

### **10:30am BREAK**

**10:40am** *Land Use Change and Vulnerability Assessment for Sustainable Development* • Presenting author: Gang Chen, Department of Civil Engineering, Florida A&M University, Tallahassee, FL (Gang Chen) 1901960

**11:15am** *Tales from Texas—Vulnerability of Land Resources for Sustainable Development* • Presenting author: Venki Uddameri, Department of Civil, Environmental, and Construction Engineering, Lubbock, TX (Venki Uddameri) 1901961

**11:50am** *Natural Resource and Forest Land Management / Research Role in Developing Sustainable Agroecosystem* • Presenting author: Johnny Grace, USDA-Forest Service, Tallahassee, FL 1901998

## **219 Biosecurity for Livestock and Poultry Production Systems**

Tuesday, July 9, 9:30am-12:00pm

Location: Falmouth

Sponsored by: PAFS-40; PAFS-50; PAFS-07/1; PAFS-40; NRES-27

Moderator: Joseph Purswell, USDA ARS, Starkville, MS

**9:35am** *A Review of Animal Disease Outbreaks and the Biosecurity of Composting as a Disposal Method* • Presenting author: Tiago Costa, University of Illinois at Urbana-Champaign, Urbana, IL (Tiago Costa, Neslihan Akdeniz) 1901210

**9:50am** *Biosecure Animal Mortality Composting for Reducing Release Risk of Pathogens and Antibiotic Resistant Genes* • Presenting author: Tiago Costa, University of Illinois at Urbana-Champaign, Urbana, IL (Tiago Costa, Neslihan Akdeniz, Richard S. Gates, James F. Lowe) 1901208

**10:05am** *Factors Affecting Pre-Filter Loading and Strategies to Manage Excessive Loading* • Presenting author: Benjamin Smith, Iowa State University, Ames, IA (Steven Hoff, Jay Harmon, Daniel Andersen, Jeffery Zimmerman, John Stinn) 1900326

**10:20am** *Simulating Risk Reduction Using Biosecurity Practices on Farm* • Presenting author: Erin Cortus, University of Minnesota, St. Paul, MN (Abby Neu, Kevin Janni, Sally Noll, Chuck Clanton) 1900870

### **10:35am BREAK**

**10:45am** *Monitoring the Dust Level of the Broiler Breeder Houses in Georgia USA* • Presenting author: Lilong Chai, University of Georgia, Athens, GA (Claudia Dunkley, Casey Ritz) 1900109

**11:00am** *Session Wrap Up: Engineered Approaches to Biosecurity—Opportunities for Designed Interventions*

## **220 Greenhouse and Nursery Technology**

Tuesday, July 9, 9:30am-12:00pm

Location: Yarmouth

Sponsored by: PAFS-30

Moderator: Bo-Sen Wu, McGill University, Montreal, Quebec Canada

**9:35am** *Humidity Recovery and Reuse Using Liquid Desiccants for Sustainable Water Use in Controlled Environment Agriculture* • Presenting author: Ryan Lefers, King Abdullah University of Science and Technology, Thuwal, Makka, Saudi Arabia (Srivatsa Betthalli, Nina Fedoroff, Philip Davies, Suzana Nunes, TorOve Leiknes) 1901585

**NO-SHOW** *Theoretical and Experimental Investigations for Testing a Hypothesis to Enhance the Efficiency of Evaporative Cooling Pads for Livestock Barns and Greenhouses* • Presenting author: Omar Hijazi, Technical University of Munich, Agricultural Systems Engineering, Freising, Germany (Mohamed Samer, Omar Hijazi, Essam Abdelsalam, Jochen G. Wiecha, Kathrin L. M. Ziegler, Heinz Bernhardt) 1900101

**10:05am** *The Canadian Integrated Northern Greenhouse: Four-Season Testing and Future Opportunities* • Presenting author: David Leroux, McGill University, Sainte-Anne-de-Bellevue, Québec, Canada (David Leroux, Mark Lefsrud) 1901312

**10:20am** *The Use of Light Emitting Diodes for Shelf Life Extension of Spinach and Kale* • Presenting author: Anne Sophie Ruffykiri, McGill University, Montreal, Quebec Canada (Mark Lefsrud, Bo-Sen Wu) 1900908

### **10:35am BREAK**

**10:45am** *Design of a Bioreactor and Nutrient Monitoring Instrument for Food Production in Hydroponic Systems Located in Northern Canada* • Presenting author: Peter Tikasz, McGill University, Montreal, Quebec Canada (David Leroux, Mark Lefsrud) 1900022

# Tuesday, July 9

**11:00am** *Influence of Biochar Amendment on the Efficacy of Algal Biofertilizers to Support Plant Growth* • Presenting author: Steven White, Oregon State University, Corvallis, OR (Durga Madhab Mahapatra, Steven White, Ganti S Murthy) 1900979

**11:15am** *Deep Neural Network Based Control Algorithm for Maintaining Electrical Conductivity and Water Content of Substrate in Closed-Soilless Cultivation* • Presenting author: Dae-Hyun Jung, KIST/Seoul National University, Gangleung, Gangwon South Korea (Dae-Hyun Jung, Soo Hyun Park, Hak-Jin Kim, Taek Sung Lee, Jung-Suk Yang, Changho Jhin) 1900951

**11:30am** *Improved Procedure for Germination of *Coix lacrimajobi* (Poaceae) and *Rhynchospora corymbosa* (Cyperaceae) Seeds in the Environmental Chamber and Greenhouse* • Presenting author: Oluseyi E. Ewemoje, University of Ibadan, Ibadan. Oyo State, Nigeria (Abimbola Sangodoyin, Adeniyi Jayeola, Tyler S. Radniecki) 1900362

**11:45am** *Design and Experiment on the Tray Embedding Machine for Hybrid Rice Potted Seedlings* • Presenting author: Ruiyun Zhou, Zhejiang University, Hangzhou China (Kun Ding, Xiaoqiang Du, Yaxin Yu, Jianneng Chen, Ruiyun Zhou) 1900402

**12:00pm** *Chassis Design and Finite Element Analysis of Plug Seedling Automatic Transplanter* • Presenting author: Jing Zhang, Jiangsu University, Zhenjiang, Jiangsu, China (Qizhi Yang, Guanlong Huang, Xinyi Shi, Guangyu Du, Jing Zhang, Jianping Hu, M. Addy) 1901563

**12:15pm** *Design and Experiment of Automatic Seeder for *Pteris vittata* L.* • Presenting author: Junyang Chen, Zhejiang University, Hangzhou, Zhejiang, China (Junyang Chen, Jianping Li, Kang Wu, Songming Zhu) 1900342

**NO-SHOW** *Design and Experiment of Transplanter for watermelon Seeding Tray* • Presenting author: Chen Xiao, NRIAM, Nanjing, Jiangsu China (Xiao Chen, Yan Gong, Youyi Miao, Dejiang Liu, Xiao Zhang, Guo Wang) 1901518

## **PRS Community Update**

Tuesday, July 9, 8:00am-9:00am

Salon I

## **221 Building Successful Collaborations to Address Challenges in Food and Bioprocess Engineering —PANEL**

Tuesday, July 9, 9:00am-11:00am

Location: Salon I

Sponsored by: PRS-06

Moderator: Deepak Keshwani, University of Nebraska, Lincoln, NE

*Featuring a panel discussion of speakers from industry, academia, and government with successful histories of collaborative work.*

## **222 Microwave and Radio-Frequency Energy for Processing**

Tuesday, July 9, 9:30am-12:00pm

Location: Columbus I

Sponsored by: PRS-703; PRS-703

Moderator: Satyanarayan Dev, Florida A&M University, Tallahassee, FL

**9:35am** *A Microwave Dielectric Method for Rapid and Nondestructive Determination of Moisture Content and Water Activity of Almonds* • Presenting author: Samir Trabelsi, USDA-ARS, Athens, GA (Samir Trabelsi) 1901908

**9:50am** *Thermal and Dielectric Properties of Red Lentil and Kabuli Chickpea in Relation to Radio Frequency Heat Treatment* • Presenting author: Adedayo Oke, University of Saskatchewan, Saskatoon, Saskatchewan Canada (Oon-Doo Baik) 1900913

**10:05am** *Developing Radio Frequency Sensor Based Models for Grain Measurement* • Presenting author: Ewumbua Monono, North Dakota State University, Fargo, ND (Ewumbua Monono, Harjot Sidhu, Xin Sun, Benjamin Braaten, Ryan Striker, Bingcan Chen, Allen Peckrul, Gurmukh Advani) 1900836

**10:20am** *Impact of Energy Dissipation Rate of a 915 MHz Microwave on Drying and Milling Characteristics of Parboiled Rice* • Presenting author: Deandrae Smith, Department of Food Science, University of Arkansas, Fayetteville, AR (Deandrae Smith, Griffiths G. Atungulu) 1901514

## **10:35am BREAK**

**10:45am** *Drying of Soybean and Corn Seeds Using Microwave* • Presenting author: Rute Quelvia de Faria, IFGoiano, Urutaí, GO, Brazil (Amanda Rithieli Pereira dos Santos, Edvaldo Aparecido Amaral da Silva, Yvan Gariepy, Vijaya Raghavan, Maria Márcia Pereira Sartori) 1900535

**NO-SHOW** *Modeling Radio Frequency Disinfestation and Control of *Dried Apricot** • Presenting author: Zhi Huang, Northwest A&F University, Yangling, Shaanxi China (Shaojin Wang) 1900639

**11:15am** *The Quality and *Staphylococcus aureus* ATCC 25923 Survival on In-Shell Walnuts as Influenced by Radio Frequency Treatment* • Presenting author: Lihui Zhang, Northwest A&F University, Yangling, Shaanxi China (Lihui Zhang, Shuang Zhang, Rui Li, Shaojin Wang) 1900474

**11:30am** *Microbial Validation of Continuous Radiofrequency Pasteurization of Cumin Seeds* • Presenting author: Long Chen, University of Nebraska-Lincoln, Lincoln, NE (Long Chen, Sibel Irmak, Jeyamkondan Subbiah) 1901331

**11:45am** *Effects of Fissures of Germinated Brown Rice Caused by Microwave Drying on its Cooking Quality* • Presenting author: Liuyang Shen; Lei Wang; Northeast Agricultural University, Harbin City, Heilongjiang Province, China (Liuyang Shen, Lei Wang, Xianzhe Zheng) 1900670

# Tuesday, July 9

## **223 Physical Properties Related to Drying and Storage**

Tuesday, July 9, 9:30am-12:00pm

Location: Columbus II

Sponsored by: PRS-702; PRS-701

Moderator: Igathinathane Cannayen, North Dakota State University, Fargo, ND

**9:35am** *Feasibility of Real-Time Monitoring and Early Detection of Insect Activity in Storage Rice Using Imaging Technique* • Presenting author: Ragab Khir, University of California, Davis, CA (Hui Luo, Cameo Tsui, Zhongli Pan) 1900480

**9:50am** *Assessment of New Approaches for On-Farm, In-Bin Chilling Aeration and Drying of Rice* • Presenting author: Soraya Shafiekhani, University of Arkansas, Fayetteville, AR (Soraya Shafiekhani, Griffiths Atungulu) 1901575

**10:05am** *Walnut Drying with Stepwise Change in Air Temperature for Energy Saving and Quality Preservation* • Presenting author: Chang Chen, Department of Biological and Agricultural Engineering, University of California Davis, Davis, CA (Chandrasekar Venkitasamy, Weipeng Zhang, Ragab Khir, Zhongli Pan) 1900368

**10:20am** *Modelling the Drying Kinetics of Dried Maize in a Solar Biomass Hybrid Dryer* • Presenting author: Samuel McNeill, University of Kentucky, Princeton, KY (Joseph Akowuah, Dirk Maier, George Opit, Samuel McNeill, Paul Armstrong, Carlos Campabadal, Kingsley Ambrose, George Obeng-Akrofi) 1901795

**10:35am** **BREAK**

**10:45am** *Effects of Liquid Smoke Infusion on Osmotic Dehydration Kinetics and Microstructural Characteristics of Apple Cubes* • Presenting author: Kaushlendra Singh, West Virginia University, Morgantown, WV (Felix Akharume, Litha Sivanandan) 1901593

**11:00am** *Investigation of Key Engineering Properties of Commonly Used Hermetic Crop Storage Bags* • Presenting author: Ma. Cristine Concepcion D. Ignacio, Iowa State University, Ames, IA (Dirk E. Maier) 190134

**11:15am** *Functionalization of Dry High-Protein and High-Fibre Legume Fractions Using Semi-Direct Cold Atmospheric Pressure Plasma* • Presenting Author: Oliver Schlüter, Leibniz Inst. Agric. Eng. and Bioeconomy, Potsdam, Brandenburg Germany (Sara Bußler) 1901173

## **224 ASE—Applied Science & Engineering POSTER SESSION**

Tuesday, July 9, 2:30pm-5:00pm

Posters will be displayed for the entire session, but authors will be present at posters as follows:

2:30pm-3:45pm, authors with ODD numbered posters present

3:45pm-5:00pm, authors with EVEN numbered posters present

Location: Gloucester

Sponsored by: ASE

Moderator: David Lanning, Forest Concepts LLC, Auburn, WA

**1** *Reconstruction of Wound Tree Using 3D Scanning and Printing Techniques* • Presenting author: Juo Lee, Suncheon National Univ, Suncheon si, Jeollanam-do, Republic of Korea (Juo Lee, Taeyoung An, Sung Hyuk Kim, Kyeong Sik Choi, Kijeong Hong, Hoon Seonwoo) 1901028

**2** *Impact of Land Development and Climate Change on Flood Risk in the Blue River Watershed* • Presenting author: Jessica Stanton, Education, Manhattan, KS (Stacy Hutchinson, Kelsey McDonough) 1900930

**3** *Multi-Variable Sensitivity Analysis, Calibration, and Validation of a Field-Scale SWAT Model: Building Stakeholder Trust in Hydrologic/Water Quality Modeling* • Presenting author: Ritesh Karki, Auburn University, Auburn, AL (Ritesh Karki, Puneet Srivastava, Latif Kalin, Jasmeet Lamba, David D. Bosch) 1901362

**4** *Parameterization and Sensitivity Analysis for Integrated Food Energy Water Nexus Framework* • Presenting author: Kyle Proctor, Oregon State University, Corvallis, OR (Ganti S. Murthy, Seyed Mohammad Hossein Tabatabaie) 1900869

**5** *Removal of Pesticides and Recovery of Plant Nutrients from Nursery Wastewater through Biochar Columns* • Presenting author: Kyle Proctor, Oregon State University, Corvallis, OR (Durga Madhab Mahapatra, Kyle Proctor, Ganti S Murthy) 1900977

**6** *Development of Fractional Vegetation Coverage Acquisition System for Summer Maize Based on Android* • Presenting author: Wei Yang, China Agricultural University, Beijing, China (Ziyuan Hao, Wei Yang, Minzan Li, Yuqing Chen) 1901471

**7** *Energy Efficiency and Economic Analyses of an Anaerobic Digestion-Based Biorefinery for the Recovery of Energy, Nutrients and Water from Agricultural Wastes* • Presenting author: Lijun Wang, North Carolina A&T State University, Greensboro, NC (Lijun Wang, Gail Joseph, Bo Zhang, Abolghasem Shahbazi) 1901136

**8** *Expression of Oil from *Lagenaria siceraria* Seed Using Mechanical Oil Expeller* • Presenting author: Rama Chandra Pradhan, National Institute of Technology, Rourkela, Odisha India (Avinash Singh Patel, Sabyasachi Mishra) 1901081

**9** *Water Activity Change of Egg Powders at Elevated Temperatures Modeled by Clausius Clapeyron Equation* • Presenting author: Marco Esteban Pérez Reyes, Washington State University, Pullman, WA (Marco Esteban Pérez Reyes, Juming Tang, Mei-Jun Zhu, Gustavo Barbosa Cánovas) 1901211

**10** *Calculation and Simulation of Thin-walled Ring Elastic Deformation for Buffer Structure* • Presenting author: Min Zhou, China Agricultural University, Beijing, China (Yuping Cui, Guolei Zheng, Min Zhou) 1900134

**11** *Effect of Within Field Soil Variability on Potato Tuber Yield* • Presenting author: Humna Khan, University of Prince Edward Island, Charlottetown, PEI, Canada (Humna Khan, Aitazaz Farooque, Bishnu Acharya, Travis Esau) 1900332

**12** *Economic Performance of Different Paddy Storage Technologies in Bangladesh* • Presenting author: Md Monjurul Alam, Bangladesh Agricultural University, Mymensingh, Bangladesh (Md. Abdul Awal, Mohammad Afzal Hossain, Md. Rostom Ali, Fakir Azmal Huda, Md. Monjurul Alam) 1901474

## Tuesday, July 9

**13** *Sustainable Treatment for High Iron Concentration in Groundwater for Irrigation Purposes* • Presenting author: Karim Shahin, National Training Academy, Giza, Egypt (Karim Shahin, AE Ahmed, SM Ismail, AMZ El-Din) 1900019

**14** *ETo Estimation to Schedule Irrigation in a Green Wall Using Cropwat* • Presenting author: Jorge Flores Velazquez, Mexican Institute of Water Technology, Morelos Mexico. (Fernando Rojano Aguilar, Ernesto Cruz Rodriguez) 1900223

**15** *Elemental Analysis of Lobster Waste* • Presenting author: Sara Mikhail, McGill University, Montreal, QC, Canada (Sara Mikhail, Shrikalaa Kannan, Vijaya Raghavan) 1901848

**16** *Hydrochar-Based Hierarchical Carbon Nanofibers as Highly Flexible Freestanding Nanofibrous Electrode Material for Supercapacitor* • Presenting author: Abolghasem Shahbazi, NC A&T University, Greensboro, NC (Abolghasem Shahbazim, Spero Gbewonyo, Lifeng Zhang) 1900565

**17** *Biochar Production and Characterization—An Experimental Comparison between Pyrolysis and Hydrothermal Carbonization* • Presenting author: Abolghasem Shahbazi, NC A&T University, Greensboro, NC (Abolghasem Shahbazi, Aicha Slassi Sennou) 1900568

**18** *Effect of Spray Aids on Particle Size Distribution and Spray Uniformity of Droplets* • Presenting author: Chen Xiao, NRIAM, Nanjing, Jiangsu China (Dejiang Liu, Yan Gong, Xiao Chen, Guo Wang, Xiao Zhang) 1901523

**19** *Distribution of the Nutrients from Ferti-Release Polymers in Sandy Soil* • Presenting author: Claudinei Souza, UFSCar, Araras, Sao Paulo Brazil (Marilia Silva, Julia Simione, Roselena Faez) 1900246

**20** *Microwave Pyrolysis of Biomass and Waste Plastics over Chemically-Activated Porous Carbons from Wood* • Presenting author: Elmar Villota, Washington State University, Richland, WA (Elmar M. Villota, Hanwu Lei, Moriko Qian, Wendy C. Mateo, Denge Duan, Yunfeng Zhao) 1900834

**21** *Wood-Based Catalyst and Its Application for the Production of Platform Chemicals* • Presenting author: Guillermo Alberto Portillo Perez, McGill University, Montreal, Quebec, Canada (Marie-Josée Dumont) 1900074

**22** *Effect of Pyrolysis Temperature on the Thermal Stability and Physicochemical Characteristics of Biochars Produced from Herbaceous Biomass* • Presenting author: Kaushlendra Singh, West Virginia University, Morgantown, WV (Oluwatosin Oginni, Litha Sivanandan) 1901590

**23** *Comprehensively Characterization of Chars Derived from Different Parts of Porcine Bone* • Presenting author: Mengyan Wang, China Agricultural University, Beijing, China (Mengyan Wang, Ye Liu, Lujia Han, Xian Liu) 1901558

**24** *Microstructural and Physicochemical Characteristics of Woody Biomass Derived Activated Carbons Using MgCl<sub>2</sub>* • Presenting author: Oluwatosin Oginni, West Virginia University, Morgantown, WV (Kaushlendra Singh) 1900610

**25** *Preparation of Magnetic Biochar-Based Solid Acid and Its Nano-Effect on Cellulose* • Presenting author: Yunfeng Zhao,

Washington State University, Richland, WA (Yunfeng Zhao, Hanwu Lei, Denge Duan) 1900893

**54** *Application Design for Manufacture and Assembly to Improving Product Design and Development Performance* • Presenting author: Chenggang Yin, China Agricultural University, Beijing, China (Chenggang Yin, Shulin Hou) 1900289

**66** *Study on the Equipment and Technology of High-Temperature Airtight Fermentation of Manure* • Presenting author: Hongying Wang, China Agricultural University, Beijing, China (Juan Ma, Jian Su, Hao Li, Lingzhuo Kong, Jie Zhang, Paheerding Abulaiti, Nan Jin, Bin Feng, Hongying Wang) 1900319

**73** *Hydrochar from Sewage Sludge and Manure as Soil Amendment* • Presenting author: Luis Huezco, The Ohio State University, Wooster, OH (Luis Huezco, Ajay Shah) 1901199

**123** *Heat and Mass Transfer Modeling in Baled Switchgrass* • Presenting author: Drew Schiavone, University of Maryland Western Maryland Research and Education Center, Keedysville, MD (Michael Montross) 1900547

### **225 Resource Development for Agricultural and Biological Engineering Challenges in Africa, China, and India—INVITED**

Tuesday, July 9, 2:30pm-5:00pm

Location: Columbus II

Sponsored by: E-2050; PRS-702; EOPD-205; ES-100; ESH-04

Moderator: Senorpe Asem-Hiablie, USDA ARS, University Park, PA

**2:35pm** *Resource Development for Agricultural and Biological Engineering Challenges in China* • Presenting author: Baoming Li, China Agricultural University, Beijing China (Baoming Li) 1901949

**3:05pm** *Resource Development for Agricultural and Biological Engineering Challenges in India* • Presenting author: Indra Mani, President, Indian Society of Agricultural Engineers, New Delhi, India 1901951

**3:35pm** **BREAK**

**3:45pm** *Resource Development for Agricultural and Biological Engineering Challenges in Africa* • Presenting author: Michael Ngadi, Fellow of the Canadian Society for BioEngineering, Professor, McGill University, Montreal, Quebec, Canada (Vara Prasad) 1901950

### **226 Improving Student Learning One Course at a Time**

Tuesday, July 9, 2:30pm-5:00pm

Location: Salon I

Sponsored by: EOPD-203

Moderator: David Mabie, University of Nebraska, Lincoln, NE

**2:35pm** *Practice: Designing, Modeling, and Building a Small Grain Dryer; Theory: Fluids, Psychrometrics, Thermodynamics* • Presenting author: Gregory Osborn, University of Arkansas, Fayetteville, AR (Gregory Osborn) 1900604

# Tuesday, July 9

**2:50pm** *A Project-Based, International Course about Ecological Engineering* • Presenting author: O. Grant Clark, McGill University, Ste-Anne-de-Bellevue, Quebec Canada (O. Grant Clark, Thomas G. Franti) 1900841

**3:05pm** *Development and Evaluation of a Variable Frequency Drive Educational Trainer* • Presenting author: Donald M. Johnson, University of Arkansas, Fayetteville, AR (Colton Teekell, Patterson Hilaire, Donald M. Johnson) 1901298

**3:20pm** *Introduction of 3D Printers into ABE Machine Design Classes* • Presenting author: Robert M. Stwalley III, Purdue University Agricultural & Biological Engineering, West Lafayette, IN (Claire E. Haselhorst, Carol S. Stwalley, & Robert M. Stwalley III) 1901396

**3:35pm** **BREAK**

**3:45pm** *Reliable Low Cost CAN-Logger for Off-road Vehicles Engineering Education and Research* • Presenting author: Omer Ahmed Omer Abubakr, University of Khartoum, Khartoum, Sudan (A. F. Kheiralla, Omer A. Abubakr, Mutaz A. Gamal) 1900686

**4:00pm** *Bringing Indigeneity to the BSE Classroom* • Presenting author: Qualla Ketchum, Virginia Tech, Blacksburg, VA (W. Cully Hession) 1901808

**4:15pm** *Innovative Campus Outdoor Laboratory Development and Integration into Academic Programs* • Presenting author: Andrea Ludwig, University of Tennessee, Knoxville, TN (Tim Gangaware, Chris Graves, Garrett Ferry) 1901175

## **227 ES—Energy Systems POSTER SESSION**

Tuesday, July 9, 2:30pm-5:00pm

Posters will be displayed for the entire session, but authors will be present at posters as follows:

2:30pm-3:45pm, authors with ODD numbered posters present

3:45pm-5:00pm, authors with EVEN numbered posters present

Location: Gloucester

Sponsored by: ES-220; MS-23/7/2; PRS-701; ASE-12; ES-01

Moderator: Ganti Murthy, Oregon State University, Corvallis, OR

**26** *Co-Pyrolysis of Microalgae, Sludge and Lignocellulosic Biomass for Aromatic Hydrocarbon Production* • Presenting author: Sourabh Chakraborty, Oklahoma State University, Stillwater, OK (Sourabh Chakraborty, Nurhan Dunford) 1901682

**27** *Development of Heterogeneous Catalysts with Novel Properties for Hydrogen Production from Biomass* • Presenting author: Boanerges Elias Bamaca Saquic (Boanerges Elias Bamaca Saquic, Sibel Irmak, Mark Wilkins) 1901829

**28** *Physical Properties of Solid Biofuel Pellets from Microbially Pretreated Camelina Straw and Switchgrass* • Presenting author: Cuong Dao, University of Saskatchewan, Saskatoon, Saskatchewan Canada (Cuong Dao, Lope Tabil, Edmund Mupondwa, Tim Dumonceaux) 1901269

**29** *Sandwiched  $\text{SiO}_2/\text{Ni}/\text{ZrO}_2$  as a Coke Resistant Nanocatalyst for Carbon Dioxide Reforming with Addition of Methane* • Presenting author: Fei Yu, Mississippi State University, Mississippi State, MS (Jian Dou) 1900012

**30** *Comparison of Mesophilic and Thermophilic Co-Digestion of Swine Manure with Corn Core for Methane Production* • Presenting author: Leipeng Cao, The Ohio State University, Wooster, OH (Fuqing Xu, Harold Keener) 1901706

**31** *Using Cyanobacteria to Simultaneously Remediate Aquacultural Wastewater and Produce Bioethanol* • Presenting author: Rifat Hasan, NCSU, Raleigh, NC (Ashley Beck, Steven Hall) 1901322

**32** *Environmental Life Cycle Assessment of Pennycress Production as Feedstock for Aviation Biofuel* • Presenting author: Seyed Hashem Mousavi Avval, The Ohio State University, Wooster, OH (Ajay Shah) 1901658

**33** *Life Cycle Assessment of Lactic Acid Production Using Corn Grain and Corn Stover* • Presenting author: Ashish Manandhar, The Ohio State University, Wooster, OH (Ashish Manandhar, Ajay Shah) 1901646

**34** *Techno-Economic and Life-Cycle Analysis of Lignocellulosic Materials Pretreatment Approaches for Acetone-Butanol-Ethanol (ABE) Fermentation* • Presenting author: Kurt A. Rosentrater, Iowa State University, Ames, IA (Nazira Mahmud, Kurt A. Rosentrater) 1901863

**35** *Experimental Determination of the Drying Rate of Cocoa Beans (*Theobroma cacao*)* • Presenting author: Okonkwo Wilfred Ifeanyi, University of Nigeria, Nsukka, Enugu State, Nigeria (Okonkwo W. I., E. T. Okorie) 1900245

**36** *Influence of Varying Light Wavelengths on the Biomass Productivity of a Microalgal Consortia Cultivated on Simulated Dairy Effluent* • Presenting author: Bhalamurugan Gatamaneni Loganathan, McGill University, Saint Anne de Bellevue, Quebec Canada (Valerie Orsat, Mark Lefsrud) 1900145

**37** *Designing Biomass Logistics Systems to Supply Bioderived Materials and Biofuels Markets* • Presenting author: Erin Webb, Oak Ridge National Laboratory, Oak Ridge, TN (Robin Clark, Soydan Ozcan, Halil Tekinalp, Xianhui Zhao, Nikki Labbe) 1901281

**38** *Effect of Torrefaction on Glucose Yield of Wheat Straw* • Presenting author: Jaya Tripathi, Penn State University, PA (Jaya Tripathi) 1901899

**39** *Develop Biopolymer Based Nanocomposite Films by Combination of Cellulose Nanocrystal (CNC) and Polylactic Acid (PLA)* • Presenting author: Lin Wei, South Dakota State University, Brookings, SD (Zeyad Albahr, Lin Wei) 1900582

**40** *Characterization of Bionanocomposite Films Based on Nanocellulose and Activated Carbon* • Presenting author: Lin Wei, South Dakota State University, Brookings, SD (Abdus Sobhan, Kasisviswanathan Muthukumarappan, Lin Wei) 1900618

## Tuesday, July 9

**41** *A Green Approach to Nanocrystalline Cellulose Production with Cellulase from Aspergillus niger* • Presenting author: Marie Qian, WSU-Tricities, Richland, WA (Moriko Qian, Hanwu Lei, Elmar Villota, Wendy Mateo, Dengle Duan, Yunfeng Zhao) 1901408

**42** *Use of Photocatalytic Nanomaterials for Volatile Fatty Acid Removal from Anaerobic Digestate Leads to Improved Algal Growth* • Presenting author: Qichen Wang, Auburn University, Auburn, AL (Haodong Ji, Dongye Zhao, Brendan Higgins) 1900653

**43** *Sustainable Chemicals Using Waste Resources: Synergistic Effects in Co-pyrolysis of Lignin and Plastics* • Presenting author: Vivek Patil, Auburn University, Auburn, AL (Sushil Adhikari, Phillip Cross) 1900576

**44** *Effects of Rubbing-Alkali Pretreatment on Enzymatic Hydrolysis-Reducing Sugar Yield and Structure of Rice Straw* • Presenting author: Yutao Liu, Nanjing Agricultural University, Nanjing, Jiangsu China (Weiming Ding, Weihua Mao) 1900061

**45** *Free Ammonia Resistance of NOB in Continuous Flow Air-Lift Reactor Performing Partial Nitrification* • Presenting author: Zhaohui An, Virginia Tech, Manassas, VA (Tim Kent, Charles Bott, Zhi-Wu Wang) 1900239

**46** *Stabilization of Full or Partial Nitrification Aerobic Granules in Continuous Flow Reactors Without Hydraulic Selection Pressure* • Presenting author: Zhaohui An, Virginia Tech, Manassas, VA (Charles Bott, Zhi-Wu Wang) 1900241

**47** *Development of a Pretreatment Reactor for Lignocellulosic Biomass Using Low-Moisture Anhydrous Ammonia (LMAA) Method* • Presenting author: Haider Kadhum, Oregon State University, Corvallis, OR (Haider J. Kadhum, G. S. Murthy) 1900389

**48** *Effect of Spray Adjuvant Types and Concentration on Nozzle Atomization* • Presenting author: Xiao Chen, Nanjing Research Institute for Agricultural Mechanization Ministry, Nanjing, Jiangsu, China (Xiao Chen, Yan Gong, Dejiang Liu, Guo Wang, Xiao Zhang) 1901399

**49** *Reduction of Heating Energy Cost of Heat Pump System Using Rainwater Storage Facility As Heat Source* • Presenting author: Younkoo Kang, Protected Horticulture Research Institute, Haman-gun, Gyeongsangnam-do, Republic of Korea (Younkoo Kang, Jongpil Moon, Seunghee Kim) 1900675

**50** *Life Cycle Assessment of Levoglucosan Production Via Fast Pyrolysis of Cotton Straw in China* • Presenting author: Ajay Shah, Ohio State University, Wooster, OH (Junqi Wang, Ajay Shah) 1901530

**51** *Effects of Pressure on the Torrefaction Process Using Self-Heating of Dairy Manure* • Presenting author: Naohiro Maemoku, Graduate School of Agriculture Hokkaido University, Sapporo, Hokkaido, Japan (Takanori Itoh, Kazunori Iwabuchi, Izumi Sasaki, Katsumori Taniguro) 1900092

**52** *Bio-Methane Potential Testing and Modelling in Anaerobic Digestion* • Presenting author: Sarah Daly, Purdue University, West Lafayette, IN (Ji-Qin Ni) 1900879

### **228 ESH—Ergonomics, Safety, & Health POSTER SESSION**

Tuesday, July 9, 2:30pm-5:00pm

Posters will be displayed for the entire session, but authors will be present at posters as follows:

2:30pm-3:45pm, authors with ODD numbered posters present

3:45pm-5:00pm, authors with EVEN numbered posters present

Location: Gloucester

Sponsored by: ESH-01

Moderator: Gretchen Mosher, Iowa State University, Ames, IA

**53** *Modeling Retrofit Anchor Points for On-Farm Grain Bin Structures* • Presenting author: Michael L. Dyer, Penn State University, University Park, PA (Michael Dyer, Michael L. Pate) 1900751

**55** *Socio-Technical Features and Performance Impact Factors in New Product Development Processes* • Presenting author: Chenggang Yin, China Agricultural University, Beijing, China (Chenggang Yin, Ruling Hong, Jianming Jian) 1900290

**56** *Survey Design in Supporting of Product Design and Development: A Case Study* • Presenting author: Chenggang Yin, China Agricultural University, Beijing, China (Chenggang Yin, Yiyang Wang, Haiqiang Wang) 1900291

**57** *Universal Foldable ROPS Lift Assist Designs with Torsion Spring* • Presenting author: Paul Ayers, University of Tennessee, Knoxville, TN (Farzaneh Khorsandi, Mathew Poland, Cameron Hilliard) 1900615

**58** *Prediction of the Trend of Antimicrobial Resistance of Escherichia coli in Livestock and Poultry* • Presenting author: Yang Shenghui, China Agricultural University, Beijing China (Li Jianping, Ma Hengtao, Xu Ding, Feng Pengxing, Yang Shenghui, Zheng Yongjun) 1901053

**59** *Development of an Ergonomic Evaluation System Based on Inertial Measurement Unit and its Application for Exoskeleton Load Reduction* • Presenting author: Hsu,Chi-Fang, Taipei, Taiwan (Ta-Te Lin) 1901464

**60** *Appraisal of Common Practices Constituting Misuse Among Farm Tractor Operators in Nigeria* • Presenting author: E. O. Atanda, Auchi Polytechnic, Auchi, Edo State, Nigeria (E.O. Atanda, O.M. Unuigbo, O. Ajayi) 1900051

### **229 3D Machine Vision for Sensing and Automation**

Tuesday, July 9, 2:30pm-5:00pm

Location: Salon H

Sponsored by: ITSC-312

Moderator: Seung Chul Yoon, USDA ARS, Athens, GA

**2:35pm** *2D and 3D Sensor Fusion for Rapid Detection of Woody Breast Myopathy in Broiler Chickens* • Presenting author: Seung-Chul Yoon, USDA-ARS, Athens, GA (Seung-Chul Yoon, Bin Pang, Yi Yang, Hong Zhuang, Brian Bowker, Kurt C. Lawrence) 1901883

# Tuesday, July 9

**2:50pm** *Development of the Mushroom Harvesting Assistance System Using Computer Vision* • Presenting author: Cheng-Hao Lee, The Pennsylvania State University, University Park, PA (Daeun Choi, John Pecchia, Long He, Paul Heinemann) 1900505

**3:05pm** *Development of a 3D Multispectral Imaging System Using Structured Light* • Presenting author: Xueping Ni, University of Georgia, Athens, GA (Xueping Ni, Changying Li, Huan Yu Jiang) 1900791

**3:20pm** *Automated Plant Node Detection Using Terrestrial LiDAR Data under Field Conditions* • Presenting author: Shangpeng Sun, The University of Georgia, Athens, GA (Shangpeng Sun, Changying Li, Andrew H. Paterson, Jeevan Adhikari, Jon S. Robertson, Cheng Meng) 1900598

**3:35pm** **BREAK**

**3:45pm** *Blossom Detection in Apple Trees for Selective Blossom Thinning* • Presenting author: Uddhav Bhattarai, Washington State University, Pullman, WA (Uddhav Bhattarai, Santosh Bhusal, Yaqoob Majeed, Manoj Karkee) 1901629

**4:00pm** *Apple Detection in Fruiting Wall Architecture Trees Using RGB and Depth Features Based on Faster R-CNN* • Presenting author: Longsheng Fu, Northwest A&F University, Yangling, Shaanxi China (Xin Zhang, Yaqoob Majeed, Zhihao Liu, Jing Zhang, Manoj Karkee, Qin Zhang) 1900448

**4:15pm** *Real-Time Corn Grain Depth and Volume Measurement Device Using Stereo Vision* • Presenting author: Matthew Rogers, Purdue University, West Lafayette, IN (Robert Clark Stevens) 1900422

**4:30pm** *Optical Measurement of Degree of Fill and Discharge Rate in a Lab-Scale Storage Vessel* • Presenting author: Miles Grafton, Massey University, Palmerston North, Manawatu, New Zealand (Mohammad Barzegar, Clive Davies, Gabe Redding, Luke Fullard) 1900436

**4:45pm** *Semantic Segmentation of Sparse 3D Point Cloud Based on Geometrical Features for Trellis Structured Apple Orchard* • Presenting author: Long He, Pennsylvania State University, University Park, PA (Lihua Zeng, Juan Feng, Long He) 1901390

**5:00pm** *Automatic Body Condition Scoring System Based on Curvature and Visibility Analysis Using Depth Images* • Presenting author: Kaixuan Zhao, Henan University of Science and Technology, Luoyang, Henan, China (Kaixuan Zhao, Jeffrey M. Bewley, Anthony N. Shelley, Daniel L. Lau, Jiangtao Ji) 1900501

## **230 Advances in Spectroscopy and Hyperspectral Properties of Biological Products**

Tuesday, July 9, 2:30pm-5:00pm

Location: Salon K

Sponsored by: ITSC-348; PRS-701

Moderator: Lav Khot, Washington State University, Prosser, WA

**2:35pm** *Early Grapevine Leafroll Disease Diagnosis Using Hyperspectral Imaging Combined with Convolutional Neural Network* • Presenting author: Zongmei Gao, Washington State

University, Prosser, WA (Lav R. Khot, Qin Zhang, Rayapati A. Naidu) 1900833

**2:50pm** *Cultivars Classification of Single Sweet Corn Seed Using Fourier Transform Near-Infrared Spectroscopy Combined with Discriminant Analysis* • Presenting author: Guangjun Qiu, Oklahoma State University, Stillwater, OK (Guangjun Qiu, Enli Lü, Ning Wang, Huazhong Lu) 1901865

**3:05pm** *Laser Induced Fluorescence Hyperspectral Imaging (LIF-HSI) for Aflatoxin B1 Detection in Pistachio Kernels* • Presenting author: Qifang Wu, Zhejiang University, Hangzhou, Zhejiang, China (Qifang Wu, Hao Tian, Huirong Xu) 1900103

**3:20pm** *SiriTool: A Matlab Graphical User Interface for Image Analysis in Structured-illumination Reflectance Imaging for Fruit Defect Detection* • Presenting author: Yuzhen Lu, USDA/ARS, East Lansing, MI (Renfu Lu) 1900169

**3:35pm** **BREAK**

**3:45pm** *Determining Damage Levels in Wheat Caused by Sunn Pest (*Eurygaster integriceps*) Using Visible and Near-Infrared Spectroscopy* • Presenting author: Paul Armstrong, USDA-ARS, Manhattan, KS (Paul Armstrong, Elizabeth Maghirang, Mehmet Ozulu) 1900178

**4:00pm** *WSN Detection and Recognition of Rice Rust Disease Based on Hyperspectral Imaging* • Presenting author: Paul Oppong Kwabena, Jiangsu University, Zhenjiang, Jiangsu China (Mao Hanping, Ning Yang, Li Lin) 1900131

**4:15pm** *Identification of Rice Leaf Blast Using Hyperspectral Imaging* • Presenting author: Susu Zhu, Zhejiang University, Hangzhou, Zhejiang Province, China (Lei Feng, Yong He) 1900311

**4:30pm** *On-line evaluation of Watercore in Apples by Visible/Near Infrared Spectroscopy* • Presenting author: Han Chang, Zhejiang University, Hangzhou, Zhejiang, PR China. (Han Chang, Qifang Wu, Jinshan Yan, Xuan Luo, Huirong Xu) 1900308

**4:45pm** *Detection of Subsurface Bruising in Tomatoes of Different Ripening Stages Using Structured-Illumination Reflectance Imaging* • Presenting author: Hao Lin, Michigan State University, Lansing, MI (Hao Lin, Yuzhen Lu, Renfu Lu) 1900354

**5:00pm** *Near Infrared Spectroscopy Internal Quality Detection Based on Characteristic Wavelength* • Presenting author: Pengkun Quan, Northwest A&F University, Yangling, Shaanxi China (Pengkun Quan, Juan Zhao, Mengsheng Zhang, Haihui Zhang) 1900500

## **231 Cloud Computing and Internet of Things in Agriculture**

Tuesday, July 9, 2:30pm-5:00pm

Location: Boston University

Sponsored by: ITSC-254; ITSC-217

Moderator: Hasan Seyyedhasani, University of California, Davis, CA

**2:35pm** *A Tutorial on Wireless Communication Protocol Selection for Digital Agricultural Applications* • Presenting author: Yang Wang, Purdue University, West Lafayette, IN (Yaguang Zhang, Andrew Balmos, Dennis Buckmaster, James Krogmeier) 1901287

# Tuesday, July 9

**2:50pm** *The Merits of an Agricultural Vehicle to Vehicle Mesh WiFi Network* • Presenting author: Andrew D Balmos, Purdue University, West Lafayette, IN (Yaguang Zhang, Yang Wang, James Krogmeier) 1901531

**3:05pm** *Connectivity for IoT Solutions in Integrated Dairy Farming in Germany* • Presenting author: Maximilian Treiber, Technical University of Munich, Chair of Agricultural Systems Engineering, Freising, Bavaria, Germany (Maximilian Treiber, Martin Höhendinger, Harald Rupp, Natascha Schlereth, Josef Bauerdick, Heinz Bernhardt) 1900561

**3:20pm** *Iris: Tuning the Configuration Parameters of NoSQL Databases for High-Throughput Digital Agricultural Processing Pipelines* • Presenting author: Somali Chaterji, Purdue Univ, W Lafayette, IN (Ashraf Mahgoub, Somali Chaterji) 1900330

**3:35pm** **BREAK**

**3:45pm** *Smart Farms and the Digital Age—A Reality* • Presenting author: Leon Schumacher, University of Missouri, Columbia, MO (Jianfeng Zhou) 1901857

**4:00pm** *Trellis++: A Practical Privacy-Preserving Food Safety Framework* • Presenting author: Servio Palacios, Purdue University, West Lafayette, IN (Servio Palacios, Aaron Ault, Alexander W. Layton, Samuel Noel, Yang Wang, Andrew Balmos, James Krogmeier, Dennis Buckmaster, Bharat Bhargava) 1901553

**4:15pm** *Blockchain and Its Applications in Food Production System* • Presenting author: Azar Alizadeh, University of California Merced, Merced, CA (Azar Alizadeh, Mukesh Singhal, Reza Ehsani) 1901000

**4:30pm** *Internet of Things Based System for Crop Loss Management: Prototyping a Visible-Infrared and Microclimate Sensing Derived Apple Fruit Sunburn Monitoring System* • Presenting author: Rakesh Ranjan, Washington State University, Prosser, WA (Rakesh Ranjan, Guobin Shi, Lav R Khot) 1901249

**4:45pm** *Development of a Wireless Sensor Network to Monitor Rainfall, Temperature, and Relative Humidity at Farm Scale Level* • Presenting author: Thiago Borba Onofre, University of Florida, Gainesville, FL (Thiago Borba Onofre, Clyde Fraisse) 1901296

**5:00pm** *Amazon Web Services for Storing and Processing Sensor Outputs* • Presenting author: Tristan Chauvin-Bosse, McGill University, Saint-Anne-de-Bellevue, Quebec Canada (Mark Lefsrud, David Leroux, Ryan Knight, Samuel Bilodeau) 1900859

**5:15pm** *Development of a Framework for Internet of Things (IoT)-Based Precision Farming* • Presenting author: Jianfeng Zhou, University of Missouri, Columbia, MO (Leon Schumacher, Jianjun Yin) 1900611

**5:30pm** *IoT Based Real-Time Position Tracking and Engine Status Monitoring System of an Agricultural Tractor* • Presenting author: Prateek Shrivastava, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India (Prateek Shrivastava, V K Tewari) 1900757

## **232 Machine Vision Applications in Animals and Animal Products**

Tuesday, July 9, 2:30pm-5:00pm

Location: MIT

Sponsored by: ITSC-312

Moderator: Yan-Fu Kuo, National Taiwan University, Taipei, Taiwan China

**2:35pm** *Estimating Shrimp Body Length Using Deep Convolutional Neural Network* • Presenting author: Hong-Yang Lin, Department of Bio-Industrial Mechatronics Engineering, NTU, Taipei, Taiwan (Hong-Yang Lin, Woei-Ling Ng, Jyh-Nain Pai, Yuan-Nan Chu, Chyng-Hwa Liou, Kuo-Chi Liao, Yan-Fu Kuo) 1900724

**2:50pm** *Determining the Body Condition Scores of Sows Using Convolutional Neural Networks* • Presenting author: Mao-Hsiang Huang, Department of Bio-Industrial Mechatronics Engineering, NTU, Taipei, Taiwan (Mao-Hsiang Huang, En-Chung Lin, Yan-Fu Kuo) 1900915

**3:05pm** *Detecting and Counting Harvested Fish and Measuring Fish Body Lengths in Video Using Deep Learning Methods* • Presenting author: Chi-Hsuan Tseng, Department of Bio-Industrial Mechatronics Engineering, NTU, Da'an Dist., Taipei City Taiwan (Yan-Fu Kuo) 1900408

**3:20pm** *Identifying Species of Common Sea Fish Harvested by Longliner Using Deep Convolutional Neural Networks* • Presenting author: Yi-Chin Lu, Department of Bio-Industrial Mechatronics Engineering, NTU, Taipei Taiwan (Yi-Chin Lu, Yan-Fu Kuo) 1900399

**3:35pm** **BREAK**

**3:45pm** *Individual Identification of Holstein Dairy Cows Based on Detecting and Matching Feature Points in Body Images* • Presenting author: Kaixuan Zhao, Henan University of Science and Technology, Luoyang, Henan, China (Kaixuan Zhao, Xin Jin, Jun Wang, Xuefeng Zhu) 1900627

**4:00pm** *Optimal Camera Placement for Visual Sensing of Livestock Animals during Confined Transport* • Presenting author: Joshua Peschel, Iowa State University, Ames, IA (Joshua Peschel) 1901342

**4:15pm** *Computer Vision Technology in Fish Farming* • Presenting author: Daoliang Li, China Agricultural University, Beijing, China (Daoliang Li Yinfeng Hao) 1900377

**4:30pm** *Shell Egg Quality Determination with Machine Vision* • Presenting author: Kurt Lawrence, USDA, ARS, Athens, GA (Kurt Lawrence, Seung Chul Yoon, Gerald Heitschmidt, Tae-Sung Shin) 1901559

**4:45pm** *Classification of Eggs into Damaged and Undamaged Categories Using Machine Learning Techniques* • Presenting author: Bhavya Botta, Agricultural and Food Engineering Department, Indian Institute of Technology, Kharagpur, West Bengal India (Ashis Kumar Datta, Gattam Sai Swaroop Reddy) 1901240

**5:00pm** *Damage Detection on Chicken Eggshells Using Faster R-CNN* • Presenting author: Ashis Kumar Datta, Agricultural and Food Engineering Department, Indian Institute of Technology, Kharagpur, West Bengal, India (Gattam Sai Swaroop Reddy, Ashis Kumar Datta) 1901244

# Tuesday, July 9

**5:15pm** *An Online Unsupervised Deep Learning Approach for an Automated Pest Insect Monitoring System* • Presenting author: Dan Jeric Arcega Rustia, National Taiwan University, Taipei City Taiwan (Dan Jeric Arcega Rustia, Jun-Jee Chao, Jui-Yung Chung, Ta-Te Lin) 1900477

## **233 UAV for Sensing, Imaging, and Agricultural Aquacultural Applications Part I**

Tuesday, July 9, 2:30pm-5:00pm

Location: Harvard

Sponsored by: ITSC-318

Moderator: Daniel Jenkins, University of Hawaii, Honolulu, HI

**2:35pm** *High-Throughput Sensing to Evaluate Irrigation Treatment Responses in Quinoa Varieties* • Presenting author: Sindhuja Sankaran, Washington State University, Pullman, WA (Carlos Zúñiga, Leonardo Hinojosa, Kevin Murphy) 1901360

**2:50pm** *Estimation of Maturity Date of Soybean Breeding Lines Using UAV-Based Imagery* • Presenting author: Jing Zhou, University of Missouri, Columbia, MO (Jing Zhou, Dennis Yungbluth, Chin Vong, Andrew Scaboo, Jianfeng Zhou) 1900427

**3:05pm** *Remote Quantification of Land Surface Temperature and Evapotranspiration Using Thermal Infrared Observations from UAVs* • Presenting author: Darren Drewry, Ohio State University, Columbus, OH (Debsunder Dutta, Kaniska Mallick, William Johnson, Roland Brockers) 1901711

**3:20pm** *Data Collection by Unmanned Aircraft Systems (UAS) to Develop Variable Rate Prescription Maps for Cotton Plant Growth Regulators and Defoliants* • Presenting author: Gary Roberson, North Carolina State University, Raleigh, NC (Gary Roberson, John Classen, Jason Osborne) 1900148

**3:35pm** **BREAK**

**3:45pm** *Data-Driven Precision Agricultural Applications Using Field Sensors and Unmanned Aerial Vehicle (UAV)* • Presenting author: Rohit Pathak, Mississippi State University, Starkville, MS (Ganesh C. Bora, Razieh Barzin) 1901527

**4:00pm** *Band-to-Band Image Registration Using Deep Learning Based Features* • Presenting author: Haoyu Niu, University of California, Merced, CA (Tiebiao Zhao, Alexander Koumis, Haoyu Niu, Dong Wang, YangQuan Chen) 1901839

**4:15pm** *Evaluation of In-Field-Crop Sensors and UAS Imagery for Variable Rate N Application* • Presenting author: Razieh Barzin, Mississippi State University, Starkville, MS (Ganesh C. Bora, Rohit Pathak) 1901671

**4:30pm** *Estimating Evapotranspiration with UAVs in Agriculture: A Review* • Presenting author: Haoyu Niu, University of California, Merced, CA (Haoyu Niu, Tiebiao Zhao, Dong Wang, YangQuan Chen) 1901226

**4:45pm** *Deep Autoencoder to Reduce Dimensionality of Hyperspectral Images Collected by UAV Flying Over Experimental Plots* • Presenting author: Ali Moghimi, Department of Bioproducts

and Biosystems Engineering, University of Minnesota, St. Paul, MN (Ali Moghimi, Ce Yang, James A. Anderson, Susan K. Reynolds) 1900814

## **234 Advances in Cotton Engineering**

Tuesday, July 9, 2:30pm-5:00pm

Location: Brandeis

Sponsored by: MS-23/7/3

Moderator: Wesley Porter, University of Georgia, Tifton, GA

**2:35pm** *Consideration of Planter Parameters, Seed Vigor, and Field Conditions for Improving Crop Emergence and Yield in Cotton* • Presenting author: Simerjeet Virk, University of Georgia, Tifton, GA (Wesley Porter, John Snider, Jared Whitaker) 1901107

**2:50pm** *Preliminary Evaluation of Mapping Cotton Quality* • Presenting author: Jason Ward, NC State University, Raleigh, NC (Enrique Pena, Jason Ward, Terry Griffin) 1901778

**3:05pm** *Round Cotton Module Handling Logistics and Cover Damage* • Presenting author: Robert Hardin, Texas A&M, College Station, TX (Tianyi Wang, Jason Ward, John Wanjura, Ed Barnes) 1901830

**3:20pm** *An Electronic System for Managing Cotton Modules—System Development Update* • Presenting author: John Wanjura, USDA ARS CPPRU, Lubbock, TX (John Wanjura, Greg Holt, Mathew Pelletier, Ed Barnes) 1901157

**3:35pm** **BREAK**

**3:45pm** *Results From Testing a Mechanical Preconditioning System for Removing Cottonseed Linters* • Presenting author: Greg Holt, USDA-ARS, Lubbock, TX (Tom Wedegaertner, John Wanjura, Mathew Pelletier) 1900159

**4:00pm** *Commercialization of Plastic Contamination Detection and Removal System for Cotton Gins* • Presenting author: Mathew Pelletier, USDA-ARS, Lubbock, TX (Greg Holt, Derek Whitelock, John Wanjura, Paul Funk, Carlos Armijo, Kevin Tran, Marcus Gray, Ivan Bader) 1901338

**4:15pm** *Thermal Contact, a Passive Approach to Plastic Removal from Seed Cotton* • Presenting author: Paul Funk, USDA-ARS (P.A. Funk, C.B. Armijo, D.P. Whitelock, C.D. Delhom, G.A. Holt, J.D. Wanjura, M.G. Pelletier) 1901898

**4:30pm** *In-Situ Color and Leaf Measurement Via Image Analysis* • Presenting author: Chris Delhom, USDA, New Orleans, LA (Chris Delhom) 1900298

**4:45pm** *Evaluation of Prototype High-Capacity Roller-Gin Reclaimers* • Presenting author: Derek Whitelock, USDA-ARS, Las Cruces, NM (Derek Whitelock, Carlos Armijo, Paul Funk) 1901880

**5:15pm** *Preliminary Results of How Conventional and Experimental Lint Cleaning Processes Affect Fiber Length Uniformity Index* • Presenting author: Carlos Armijo, USDA-ARS (Carlos B. Armijo, Christopher D. Delhom, Derek P. Whitelock, Paul A. Funk, John D. Wanjura, Gregory A. Holt, Ruixiu Sui, Vikki B. Martin, Neha Kothari) 1901902

# Tuesday, July 9

## **235 Automation and Robotics for Fruit, Vegetables, and Other Specialty Crops**

Tuesday, July 9, 2:30pm-5:00pm

Location: Northeastern

Sponsored by: MS-48; MS-54; ITSC-318

Moderator: Yiannis Ampatzidis, Univeristy of Florida, Immokalee, FL

**2:35pm** *High Speed Centimeter Scale Resolution Sprayer for Precision Weed Control* • Presenting author: Mark C. Siemens, University of Arizona, Yuma, AZ (Victor Godinez, Jr.) 1901673

**NO-SHOW** *Design and Implementation of Automatic Seedling Transplanter with Seedling Leakage Detection* • Presenting author: Xin Jin, Henan University of Science and Technology, Luoyang, Henan, China (Kaixuan Zhao, Shengsheng Wang, Jiangtao Ji, Hao Ma) 1900682

**3:05pm** *Physical and Mechanical Experiments for Designing Cabbage Precision Trimming Device* • Presenting author: Cui Gongpei, Northwest A&F University, Yangling, Shaanxi China (Cui Gongpei, Zheng Xinmeng, Wang Jingzheng, Yang Chen, Liu Zhihao, Cui Yongjie) 1901420

**3:20pm** *Leveraging Deep Learning and RGB-D Cameras for Cooperative Apple-Picking Robot Arms* • Presenting author: Simeon Harbert, Georgia Tech Research Institute, Atlanta, GA (Konrad Ahlin, Ai-Ping Hu) 1901125

**3:35pm BREAK**

**3:45pm** *Development of a Robotic End Effector for Apple Tree Pruning* • Presenting author: Azlan Zahid, Department of Agricultural and Biological Engineering, Pennsylvania State University, State College, PA (Azlan Zahid, Long He, Lihua Zeng) 1900964

**4:00pm** *Field Evaluations on Locally Targeted Shake-and-Catch Apple Harvesting Technology for Fresh Market* • Presenting author: Xin Zhang, Washington State University, Prosser, WA (Xin Zhang, Long He, Matthew Whiting, Manoj Karkee, Qin Zhang) 1900978

**4:15pm** *A New Fruit Removal Head for an Olive Harvesting System* • Presenting author: Taymaz Homayouni, Merced, CA (Taymaz Homayouni, Mohammadmehdi Maharlooeei, Arash Mohammadi Toudeshki, Reza Ehsani) 1900996

**4:30pm** *Development of a Wireless Sensor for Measuring the Performance of Mechanical Harvesting Machines for Tree Crops* • Presenting author: Arash Toudeshki, University of California, Merced, Merced, CA (Arash Toudeshki, Reza Ehsani, Taymaz Homayouni, Fuxi Shi) 1900937

**4:45pm** *Mathematical Modelling of the Acceleration Transferred from Trunk to Top Branch of Pistachio Trees during Harvest Using a Trunk Shaker* • Presenting author: Ruijun Ma, University of California, Merced, Merced, CA (Ma Ruijun, Arash Toudeshki, Taymaz Homayouni, Reza Ehsani, Zhang Xiaohua) 1901233

## **236 Automation Systems for Agricultural Field Machinery**

Tuesday, July 9, 2:30pm-5:00pm

Location: Tufts

Sponsored by: MS-58; ITSC-318; ITSC-353

Moderator: Aaron Franzen, South Dakota State University, Brookings, SD

**NO-SHOW** *Study on Torque Distribution of Traction Operation of Four Wheel Independent Driven Electric Tractor* • Presenting author: Huadong Zhou, Nanjing Agricultural University, Nanjing, JiangSu China (Huadong Zhou, Zhixiong Lu, Xiaoting Deng) 1901082

**2:50pm** *Development and Evaluation of an Improved Apple Infield Sorting System* • Presenting author: Zhao Zhang, USDA, Lansing, MI (Zhao Zhang, Renfu Lu) 1900745

**3:05pm** *Development of a Driverless Tractor Using Information and Communication Techniques* • Presenting author: Xiang Yin, Shandong University of Technology, Zibo, Shandong, China (Xiang Yin, Yanpu Chen, Chengqian Jin, Juan Du) 1900540

**3:20pm** *Development of Automatic Loading System for Roller-Type Pot-Seeding Machine* • Presenting author: Seok-Joon Hwang, Kangwon National University, Chuncheon, Gangwon, Republic of Korea (Seok-Joon Hwang, Ju-Seok Nam) 1900550

**3:35pm BREAK**

**NO-SHOW** *Development of an Automatic Steering System for Agricultural Vehicles* • Presenting author: Xiang Yin, Shandong University of Technology, Zibo, Shandong, China (Xiang Yin, Min Li, Chengqian Jin, Juan Du) 1900504

**4:00pm** *Optimal Utilization of Autonomous Robotics for Cotton Harvest* • Presenting author: Terry Griffin, Kansas State University, Manhattan, KS (Terry Griffin, Gregg Ibendahl, Ed Barnes, Jon Devine, Ty Griffin) 1901448

**NO-SHOW** *Autonomous Calibration for a Mass-Flow Yield Monitor in a Combine Harvester* • Presenting author: Don Petkau, Department of Biosystems Engineering, University of Manitoba, Winnipeg, MB, Canada (Carly R. Baker, Don Petkau) 1900356

**4:30pm** *RootRobot: A Field-based Platform for Maize Root System Architecture Phenotyping* • Presenting author: Xiaomeng Shi, Penn State University, University Park, PA (Xiaomeng Shi, Daeun Choi, Paul Heinemann, Molly Hanlon, Jonathan Lynch) 1900806

**4:45pm** *Motion Planning for Autonomous Grain Cart* • Presenting author: Lantian Shangguan, Texas A&M University, College Station, TX (Lantian Shangguan, Alex Thomasson, Swaminathan Gopalswamy) 1900379

## **237 Innovations in Precision Agriculture**

Tuesday, July 9, 2:30pm-5:00pm

Location: Tremont

Sponsored by: MS-54; MS-23/6/1

Moderator: Dharmendra Saraswat, Purdue University, West Lafayette, IN

**2:35pm** *Research on Kinematics of Male Parent Panicle of Hybrid Rice Affected by Airflow* • Presenting author: Fuqiang Yao, Zhejiang University, Hangzhou, Zhejiang, China (Fuqiang Yao, Yongwei

# Tuesday, July 9

Wang, Jiayuan Yu, Mengyuan Chen, Jun Wang, Zhenbo Wei, Ming Cao) 1900771

**2:50pm** *Qualitative Analysis of the Infield Logistics of Agricultural Machinery in Germany* • Presenting author: Heinz Bernhardt, Technical University of Munich, Freising, Germany (Michael Mederle, Michael Gerl, Heinz Bernhardt) 1900528

**NO-SHOW** *Use of Thermal Imagery to Identify Stress in Crops Grown in Various Environments and Soil Types* • Presenting author: Harman Singh Sangha, Kansas State University, Manhattan, KS (Ajay Sharda, William Schapaugh, Lukas Koch, Dylan Walta) 1901589

**3:20pm** *AEF—Providing Electronic Communication to the Ag Sector for Wireless In-Field Communication* • Presenting author: Norbert Schlingmann, Agricultural Industry Electronics Foundation, Frankfurt, Germany (Mark Benishek) 1901864

**3:35pm** **BREAK**

**3:45pm** *Digital Soil Mapping: Comparative Evaluation of Machine Learning and Geostatistical Modeling Methods* • Presenting author: Jeff Fiechter, Purdue University, West Lafayette, IN (Dharmendra Saraswat) 1900608

**4:00pm** *Using On-Farm Research Data to Inform Variable Rate Seeding* • Presenting author: Elizabeth Hawkins, The Ohio State University, Wilmington, OH (John Fulton) 1901722

**4:15pm** *Spatial Relationships between Sensed Corn Populations and Yield* • Presenting author: Kenneth A. Sudduth, USDA-ARS, Columbia, MO (Kenneth A. Sudduth, Newell R. Kitchen, Scott T Drummond) 1901897

**4:30pm** *Operational Challenges and Yield Implications of Increasing Corn Planting Speeds* • Presenting author: Andrew Klopfenstein, The Ohio State University, Columbus, OH (Andrew Klopfenstein, Richard Colley, Ryan Tietje, Chris Wiegman, John Fulton, Scott Shearer) 1901183

**4:45pm** *Intensive Spatial Data Characterization: A New Method for Identifying Data Relationships in Crop Production* • Presenting author: Kendall Kirk, Clemson University, Blackville, SC (Kendall R. Kirk, Michael T. Plumblee, John D. Mueller, Jeremy K. Greene, Benjamin B. Fogle, Brennan E. Teddy) 1901764

**5:00pm** *Intra-Row Weeding—Approaches for Elimination of Weeds between the Crop Plants* • Presenting author: Peter Schulze Lammers, University of Bonn, North Rhine Westfalia Germany (Peter Schulze Lammers, Oliver Schmittmann, Matthias Mütter) 1900532

## **238 Advances in Ecosystem Evapotranspiration Research—HYBRID**

Tuesday, July 9, 2:30pm-5:00pm

Location: Vineyard

Sponsored by: NRES-23; NRES-25

Moderators: Devendra Amatya, USDA Forest Service, Cordesville, SC; Suat Irmak, University of Nebraska-Lincoln, Lincoln, NE

**2:35pm** *Modeling Urban Forest Evapotranspiration and Heat Island Mitigation with a Coupled Water and Energy Balance*

*Model* • Presenting author: Ted Endreny, State University of New York, Syracuse, NY (Ted Endreny, Yang Yang, Dave Nowak) 1901914

**NO-SHOW** *Evaluation of the Penman-Monteith and Other 34 reference Evapotranspiration Equations under Limited Data in a Semiarid Dry Climate* • Presenting author: Koffi Djaman, New Mexico State University, Farmington, NM (Michael O'Neill, Lamine Diop, Ansoumana Bodian, Samuel Allen, Komlan Koudahe, Kevin Lombard) 1900113

**3:20pm** *Drought Stress Effect on Observed Surface Energy Balance Closure* • Presenting author: Jason Kelley, University of Idaho, Moscow, ID (Jason Kelley) 1901691

**3:35pm** **BREAK**

**3:45pm** *Dynamics of Sensible Heat in a Semi-Arid Environment* • Presenting author: Jerry E. Moorhead, USDA-ARS Conservation and Production Research Laboratory, Bushland, TX (Jerry E. Moorhead, Gary W. Marek, Prasanna H. Gowda, Thomas H. Marek) 1901903

**4:00pm** *Evaluating and Improving Model Behavior of Evapotranspiration: Dual Crop Coefficient in DSSAT* • Presenting author: Kendall DeJonge, USDA-ARS, Fort Collins, CO (Kendall DeJonge, Kelly Thorp) 1901890

**4:15pm** *C3 and C4 Row Crop Transpiration and Evapotranspiration in Response to Environmental and Morphological Factors* • Presenting author: Meetpal Kukal, University of Nebraska-Lincoln, Lincoln, NE (Suat Irmak) 1900866

**4:30pm** *Interactions of Sub-seasonal Water and Light Use Efficiencies in C3 and C4 Crops Managed Under Optimal Growth Conditions* • Presenting author: Meetpal Kukal, University of Nebraska-Lincoln, Lincoln, NE (Suat Irmak) 1900865

**4:45pm** *Applying Stable Isotopes to Determine Seasonal Variability in Evapotranspiration Partitioning of Winter Wheat for Optimizing Agricultural Management Practices* • Presenting author: Ying Ma, Institute of Geographic Science and Natural Resources Research, Chinese Academy of Sciences (CAS), Beijing, China (Xianfang Song) 1900056

**5:00pm** *Advances in the Use of Remotely Sensed Data to Estimate Evapotranspiration for Water Use Mapping and Water Budget Studies in Diverse Ecosystems* • Presenting author: Gabriel Senay, US Geological Survey EROS Center, Fort Collins, CO (Gabriel Senay) 1901913

## **239 Advances in Irrigation Management**

Tuesday, July 9, 2:30pm-5:00pm

Location: Clarendon

Sponsored by: NRES-24; NRES-244

Moderators: Andre Daccache, UC Davis, Davis, CA; Behnaz Molaei, Washington State University, Prosser, WA

**2:35pm** *Estimating Sensible Heat Flux from *Camellia sinensis* Using the Surface Renewal Method* • Presenting author: Noman Ali Buttar, Jiangsu University, Zhenjiang China (Noman Ali Buttar, Yongguang Hu, Imran Ali Lakhari, Ahmed Azeem, Muhammad Zaman, Muhammad Awais) 1901370

# Tuesday, July 9

**2:50pm** *Model-Based Optimal Crop Selection and Water Allocation* • Presenting author: Raphael Linker, Technion, Haifa Israel (Raphael Linker) 1900511

**3:05pm** *Comparison of Lysimeter-Derived Crop Coefficients for Legacy and Drought Tolerant Maize Cultivars* • Presenting author: Gary Marek, USDA-ARS, Bushland, TX (Thomas Marek, Steve Evett, Paul Colaizzi, Terry Howell, David Brauer) 1901816

**3:20pm** *Crop Evapotranspiration Coefficients for Drip-Irrigated Cotton Using FAO-56 Methods* • Presenting author: Doug Hunsaker, USDA-ARS, Maricopa, AZ (Douglas Hunsaker, Kevin F. Bronson) 1901840

**3:35pm** **BREAK**

**3:45pm** *A Survey of Evapotranspiration Networks in the US* • Presenting author: Charles Swanson, Texas A&M Agrilife Extension Service, College Station, TX (Guy Fipps) 1901511

**4:00pm** *Evaluation of an Improved SWAT Auto-Irrigation Algorithm in the U.S. Southern Great Plains* • Presenting author: Yong Chen, Texas A&M Agrilife Research, Amarillo, TX (Gary Marek, Thomas Marek, David Brauer, Raghavan Srinivasan) 1900559

**4:15pm** *Development of an Advanced Cyber Infrastructure for Sustainable Water Management in Agriculture* • Presenting author: Jae Sung Kim, University of California, Davis, Davis, CA (Jae Sung Kim, Isaya Kisekka, Prasanna Gowda) 1900357

**4:30pm** *Utilizing IRT and Two Source Energy Balance Model for Irrigation Scheduling of Dry Edible Beans in Western Nebraska: Part 1. Experiment* • Presenting author: Isabella Presotto Possignolo, University of Nebraska-Lincoln, Lincoln, NE (Isabella Presotto Possignolo, Xin Qiao, Wei-zhen Liang) 1901289

**4:45pm** *Utilizing IRT and Two Source Energy Balance Model for Irrigation Scheduling of Dry Edible Beans in Western Nebraska: Part 2. Modeling* • Presenting author: Wei-zhen Liang, University of Nebraska-Panhandle Research and Education Center, Scottsbluff, NE (Xin Qiao, Isabella Possignolo) 1901294

**5:00pm** *Irrigation Water Fluxes in an Agricultural Watershed in Central Oklahoma* • Presenting author: Sumon Datta, Oklahoma State University, Stillwater, OK (Saleh Taghvaeian, Mukesh Mehata, Daniel Moriasi) 1901245

## **240 Benefits and Challenges of Microirrigation**

Tuesday, July 9, 2:30pm-5:00pm

Location: Berkeley

Sponsored by: NRES-24; NRES 245

Moderators: Freddie Lam, Kansas State University  
Rothwest Res Ext Center, Colby, KS; Hemendra Kumar,  
Auburn University, Auburn, AL

**2:35pm** *Effects of Furrow Depth on Soil Hydrothermal Properties and Corn Germination with Alternate Row/Bed Planting under Subsurface Drip Irrigation* • Presenting author: Yan Mo, China Institute of Water Resources and Hydropower Research, Beijing, China (Yan Mo, Ronglian Wang, Shanqiang Guo, Zhongdong Wu, Jiandong Wang, Yanqun Zhang, Guangyong Li, Dan Wang, Xiaoyan Gao) 1900699

**2:50pm** *Technique Characterization and Hydraulic Performance of Perforated Hose Microirrigation System for Sugarcane in Colombia* • Presenting author: Christian J. Mendoza, Cenicana, San Antonio, Valle del Cauca Colombia (Christian Mendoza, Javier Carbonell, Jhon Lasso) 1900792

**3:05pm** *Viability of Sub-Surface Drip Irrigation in Sugar Beets Production* • Presenting author: Aliasghar Montazar, University of California Division of Agriculture and Natural Resources- UCCE Imperial, Holtville, CA (Steve Kaffka, Khaled Bali, Oli Bachie) 1900809

**3:20pm** *Effects of Drip System Uniformity on Salt Dynamics and Cotton Yield in the Arid Region of Southern Xinjiang, China* • Presenting author: Jun Wang, China Institute of Water Resources and Hydropower Research, Beijing, China (Xiaomin Lin, Zhen Wang, Jiusheng Li, Yanfeng Li, Jun Wang) 1901109

**3:35pm** **BREAK**

**3:45pm** *Field Evaluation of Drip Irrigation and Fertigation Performance as Affected by Lateral Layout of Subunits* • Presenting author: Zhihao Zhang (Zhihao Zhang, Zhen Wang, Yanfeng Li, Jiusheng Li) 1900966

**4:00pm** *Effects of Phosphorus Fertigation on the Olsen-P Content in Soil and Yield of Maize under Drip Irrigation with Secondary Sewage Effluent* • Presenting author: Weixia Zhao, China Institute of Water Resources and Hydropower Research, Beijing, China (Zhen Wang, Jiusheng Li, Fengzhen Hao, Yanfeng Li, Weixia Zhao) 1901097

**4:15pm** *Coupling Effects of Water and Nitrogen on Cotton Growth and Yield under Mulched Drip Irrigation with Different Qualities of Water in the Arid Region* • Presenting author: Jiusheng Li, China Institute of Water Resources and Hydropower Research, Beijing, China (Zheng Che, Jun Wang, Jiusheng Li, Yanfeng Li) 1900945

**4:30pm** *Soybean Response to Subsurface Drip Irrigation in West Central Nebraska* • Presenting author: Hope Njuki Nakabuye, University of Nebraska-Lincoln, North Platte, NE (Tsz Him Lo, Daran Rudnick) 1901300

**4:45pm** *A Real-Time Irrigation Scheduling App for Drip-Irrigated Greenhouse Tomatoes Using Dual Crop Coefficient Method* • Presenting author: Zhe Gu, Hohai University, Nanjing, Jiangsu Province China (Xiyun Jiao, Junzeng Xu, Weihua Guo, Qi Wei) 1900172

## **241 BMPs and Water Quality: Measurements**

Tuesday, July 9, 2:30pm-5:00pm

Location: Arlington

Sponsored by: NRES-22; NRES-21; NRES-225; NRES-23;  
NRES-25; NRES-26; NRES-28

Moderators: Prem Parajuli, Mississippi State University,  
Starkville, MS; Kira Hansen, University of Florida,  
Immokalee, FL

**2:35pm** *Efficacy of a Linear Wetland to Treat Agricultural Drainage in the Little River Watershed* • Presenting author: Brock Kamrath, North Carolina State University, Raleigh, NC (Michael Burchell) 1900877

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**2:50pm** *Denitrification Bioreactors as a Structural Water Quality BMP at Watershed Scale: Performance and Lessons Learned* • Presenting author: Gary Feyereisen, USDA-ARS, St. Paul, MN (Gary W. Feyereisen, Ehsan Ghane, Mark Dittrich) 1900658

**3:05pm** *Hydrologic and Water Quality Benefits of Compact Bed Design for Fresh Produce* • Presenting author: Rajendra Sishodia, University of Florida, Gainesville, FL (Rajendra P Sishodia, Kira Hansen, Sanjay Shukla, Nathan Holt) 1901638

**3:20pm** *Nutrient Export from Paired Catchments with Varying BMPs Implementation* • Presenting author: Ji Yeow Law, Iowa State University, Ames, IA (Ji Yeow Law, Michelle Soupier, Leigh Ann Long) 1900593

**3:35pm** **BREAK**

**3:45pm** *Forming Public-Private Partnerships to Identify and Manage Agricultural Fields with Elevated Phosphorus in the Western Lake Erie Basin* • Presenting author: Michael Brooker, The Ohio State University, Columbus, OH (Margaret Kalcic, Greg LaBarge, Robyn Wilson, Brian Roe, Ryan Winston, Jessica D'Ambrosio, Kevin King, Nathan Stoltzfus, Jay Martin) 1901150

**4:00pm** *Metal Loss in Surface Runoff from Surface-Broadcast and Subsurface-Banded Broiler Litter* • Presenting author: Jasmeet Lamba, Auburn University, Auburn, AL (Jasmeet Lamba, Puneet Srivastava, Thomas R. Way, Kritika Malhotra) 1900863

**4:15pm** *Monitoring Progress of Conservation Implementation* • Presenting author: Reid Christianson, University of Illinois, Urbana, IL (Reid Christianson) 1901197

**4:30pm** *Converting Dry Detention Basins to Constructed Stormwater Wetlands for Enhanced Pollutant Removal* • Presenting author: Sarah Waickowski, NC State University, Raleigh, NC (Katy Mazer, William Hunt) 1900324

**4:45pm** *Removal of Swine Slurry Constituents in Runoff Through Setback Distance* • Presenting author: John Gilley, USDA-ARS, Lincoln, NE (John E. Gilley, Shannon Bartelt-Hunt, Kent Eskridge, Xu Li, Amy Schmidt, Daniel Snow) 1900008

**5:00pm** *Wetting and Drying Cycles Effects on Aqueous and Gaseous Nutrient Removal and Emissions in Woodchip Bioreactors* • Presenting author: Francois Birgand, NC State University, Raleigh, NC (F. Birgand, B. M. Maxwell, D. J. Williams, L. A. Schipper, L. E. Christianson, S. Tian, M. J. Helmers, G. M. Chescheir, M. A. Youssef) 1901757

**5:15pm** *Fingerprinting the Sources of Stream Bed Sediment in an Urbanized Watershed Using a Bayesian Uncertainty Estimation Framework* • Presenting author: Kritika Malhotra, Auburn University, Auburn, AL (Kritika Malhotra, Ash Abebe, Jasmeet Lamba) 1900673

## 242 Erosion and Water Quality in Urban Streams and Wetlands

Tuesday, July 9, 2:30pm-5:00pm

Location: Provincetown

Sponsored by: NRES-25; NRES 252; NRES-28

Moderators: Phuc Vu, USDA NRCS, Forth Worth, TX; Carolyn Jones, USDA NRCS, Vacaville, CA

**2:35pm** *Sources of Stream Bed and Suspended Sediment in an Urbanized Watershed* • Presenting author: Jasmeet Lamba, Auburn University, Auburn, AL (Kritika Malhotra, Jasmeet Lamba, Stephanie Shepherd) 1901637

**2:50pm** *Using Stream Restoration to Improve Hydrology and Water Quality in an Urban Watershed* • Presenting author: Carmen Agouridis, University of Kentucky, Lexington, KY (Samuel Austen, William Ford, Christopher Barton) 1901218

**3:05pm** *Comparison of Methods for Assessing Stream Bank Erosion and Failure in Stream Restoration: A Case Study in the North Carolina Piedmont Region* • Presenting author: Kayla Kassa, North Carolina State University, Raleigh, NC (Celso Castro-Bolinaga, Lucie Guertault, Garey Fox, Periann Russell) 1900358

**3:20pm** *Quantification of Erosional and Depositional Processes near Implemented Streambank Stabilization Practices* • Presenting author: Matt Russell, University of Nebraska-Lincoln, Lincoln, NE (Matthew Russell, Tiffany Messer) 1900162

**3:35pm** **BREAK**

**3:45pm** *Stream Rehabilitation and Sedimentation Modeling* • Presenting author: Jessica Calhoun, Auburn University, Auburn, AL (Frances O'Donnell, Preston Waid, Alex James, Eve Brantley) 1901625

**4:00pm** *The Short-term Response of Nutrient Loads to an Agricultural Stream Restoration in Coastal Plain of North Carolina* • Presenting author: Qianyu Hang, NC State University, Raleigh, NC (Qianyu Hang, François Birgand, Cyrus Belenky, Chiao-wen Lin) 1900954

**4:15pm** *The Role of Human-Managed Freshwater Discharges in Florida's Ongoing Harmful Algal Bloom Crises* • Presenting author: Natalie Nelson, North Carolina State University, Raleigh, NC (Edward Philips, Eric Milbrandt) 1901196

**4:30pm** *Appraising Instream Wetland Nitrate-N Abatement at a Watershed Scale Using SWAT* • Presenting author: Clement Sohoulade, USDA-ARS Coastal Plains Soil Water and Plant Research Center, Florence, SC (Ariel Szogi, Kenneth Stone) 1901901

**4:45pm** *Systematic Review of Ochlockonee River Basin Fauna* • Presenting author: Janeesa Pagan, Florida A&M University, Tallahassee, FL (Aavudai Anandhi) 1901780

**5:00pm** *Heat Storage Induced by Salinity Stratification in Tropical Saline Aquaculture Ponds* • Presenting author: Akinori Ozaki, Institute of Tropical Agriculture, Kyushu University, Fukuoka Japan (Akinori Ozaki, Panitan Kaewjantawee, Monton Anongponyoskul, Nguyen Van Thinh, Masaru Matsumoto, Masayoshi Harada, Kunihiko Hamagami, Takashi Okayasu) 1901005

# Tuesday, July 9

## **243 Grand Challenges Session—Pesticides in Freshwater Systems: Effects and Mitigation—INVITED**

Tuesday, July 9, 2:30pm-5:00pm

Location: Salon J

Sponsored by: NRES-21; NRES-253

Moderators: Rafael Munoz-Carpena, University of Florida, Gainesville, FL; Garey Fox, North Carolina State University, Raleigh, NC

**2:30pm** *Towards Sustainable Environmental Quality: Priority Research Questions in Environmental Toxicology and Chemistry* • Presenting author: Byran W. Brooks, Ph.D., Distinguished Professor, Department of Environmental Science, Institute of Biomedical Studies, Baylor University, Waco, TX (Bryan W. Brooks) 1901938

**2:50pm** *Regulatory Perspective: Opportunities and Challenges in Pesticide Risk Assessments* • Presenting author: Nelson Thurman, Ph.D., Senior Advisor, US EPA OPP-EFED, Washington, D.C. (Nelson Thurman) 1901937

**3:10pm** *Environmental Management of Pesticides in Agricultural Settings: A “Vision” on Current and Future Challenges* • Presenting author: Sheryl H. Kunickis, Ph.D., Director, Office of Pest Management Policy, U.S. Department of Agriculture, Washington, D.C. (Sheryl H. Kunickis) 1901936

**3:30pm** **BREAK**

**3:40pm** *Tipping into the Future of Pesticides Risk Assessment: Where Landscape-Scale Data and Mechanistically Driven Chemical Risk Assessment Meet* • Presenting author: Tilghman

Hall, PhD, Director, Environmental Toxicology and Risk Assessment, Regulatory Science North America, Bayer CropScience LP, Raleigh, NC 1901935

**4:00pm** *Groundwater and Pesticides: Perspective and Challenges* • Presenting author: Chittaranjan Ray, Ph. D., P.E., Director, Nebraska Water Center, University of Nebraska, Lincoln, NE (Chittaranjan Ray) 1901934

**4:20pm** *Incorporating the Benefits of Vegetative Filter Strips and Riparian Buffers into Risk Management and Assessment of Pesticides* • Presenting author: Rafael Munoz-Carpena, University of Florida, Gainesville, FL (Rafael Muñoz-Carpena, Garey Fox) 1901933

## **244 Managing Manure and Agricultural Byproducts for Sustainability**

Tuesday, July 9, 2:30pm-5:00pm

Location: Nantucket

Sponsored by: NRES-27

Moderators: Shafiqur Rahman, North Dakota State University, Fargo, NE; Jeffrey Kast, Ohio State University, Columbus, OH

**2:35pm** *Modeling Phosphorus Delivery Rates: Manure vs. Inorganic Fertilizer* • Presenting author: Jeffrey Kast, The Ohio State University, Columbus, OH (Jay Martin, Margaret Kalcic, Anna Apostel, Grey Evenson, Rebecca Muenich, Awoke Dagne, Colleen Long) 1900111

**2:50pm** *Determining Modeling Parameters for Sludge Transport and Dispersion* • Presenting author: Jacqueline Welles, North Carolina State University, Raleigh, NC (John Classen, Mark Rice, Celso Castro-Bolinaga, Mahmoud Sherara) 1901397

**3:05pm** *Optimal Planning and Operation of Swine Farm Manure Management: Modeling and Simulation* • Presenting author: Jiangong Li, University of Illinois, Urbana-Champaign, Urbana, IL (Jiangong Li, Kaiying Wang, Xinlei Wang) 1900349

**3:20pm** *Nutrient Loss from Manure Staging Areas* • Presenting author: Rhonda Miller, Utah State University, Logan, UT (Jenny Long) 1901252

**3:35pm** **BREAK**

**3:45pm** *Biochar Improves Poultry Mortality Composting Process* • Presenting author: Yuchuan Wang, University of Illinois, Urbana, IL (Yuchuan Wang, Neslihan Akdeniz) 1901222

**4:00pm** *Holistic Management of Manure Application Systems: Vehicle, Tool & Soil* • Presenting author: Erica Timmermans, Iowa State University, Ames, IA (Daniel Andersen) 1901705

**4:15pm** *Antimicrobial Resistance in Beef Feedlot Manure as Impacted by Forage Concentration and Essential Oil in Finishing Cattle Diets* • Presenting author: Mara Zelt, University of Nebraska-Lincoln, Lincoln, NE (Mara Zelt, Amy Millmier-Schmidt, Noelle Antieno-Mware, Xu Li, Zach Staley, Hannah Wilson, Galen Erickson) 1900232

**4:30pm** *Challenges and Opportunities in Swine Lagoon Sludge Management* • Presenting author: Mahmoud Sharara, North Carolina State University, Raleigh, NC (Mahmoud Sharara, John M Rice) 1900488

## **2020 Agricultural Equipment Technology Conference**

February 10-12, 2020

Hyatt Regency, Downtown Louisville, Kentucky  
asabe.org/AETC2020



**SAVE THE DATE!**

# Tuesday, July 9

**4:45pm** *A Quantitate Understanding of the ROle of Co-Composted Biochar in Plant Growth Using Meta-Analysis* • Presenting author: Yuchuan Wang, University of Illinois, Urbana, IL (Yuchuan Wang, Neslihan Akdeniz) 1901219

**5:00pm** *Evaluation of the Impact of Cover Crop and Manure Application Timing on Nitrogen Loss in the Midwestern US* • Presenting author: Alyvia Steenhoek, Iowa State University, Ames, IA (Daniel Andersen) 1901749

**5:15pm** *Bioavailable Phosphorus Attainment in Hydrochar Produced from Dairy Manure* • Presenting author: Bingjun He, University of Idaho, Moscow, ID (Chad Dunkel, Lide Chen, Kevin Kruger) 1900024

## **245 Real-Time Systems to Manage Natural Resources and Environmental Systems**

Tuesday, July 9, 2:30pm-5:00pm

Location: Orleans

Sponsored by: NRES-21; NRES-28; ITSC-353

Moderators: Debabrata Sahoo, Woolpert Inc., West Columbia, SC; Kyle Cheung, University of California, Davis, CA

**2:35pm** *GatorByte: An Open Source Platform for Low-Cost, Real-Time Water Resource Monitoring* • Presenting author: Eban Bean, University of Florida, Gainesville, FL (Piyush Agade, AJ Reisinger) 1901096

**2:50pm** *Model-Predictive Real-Time Fertilization/Irrigation Decision-Making Using RZWQM* • Presenting author: Anupam Bhar, Iowa State University, Ames, IA (Anupam Bhar, Ratnesh Kumar) 1901395

**3:05pm** *Collaborating with Ag Producers to Leverage On-Farm Weather Data* • Presenting author: Jason Kelley, University of Idaho, Moscow, ID (Jason Kelley) 1901692

**3:20pm** *A Novel Fiber-Optic Dual-Probe Heat Pulse Technique to Measure Soil Thermal Properties and Moisture Content over a Wide Range of Spatial Scales* • Presenting author: Mahmoud Shehata, North Carolina State University, Raleigh, NC (Mahmoud Shehata, Joshua Heitman, Joseph Ishak, Chadi Sayde) 1900633

**3:35pm** **BREAK**

**3:45pm** *Soil Structure and Soil Texture Effects on Soil Water Content Measurements by a Capacitance Based Electromagnetic Sensor* • Presenting author: Jasreman Singh, University of Nebraska-Lincoln, Lincoln, NE (Jasreman Singh, Derek Heeren, Yufeng Ge, John Barker, Wayne Wolcott, Christopher Neale, Geng Bai, Daran Rudnick, Joe Luck, George Meyer) 1901007

**4:00pm** *Development of Monthly Streamflow and Groundwater Level Forecasts in Semi-arid Basins* • Presenting author: Tushar Sinha, Texas A&M University-Kingsville, Kingsville, TX (Tushar Sinha) 1901594

**4:15pm** *Mapping and Predictive Analytics of Groundwater Resilience Using Machine Learning: The Integration of Policies and UNCERTAINTIES in a Decision Support Tool* • Presenting author: Francisco Munoz-Arriola, University of Nebraska-Lincoln, Lincoln,

NE (Francisco Munoz-Arriola, Alessandro Amaranto, Joel Cantu-Guerrero, Gerald Corzo-Perez, Dimitri Solomatine) 1901654

**4:30pm** *Efficacy of Passive Capillary Lysimeters for Estimating Real-Time Drainage Water Fluxes* • Presenting author: Jay Jabro, NPARR, Sidney, MT (Bart Stevens, Bill Iversen) 1900114

## **246 Waterborne Pathogens and Emerging Contaminants**

Tuesday, July 9, 2:30pm-5:00pm

Location: Falmouth

Sponsored by: NRES-28; NRES-21; NRES-22; NRES-224

Moderators: Tiffany Messer, University of Nebraska, Lincoln, NE; Christine Georgakakos, Cornell University, Homer, NY

**2:35pm** *Closing the Gap: Remaining Challenges in the Provision of Water and Wastewater Services in Rural American Communities* • Presenting author: Leigh-Anne Krometis, Virginia Tech, Blacksburg, VA (Leigh-Anne Krometis) 1900835

**2:50pm** *Sample Preparation Techniques for Onsite Detection of Environmental Water-Borne Pathogens by Loop-Mediated Isothermal Amplification* • Presenting author: Lena Diaz, University of Hawaii, Honolulu, HI (Daniel Jenkins) 1901579

**3:05pm** *Potential of Denitrifying Bioreactors to Manage Phytophthora Species in Agricultural Runoff and Drainage* • Presenting author: Natasha Bell, Clemson University, Clemson, SC (Daniel R. Hitchcock, Steven N. Jeffers, Sarah A. White) 1900538

**3:20pm** *Fate and Transport of Microplastics Following Biosolid Application in Agricultural Field* • Presenting author: Brittany Trejo, University of Nebraska-Lincoln, Lincoln, NE (Nasrin Naderi Beni, Shannon Bartelt-Hunt, Tiffany Messer) 1900454

**3:35pm** **BREAK**

**3:45pm** *Simulating the Fate and Transport of Contaminants of Emerging Concern in Agricultural Watersheds with the Soil and Water Assessment Tool* • Presenting author: Lidiia Iavorivska, The Pennsylvania State University, University Park, PA (Lidiia Iavorivska, Heather E. Gall, Tamie L. Veith, John E. Watson) 1901653

**4:00pm** *Monitoring Emerging Contaminants in Wastewater-Impacted Vernal Pools Using Integrative and Grab Sampling Techniques* • Presenting author: Kathryn Hayden, Penn State, State College, PA (Kathryn R. Hayden, Heather E. Gall, Laura B. Saleh, Herschel A. Elliott, John E. Watson, Tamie L. Veith, Kyle R. Elkin, Lidiia Iavorivska, Jamie Weikel) 1900850

**4:15pm** *Seasonal Variations of Emerging Organic Contaminants (EOCs) in Drinking Water Sources in the Susquehanna River Basin* • Presenting author: Heather E. Gall, Penn State University, University Park, PA (Faith A. Kibuye, Heather E. Gall, Tamie L. Veith, Kyle R. Elkin, Jeremy P. Harper, Herschel A. Elliott, John E. Watson) 1901742

**4:30pm** *Catchment-Scale Export of Antibiotic Resistance Genes and Bacteria from an Agricultural Watershed in Central Iowa* • Presenting author: Timothy Neher, Iowa State University, Ames, IA (Michelle Soupir, Adina Howe, Thomas Moorman) 1900156

# Tuesday, July 9

**4:45pm** *Hydraulic Flume Studies to Evaluate the Mitigation of Antimicrobial Resistance from Manure-Amended Crop Fields by Prairie Buffer Strips* • Presenting author: Andrew J. Craig, Iowa State University ABE, Ames, IA (Andrew J. Craig, Michelle L. Soupir, Chris Rehmann, Adina Howe, Laura Alt) 1900216

**5:00pm** *Prevalence and Degradation of Antibiotic Resistance Genes in Dairy Manure* • Presenting author: Yi Wang, UC Davis, Davis, CA (Pramad Pandey) 1900851

## **247 Animal Response to Environment**

Tuesday, July 9, 2:30pm-5:00pm

Location: Yarmouth

Sponsored by: PAFS-40; ITSC-312

Moderator: Yang Zhao, Mississippi State University, Mississippi State, MS

**2:35pm** *Modeling Lactating Cow Respiration Rates during Heat Stress Based on Dry-Bulb and Dew-Point Temperatures, Daily Milk Production and Air Velocity* • Presenting author: Kevin Janni, University of Minnesota, St. Paul, MN (Kevin Janni) 1900297

**2:50pm** *Thermal Environmental Stress of Broilers during Transportation Affected by Climate Condition* • Presenting author: Hong Li, University of Delaware, Newark, DE (Peyton Szymorski, Hong Li) 1901767

**3:05pm** *Responses of Broiler Live Performance, Welfare Parameters and Litter Characteristics to Air Velocity Treatments Under Hot Summer Condition* • Presenting author: Derek West, North Carolina State University, Raleigh, NC (Bin Cheng, Suraiya Akter, John Classen, Lingjuan Wang-Li, Hernan Cordova, Viviana San Martin Diaz, Edgar Oviedo) 1901359

**3:20pm** *Behavioral Responses of Heavy Broilers to Air Velocity Treatments Under Hot Summer Condition* • Presenting author: Yingying Liu, North Carolina State University, Raleigh, NC (Yingying Liu, Bin Cheng, Derek West, Suraiya Akter, John Classen, Lingjuan Wang-Li, Hernan Cordova, Viviana San Martin Diaz, Edgar Oviedo) 1900570

**3:35pm** **BREAK**

**3:45pm** *Heat and Moisture Production of Heavy Broilers Under Hot Summer Condition* • Presenting author: Suraiya Akter, North Carolina State University, Raleigh, NC (Yan Qian, Bin Cheng, Derek West, John Classen, Lingjuan Wang-Li, Hernan Cordova, Viviana San Martin Diaz, Edgar Oviedo) 1900590

**4:00pm** *Empirical and Analytical Analysis of Heat Flux in Conductive Cooling Systems for Dairy Cattle* • Presenting author: Kristen Perano, Cornell University, Ithaca, NY (Kifle Gebremedhin) 1901668

**4:15pm** *Air Speed to Increase Rate of Cool Out for Horses After Intense Exercise* • Presenting author: Staci McGill, University of Kentucky, Lexington, KY (Staci McGill, Morgan Hayes, Claire Burnham) 1901862

**4:30pm** *Laying Hen Responses to High Ammonia Concentrations for Short Durations* • Presenting author: Angela Green-Miller, University of Illinois, Urbana, IL (Christina Tucker, Angela Green-Miller, San Myint, Shih-Hsuan Hsiao, David Coleman, Yvette Johnson-Walker) 1901404

**4:45pm** *Acceptability and Economic Viability of Shades from Photovoltaic Panels to Wool Sheep* • Presenting author: Alex Sandro Maia, Sao Paulo State University, Jaboticabal, SP Brazil (Eric Culharia, Vinicius Fonsêca, Hugo Milan) 1901533

**5:00pm** *Effects of Controlling Ammonia Concentration on Broiler Production Performances, Energy Consumption, and Emission* • Presenting author: Hong Li, University of Delaware, Newark, DE (Hong Li, Joshua Payne) 1901790

**5:15pm** *Review of Methods to Mitigate Heat Stress Among Sows* • Presenting author: Bjarne Bjerg, University of Copenhagen, Denmark (Bjarne Bjerg, Pia Brandt, Kasper Sørensen, Poul Pedersen, Guoqiang Zhang) 1900741

## **248 Measurement, Mitigation and Modeling of Air Pollution from Livestock and Poultry Facilities**

Tuesday, July 9, 2:30pm-5:00pm

Location: Hyannis

Sponsored by: PAFS-50

Moderator: Jactone Ogejo, Virginia Tech, Blacksburg, VA

**2:35pm** *Empirical Model of Annual Nitrous Oxide Emissions from Open-Lot Beef Cattle Feedyard Pens (Version 2)* • Presenting author: David B. Parker, USDA-ARS, Bushland, TX (David Parker, Kenneth Casey, Erin Cortus, Heidi Waldrip, Byeng Min, Bryan Woodbury, Mindy Spiehs) 1900299

**2:50pm** *A Farm-Scale, Quasi Mechanistic Model for Estimation of NH<sub>3</sub> Emission from Commercial Manure-Belt Layer Facilities* • Presenting author: Lingying Zhao, The Ohio State University, Columbus, OH (Xinjie Tong, Lingying Zhao, Albert Heber, Ji-Qin Ni) 1901330

**3:05pm** *Laboratory Evaluation and Optimization of an Electrostatic Spray Scrubber for PM Mitigation in Poultry Facilities* • Presenting author: Reyna M. Knight, The Ohio State University, Columbus, OH (Reyna M. Knight, Jeb Hocter, Lingying Zhao) 1900543

**3:20pm** *A Dispersion-Based Tool for Assessing Odor Impact of Hog Operations* • Presenting author: Amy La, Department of Biosystems Engineering, University of Manitoba, Winnipeg, Manitoba, Canada (Amy La, Qiang Zhang, Zhu Gao, Huiqing Guo) 1900348

**3:35pm** **BREAK**

**3:45pm** *Modeling Dispersion and Deposition of Ammonia Emission from Large Layer Facilities Using AERMOD* • Presenting author: Lingying Zhao, The Ohio State University, Columbus, OH (Xinjie Tong, Lingying Zhao, Gil Bohrer) 1901141

**4:00pm** *Improved Ammonia Emission Inventory for Poultry and Swine Production in North Carolina* • Presenting author: Wang-Li, Lingjuan, North Carolina State University, Raleigh, NC (Yijia Zhao, Lingjuan Wang-Li, Sanjay Shah, Nicholas Meskhidze, Joe Guinness) 1900572

**4:15pm** *Laboratory Evaluation and Optimization of an Electrostatic Precipitator for PM Mitigation in Poultry Facilities* • Presenting author: Reyna M. Knight, The Ohio State University, Columbus, OH (Reyna M. Knight, Jeb Hocter, Lingying Zhao) 1900542

## Tuesday, July 9

**4:30pm** *Modeling Droplets Charging of Ring-Electrodes with Different Dimensions and Materials* • Presenting author: Xiaochuan Li, China University of Mining & Technology, Xuzhou, Jiangsu China (Xiaochuan Li, Reyna Knight, Lingying Zhao) 1901380

**4:45pm** *Influence of a Windbreak Wall on Particulate Matter and Bioaerosols Concentrations Emitted from a Layer-House* • Presenting author: Ailun Wang, Zhejiang University, Hangzhou, Zhejiang, China (Ailun Wang, Xiaoshuai Wang, Lingjuan Wang-Li, Kaiying Wang) 1900473

**5:00pm** *Porous Windbreak Wall-Vegetative Strip System to Reduce PM Emissions from Mechanically-Ventilated Swine and Poultry Barns* • Presenting author: Sanjay B. Shah, North Carolina State University, Raleigh, NC (Lingjuan Wang-Li, Sanjay B. Shah) 1901256

### **249 PRS—Processing Systems POSTER SESSION**

Tuesday, July 9, 2:30pm-5:00pm

Posters will be displayed for the entire session, but authors will be present at posters as follows:

2:30pm-3:45pm, authors with ODD numbered posters present

3:45pm-5:00pm, authors with EVEN numbered posters present

Location: Gloucester

Sponsored by: PRS

Moderator: Lamin Kassama, Alabama A&M University, Normal, AL

**61** *Physicochemical Properties and Biocompatibility of Poly- $\epsilon$ -caprolactone Filaments with Naturally Derived Hydroxyapatite for 3D Printing* • Presenting author: Jong Hoon Chung, Seoul National University, Seoul South Korea (Kyoung-Je Jang, Sangbae Park, Myung Chul Lee, Jae woon Lim, Jae Eun Kim, Hong Bae Kim, Bog Hee Kim, Se woong Jung, Jong Hoon Chung) 1900666

**62** *Development of Non-viral Gene Carrier Using Polyethyleneimine and Equine Bones as Livestock By-Product* • Presenting author: Jong Hoon Chung, Seoul National University, Seoul South Korea (Myungchul Lee, Kyoung-Je Jang, Sangbae Park, Jaewoon Lim, Hong Bae Kim, Hyunmok Son, Jae Eun Kim, Jong Hoon Chung) 1900987

**63** *Monitoring the Microwave-Assisted Fluidized Bed Drying of Green Peas Using Computer Vision* • Presenting author: Anthony Iheonye, Department of Bioresource Engineering, McGill University, Ste-Anne-de-Bellevue, Quebec, Canada (Yvan Garipey, Vijaya Raghavan) 1901627

**64** *Effect of Various Drying Methods on the Quality and Germination Potential of Soybean Seeds* • Presenting author: Ayushi Anand, McGill University, Montreal, Quebec Canada (Ayushi Anand, Yvan Gareipy, GSV Raghavan) 1901820

**65** *Techno-Economic Analysis of Modified Dry Milling of Colored Corn* • Presenting author: Deepak Kumar, University of Illinois, Urbana, IL (Deepak Kumar, Vijay Singh) 1900920

**67** *Differences in Gelatinization Properties Among Corn Starch, Corn Meal and Formula Feed for Finishing Pigs with Rapid Visco*

*Analyzer* • Presenting author: Hongying Wang, China Agricultural University, Beijing, China (Nan Jin, Hongying Wang, Peng Fang, Juan Ma, Enze Duan, Jiyuan Chen, Chuchen Chang) 1900492

**68** *A High-Throughput Platform for Screening and Testing Bactericides Targeting *Candidatus Liberibacter asiaticus* for Huanglongbing (HLB) Management* • Presenting author: Haoqi Wang, Texas A&M University, College Station, TX (Haoqi Wang, Kranthi Kiran Mandadi, Sandun Fernando) 1900140

**69** *A Non-Beta-Lactam Antibiotic Inhibitor for Enterohemorrhagic *Escherichia coli* O104:H4* • Presenting author: Haoqi Wang, Texas A&M University, College Station, TX (Haoqi Wang, Arul Jayaraman, Rani Menon, Varun Gejji, Raghupathy Karthikeyan, Sandun Fernando) 1900141

**70** *Comparative Study of Lycopene Encapsulation Efficiency in Polycaprolactone vs. Poly Lactic Co-Glycolic Acid* • Presenting author: Lamin S. Kassama, Alabama A&M University, Normal, AL (Mohammad Anwar Ul Alam, Lamin Kassama) 1901707

**71** *The Antioxidant Potentials of Enzymatically Hydrolyzed Canned Red Kidney Beans (*Phaseolus vulgaris* L.) in the In Vitro Simulated Gastrointestinal Tract* • Presenting author: Lamin S. Kassama, Alabama A&M University, Normal, AL (Ogechukwu Tasie, Judith Boteng, Irenus Tazisong, Lamin Kassama) 1901721

**72** *Hydrolysis and Fermentation of Corn Fiber for Succinic Acid Production* • Presenting author: Lisbeth Vallecilla-Yepey, University of Nebraska, Lincoln, NE (Lisbeth Vallecilla-Yepey, Dianna Long, Cheryl Immethun, Rajib Saha, Mark Wilkins) 1901855

**74** *Hydrothermal Carbonization of Anaerobic Digestion Effluent from Sewage Sludge* • Presenting author: Luis Huevo, The Ohio State University, Wooster, OH (Luis Huevo, Juliana Vasco-Correa, Ajay Shah) 1901206

**75** *Process Optimization and Formulation of Chickpea-Based Milk Beverage* • Presenting author: Neha Sharma, McGill University, Montreal Quebec Canada (Valerie Orsat) 1901651

**76** *The Impact of the Dairy Cow Diet on Anaerobic Digestion of Manure* • Presenting author: Alessandro Chiumenti, University of Udine, Udine Italy (Francesco da Borso, Stefano Guercini, Andrea Pezzuolo, Sandy Sgorlon, Gemini delle Vedove, Fabiano Miceli, Bruno Stefanon) 1900856

**77** *Physicochemical Properties of Pasta Derived from Extrusion of Durum Wheat and Cassava Flour* • Presenting author: Akinbode A. Adedeji, University of Kentucky, Lexington, KY (Adetola O. A., Olalusi A. P., Adedeji A.A.) 1900659

**78** *Acid and Hydrothermal Modification of Different Types of Cassava (*Manihot esculenta*) Starch* • Presenting author: Akinbode A. Adedeji, University of Kentucky, Lexington, KY (Adetola, O. A., Olukunle, O. J., Adedeji, A. A.) 1900660

**79** *A Study on the Numerical Simulations and Experimental Validation of a Hybrid Solar Dryer for Cocoa* • Presenting author: Felix Akharume, University of Kentucky, Lexington, KY (Felix Akharume, Samuel Adeyemi, Surajudeen Obayopo) 1900890

**80** *A Study on the RF Thawing of Frozen Tuna to Prevent Uneven Thawing* • Presenting author: Jinse Kim, RDA Korea, Jeonju,

## Tuesday, July 9

Jeollabuk-do, Republic of Korea (Jinse Kim, Jaeyong Son, Dongsoo Choi, Yong-Hoon Kim, Chunwan Park) 1900154

**81** *Rapid Quantitative Detection of Sulfamethoxazole in Honey by Surface-Enhanced Raman Spectroscopy* • Presenting author: Ya-Chao Liu, China Agriculture University, Beijing China (Yan Shuai, Li Yong-yu, Peng Yan-kun, Liu Ya-chao, Wang Qi) 1900643

**82** *A Nondestructive On-Line Detection System of Apple Internal and External Parameters Based on Optical Technique* • Presenting author: Ya-Chao Liu, China Agriculture University, Beijing China (Long Li, Yankun Peng, Yongyu Li, Yachao Liu) 1900783

**83** *Evaporation-Driven Attachment and Infiltration of Bacteria into Artificial Plant Leaves Built by Microfabrication* • Presenting author: Mohsen Ranjbaran, Cornell University, Ithaca, NY (Mohsen Ranjbaran, Ashim K. Datta) 1900382

**84** *Drying Kinetics and Quality Attributes of Apple Slices Dried with a Non-Thermal Ultrasound Drying Method* • Presenting author: Ozan Kahraman, University of Illinois at Urbana-Champaign (UIUC), Urbana, IL (Ozan Kahraman, Amir Malvandi, Hao Feng) 1901622

**85** *Manothermosonication for Recovery of Bioactive Compounds of Pomegranate Peels: Effects of Ultrasonication, Temperature and Pressure on Extraction Rate* • Presenting author: Ozan Kahraman, University of Illinois at Urbana-Champaign (UIUC), Urbana, IL (Nihal Guzel, Ozan Kahraman, Mosbah M. Kushad, Hao Feng) 1901620

**86** *Performance Comparison of the APSIM and CERES-Wheat Models in Guanzhong Plain, China* • Presenting author: Qaisar Saddique, Northwest A&F University, Yangling, Shaanxi China (Qaisar Saddique, Jianmei Ji, Ali Ajaz, Xu Jiatusun, Zou Yufeng, Jianqiang He, Huanjie Cai) 1900417

**87** *Development of Seed Single Granulation Device for Seeds' Vitality Detection and Classification* • Presenting author: Yankun Peng, China Agricultural University, Beijing China (Yali Wang, Yankun Peng, Xinlong Zhao) 1900787

**88** *Nondestructive Real-Time Assessment of sausage Quality Based on Visible-Near Infrared Spectrographic Technique* • Presenting author: Yankun Peng, China Agricultural University, Beijing China (Qibin Zhuang, Yankun Peng, Qinghua Yang, Yongyu Li) 1900789

**89** *Twin Screw Extrusion Processing of Snacks Containing Soy Flour and Apple Pomace* • Presenting author: Sushil K. Singh, Assistant Professor, Rourkela, Odisha, India (Poonam Singha, Sushil K. Singh, Kasiviswanathan Muthukumarappan) 1900482

**90** *Viscosity Modeling of Aquafeed Dough in a Single Screw Extruder* • Presenting author: Sushil K. Singh, Assistant Professor, Rourkela, Odisha, India (Sushil K. Singh, Poonam Singha, Kasiviswanathan Muthukumarappan) 1901306

**91** *Effect of Extrusion Processing on Properties of Extrudates Containing Sorghum and Grape Pomace* • Presenting author: Sushil K. Singh, Assistant Professor, Rourkela, Odisha, India (Sushil K. Singh, Poonam Singha, Madhuresh Dwivedi) 1901083

**92** *Effects of Different Drying Methods on the Product Quality and Drying Kinetics of Banana Slices* • Presenting author: Guang-Fei Zhu, Beijing, China (Zhian Zheng, Dalong Jiang, Lei Gao, Guangfei Zhu, Yawen Lin) 1901118

**93** *Effect of Drying and High-Humidity Hot Air Impingement Blanching (HHAIB) Parameters on Drying Characteristics and Quality of Apple Slices* • Presenting author: Guang-Fei Zhu, Beijing, China (Hui Wang, Hong-Wei Xiao, Zi-Liang Liu, Xian Long Yu, Guang-Fei Zhu, Zhian Zheng) 1900524

**94** *Enhancing the Safety of Goat Meat by Sonication against Escherichia coli* • Presenting author: Ajit Mahapatra, Fort Valley State University, Fort Valley, GA (R. Arya, H. L. Degala, A. K. Mahapatra, G. Kannan) 1900163

**95** *Effect of Gelatin Concentration on Visco-Elastic Properties of Ice-Cream Produced by Liquid Nitrogen Immersion Technique* • Presenting author: Awani Shrivastav, PhD Research Scholar, Kharagpur, West Bengal, India (Awani Shrivastav, T. K Goswami) 1900969

**96** *Effect of Seasonal Milk Compositional Variation on Coagulation Kinetics during Cheese Manufacture* • Presenting author: Colm O'Donnell, University College Dublin, Dublin Ireland (Jiani Luo, Carlos Esquerre, Fred Payne, Colm O'Donnell) 1901724

**97** *Optical Time Parameter Measurement Precision for a Milk Coagulation Sensor* • Presenting author: Fred Payne, University of Kentucky, Lexington, KY (Sam Mullins) 1901403

**98** *Properties and Finite Element Analysis of Corn Kernels under Uniaxial Compression Loads* • Presenting author: Gao Xiaojun, China Agricultural University, Beijing China (SuYuan, Cui Tao, Xu Yang, Zhang Dongxing, Xia Guoyi, Gao Xiaojun, He Xiaowei) 1901372

**99** *Modeling the Feasibility of Existing Tolerance Levels for Non-GM corn* • Presenting author: Gretchen Mosher, Iowa State University, Ames, IA (Chad J. Dolphin, Gretchen A. Mosher) 1900149

**100** *Application of Ozone Gas for Weight Loss Control of Fresh Figs* • Presenting author: Leili Afsah-Hejri, University of California Merced, Merced, CA (Leili Afsah-Hejri, Arash Toudeshki, Taymaz Homayouni, Akram Gholami Pareh, Reza Ehsani) 1901315

**101** *Development of Online Quality Control for fermentation Process during Leaving of Dough Using FT-NIR and E-Nose* • Presenting author: Madhuresh Dwivedi, National Institute of Technology, Rourkela, Odisha India (Sushil Singh, Poonam Singha) 1901078

**102** *Estimating Postharvest Loss, and Water and Energy Use in Florida Tomatoes Using Different Modeling Approaches* • Presenting author: Ratna Suthar, University of Florida, Gainesville, FL (Ratna G. Suthar, Jorge I. Barrera, Jasmeet Judge, Jeffrey K. Brecht, William Pelletier, Rachata Muneeppeerakul) 1900252

**103** *Development of 3D Printing Artificial Meat* • Presenting author: Taeyoung An, Suncheon National University, Suncheon-si, Jeollanam-do, South Korea (Taeyoung An, Joo Lee, Kyeong Sik Choi, Sunghyuk Kim, Seong-Yun Lee, Hoon Seonwoo, Ki-Chang Nam) 1901026

**104** *Optimization of Microwave-Assisted Extraction (MAE) of Phenolic Compounds and Antioxidants from Russian Olive Leaves Using Response Surface Methodology* • Presenting author: Valerie Orsat, McGill University, Montreal, Quebec, Canada (Pariya Darvishzadehboroojeni, Valerie Orsat) 1900421

**105** *Osmotic Pressure of Selected Osmotic Solutions Estimated by Van't Hoff's Equation and a Thermodynamic Equation*

## Tuesday, July 9

• Presenting author: Xiaojuan Wang, University of Illinois, Urbana, IL (Hao Feng) 1901624

### **106** *Ready-to-Eat (RTE) High Energy Food Paste Stability and Shelf Life Determination in Different Packaging Materials*

• Presenting author: Dr Rakesh Kumar Raigar, CAEPHT, Central Agricultural University Imphal, Ranipool, Gangtok, Sikkim, India (H N Mishra) 1901445

**107** *Differences in Physical Properties of Non-Inoculated and Aflatoxin Inoculated Fuzzy Cottonseeds* • Presenting author: Catelyn Evans, Texas A&M University, College Station, TX (Janie Moore) 1900822

**108** *Relationship between Optical Properties and Soluble Sugar Contents in Apple* • Presenting author: Leiqing Pan, Nanjing Agriculture University, Nanjing, P.R. China (Leiqing Pan, Jun Ni, Kangli Wei, Chen Ma, Kang Tu, Qiang Liu, Ye Sun) 1900287

**109** *Selected Physical, Mechanical, and Aerodynamic Properties of Jojoba Seeds* • Presenting author: Mahmoud A. El-Emam, Research Center of Fluid Machinery Engineering and Technology, Jiangsu University, Zhenjiang, Jiangsu, China (Mahmoud A. El-Emam, Shi Wei Dong, Ling Zhou) 1901121

**110** *Surface Profiling of Grain Dusts* • Presenting author: Benjamin Plumier, Purdue University, West Lafayette, IN (Yumeng Zhao, Mark Casada, Ronaldo Maghirang, Kingsly Ambrose) 1900669

**111** *Effect of Temperature on Dielectric Properties of Rabbit Meat for Further Microwave Heating Processes* • Presenting author: Rosalía Alvarado-Iglesias, Universidad de Guanajuato, Irapuato, Guanajuato, Mexico (Rosalía Alvarado-Iglesias, Julián Andrés Gómez-Salazar, Tejinder Kaur-Kataria, Edel Serafín Hernández-Gómez, Alonso Corona-Chávez, José Luis Olvera-Cervantes, Roberto Rojas-Laguna, Diana Alicia Ochoa-Montes, María Elena Sosa-Morales) 1901652

**112** *Development of an Integrated Regression Model of Fruit Species for Sugar Content Measurement* • Presenting author: Sang-Yeon Kim, Seoul National University, Seoul, Korea (Sang-Yeon Kim, Suk-Ju Hong, Ah-Yeong Lee, Yun-Hyeok Han, Barnabas Abraham Tarakey, Ghiseok Kim) 1901059

**113** *Rheological Properties and Sensory Qualities of Yoghurt Stabilized with Baobab Pulp* • Presenting author: Oludara Oluwatosin, Covenant University, Ota, Lagos Nigeria (Olasukanmi Bamidele, Oludara Oluwatosin M.) 1900499

**114** *Impact of Selected Infrared Wavelengths on Inactivation of Microbes on Rough Rice* • Presenting author: Abass Oduola, University of Arkansas, Fayetteville, AR (Rebecca Bowie, Shantae Wilson, Griffiths Atungulu) 1901543

**115** *Microwave-Assisted Hydrothermal Treatments Against Pests in Sweet Potatoes* • Presenting author: Roberto Rojas-Laguna, Universidad de Guanajuato, Salamanca, Guanajuato, Mexico (Anay Michell Negrete-Meza, Roberto Rojas-Laguna, Abel Cerón-García, Julián Moisés Estudillo-Ayala, María Elena Sosa-Morales) 1901615

**116** *Study on the Relationship Model between Drying Time and Moisture Content of Coco-Peat* • Presenting author: Wensong Guo, China Agricultural University, Beijing, China (Bing Lu, Nihong Liu, Wensong Guo, Can Hu, Hubo Xu, Beibei Zhang, Huiling Li, Xiuying Tang) 1900385

**117** *Spray Characterization for Stored Product Insect Control* • Presenting author: Fei Xyza Asuncion, Kansas State University, Manhattan, KS (Daniel L. Brabec, Mark E. Casada, Ronaldo Maghirang, James F. Campbell, Frank H. Arthur, Kun Yan Zhu, Daniel E. Martin) 1901447

**118** *Microwave-Assisted Hydrothermal Treatments in Chihuahua Apples Against *Penicillium expansum** • Presenting author: Rosalía Alvarado-Iglesias, Universidad de Guanajuato, Irapuato, Guanajuato, Mexico. (Guadalupe del Rocío Santoyo-Haro, Rosalía Alvarado-Torres, Abel Cerón-García, Julián Moisés Estudillo-Ayala, Roberto Rojas-Laguna, María Elena Sosa-Morales) 1901755

**119** *Development of Monitoring System to Access Internal Environment of Bagged-Grain* • Presenting author: Michael Omodara, University of Kentucky, Lexington, KY (Michael Omodara, Michael Montross, Samuel McNeill, Michael Sama, Doug Carr) 1900231

**120** *Antimicrobial Effect of Sanitizing Solutions on Fresh Romaine Lettuce* • Presenting author: Prachi Pahariya, Southern Illinois University, Carbondale, IL (Prachi Pahariya, Ruplal Choudhary, Derek J. Fisher) 1901623

**121** *Variability in Yield Losses in Kentucky* • Presenting author: Aaron Turner, Clemson University, Clemson, SC (Montross, Michael, Sama Michael, O'Neil, Shawn, Jackson, Joshua) 1900195

**122** *Novel Solar Drying Technologies for Small and Mid-Size Growers of Specialty Crops* • Presenting author: Diana Ramirez, Purdue University, West Lafayette, IN (Diana M Ramirez Gutierrez, Klein E. Ilelej, Amanda Deering, Cedric Ogden, Rebecca Milczarek) 1901239

**124** *Thermophysical Properties of Baled Switchgrass* • Presenting author: Drew Schiavone, University of Maryland Western Maryland Research and Education Center, Keedysville, MD (Michael Montross) 1900545

**125** *Moisture Measurement of Switchgrass Via Time-Domain Reflectometry* • Presenting author: Drew Schiavone, University of Maryland Western Maryland Research and Education Center, Keedysville, MD (Michael Montross) 1900562

**126** *Initial Analysis of the Rockefeller Foundation Yieldwise Initiative* • Presenting author: Hory Bakand Chikez, Iowa State University, Ames, IA (Dirk Maier) 1900229

**127** *Production of Lipo-chitooligosaccharides from *Bradyrhizobium japonicum* Grown on Food Waste* • Presenting author: Jian Shi, University of Kentucky, Lexington, KY (Abisola Olaleye, Ryan M. Kalinoski, Jian Shi) 1901877

**128** *On-Farm Evaluation of a New Paradigm for Almond Drying and Storage: Australia 2019 Harvest* • Presenting author: John Fielke, University of South Australia, Mawson Lakes, Australia (John Fielke) 1900210

**129** *Reducing Aflatoxin Contamination in Shelled Corn Using High Voltage Atmospheric Cold Plasma (HVACP) Technology* • Presenting author: Kizito Nishimwe, Iowa State University, Ames, IA (Kizito Nishimwe, Hu Shi, Dirk Maier, Kevin Keener) 1900087

**130** *Comparison of the Effects of Two-Stage Drying and Conventional Drying in Walnut Quality* • Presenting author: Lucia Felix, University of California, Davis, Davis, CA (Lucía Félix-Palomares, Irwin R. Donis-González) 1900142

## Tuesday, July 9

**131** *Evaluating Soybean Quality Stored in Commercial Grain Bags* • Presenting author: Nurun Nahar, North Dakota State University, Fargo, ND (Kenneth Hellevang) 1900864

**132** *Application of Analytical Hierarchy Process (AHP) in the Selection of a Biomass Burner for Maize Drying in a Crossflow Column Dryer* • Presenting author: Samuel McNeill, University of Kentucky, Princeton, KY (George Obeng-Akrofi, Joseph Akowuah, A. Addo, Dirk Maier) 1901800

**133** *Harnessing Moringa oleifera seeds for Protein Malnutrition in Sub-Saharan Africa* • Presenting author: Babatunde Ogunsina, Department of Agricultural and Environmental Engineering, Obafemi Awolowo University, Ile Ife, Osun State Nigeria (B. S. Ogunsina, C. Radha, D. Indrani, C. E. Chinma) 1900123

**134** *Effects of Postharvest Treatments on Qualities of Camellia oleifera Seed* • Presenting author: Guanfei Zhu, China Agricultural University, Beijing, China (Guangfei Zhu, Yue Zhang, Yanhong Liu, Yongkang Xie, Yawen Lin, Dalong Jiang, Hongwei Xiao) 1901034

**135** *The Effects of Diffuse Coplanar Surface Barrier Discharge Plasma on Barley Inoculated with Mold Fungus and the Synthesis of Ochratoxin A* • Presenting author: Oliver Schlüter, Leibniz Inst. Agric. Eng. and Bioeconomy, Potsdam, Brandenburg Germany (Julia Durek, Anne Roscher, Pawel Durek, Antje Fröhling) 1901171

### 250 Technical Trends and Career Opportunities in the U.S. and Korea—INVITED

Tuesday, July 9, 5:00pm-7:00pm

Location: Nantucket

Sponsored by: E-2050; AKABFE

Moderator: Young Ki Chang, Dalhousie University, Truro, NS Canada

**5:05pm** *Plan of the Exchange & Cooperation on Agricultural Machinery between South and North Korea* • Presenting author: Jong Hoon Chung, Seoul National University, Seoul South Korea 1901986

**5:20pm** *Building a Bridge Between Agricultural Engineering and Environmental Science* • Presenting author: Eunmi Hong, Kangwon National University, Gangwon, Korea 1901987

**5:35pm** *AKABFE Third Research Spotlight Presentations by Postdoctoral Fellows and Students*

# Pick-a-Prize Raffle

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# Wednesday, July 10

Coffee and tea are available in the Exhibit Hall on Monday and Tuesday 9:00am-11:00am and 2:00pm-4:00pm, and Wednesday 7:00am-9:30am.

## 301 Best Practices in Graduate Programming and Professional Preparation—RAP

Wednesday, July 10, 7:30am-10:00am

Location: Boston University

Sponsored by: EOPD-203

Moderator: John Classen, North Carolina State University, Raleigh, NC

## 303 Techno-Economic and Life Cycle Assessment of Biomass Conversion

Wednesday, July 10, 7:30am-10:00am

Location: Harvard

Sponsored by: ES-220; PRS-280

Moderator: Deepak Kumar, University of Illinois, Urbana, IL

**7:35am** *Life Cycle Assessment Of Rice Production And Processing System* • Presenting author: Simeon Jekayinfa, Ladoke Akintola University of Technology, Ogbomoso, Oyo State Nigeria (Simeon Jekayinfa) 1900108

**7:50am** *Techno-Economic Analysis of Front-End Fractionation Technologies in Dry Grind Ethanol Process* • Presenting author: Chinmay Kurambhatti, University of Illinois Urbana-Champaign, Urbana, IL (Chinmay Kurambhatti, Deepak Kumar, Kent Rausch, Mike Tumbleson, Vijay Singh) 1900830

**8:05am** *Life Cycle Assessment of Corn Stover Collection for Biobased Industries in Ohio Integrating Crop Modeling*

• Presenting author: Asmita Khanal, The Ohio State University, Columbus, Ohio (Asmita Khanal, Garrett Steinbeck, Sami Khanal, Ajay Shah) 1901608

**8:20am** *Environmental Footprint Assessment of Representative Swine Diets in the USA* • Presenting author: Md Ariful Haque, Kansas State University, Manhattan, KS (Md Ariful Haque, Zifei Liu) 1901308

**8:35am** **BREAK**

**8:45am** *Lifecycle and Techno-Economic Analysis of BioCNG Production from Organic Wastes and Energy Crops Using Integrated Anaerobic Digestion (i-AD) Technology* • Presenting author: Kamalakanta Sahoo, Forest Products Laboratory, Madison, WI (Sudhagar Mani) 1900302

**9:00am** *Life Cycle Assessment of Bio-Jet Fuels* • Presenting author: Kamalakanta Sahoo, Forest Products Laboratory, Madison, WI (Kamalakanta Sahoo, Nalladurai Kaliyan, Sudhagar Mani) 1901765

**9:15am** *A Consequential Life Cycle Assessment of Biofuel Production on Transportation Sector* • Presenting author: Nafisa Mahbub, University of Alberta, Edmonton, Alberta, Canada (Nafisa Mahbub, Eskinder Gemechu, Amit Kumar) 1900909

**9:30am** *Techno-Economic Analysis of Lactic Acid Production Using Corn Stover* • Presenting author: Ashish Manandhar, The Ohio State University, Wooster, OH (Ashish Manandhar, Ajay Shah) 1901645

## 304 Novel Data-Intensive Methods to Support Precision Agriculture

Wednesday, July 10, 7:30am-10:00am

Location: Northeastern

Sponsored by: ITSC

Moderator: Nourredine Abdoulmoumine, University of Tennessee, Knoxville, TN

**7:35am** *A Probabilistic Model for Estimating Harvested Areas via GPS Tracks* • Presenting author: Yaguang Zhang, Purdue University, West Lafayette, IN (Yang Wang, Dennis Buckmaster, James Krogmeier) 1901278

**7:50am** *Design of Maize Variable Fertilization Condition and Fault Warning System* • Presenting author: Yaohui Zhang, China Agricultural University, Beijing China (Yaohui Zhang, Kailiang Zhang, Yang Yu, Dongxing Zhang, LiYang, Tao Cui) 1900334

**8:05am** *Investigate the Spatial Relationship Between Wheat Streak Mosaic Infection and Pre-Harvest Hail by Using Archived Satellite Imagery and Meteorological Data* • Presenting author: Yeyin Shi, University of Nebraska-Lincoln, Lincoln, NE (Dongmei Chen, Lin Wang, Jingcheng Zhang, Rebecca Adams-Selin, Gary L. Hein, Yeyin Shi) 1901423

**NO-SHOW** *Spatial Routing Optimization for Regional Wheat Harvesting in China* • Presenting author: Renhai Zhong, Zhejiang University, Hangzhou, Zhejiang, China (Zhixian Lin, Tao Lin) 1901135

**8:35am** *Identification of Winter Wheat in Anhui Province Based on Sentinel-2 Imagery Data* • Presenting author: Dongyan Zhang, Anhui University, Hefei, Anhui, China (Dongyan Zhang, Shengmei Fang, Bao she, Yuying Yang, Yang Ding, Junwei Liu, Zhen Dai) 1900430

## 305 Robotics and Co-Robotics for Agriculture Part I

Wednesday, July 10, 7:30am-10:00am

Location: Tufts

Sponsored by: ITSC-318

Moderator: Daniel Jenkins, University of Hawaii, Honolulu, HI

**7:35am** *A Novel Weed and Crop Recognition Technique for Robotic Weed Control in a Lettuce Field with High Weed Densities* • Presenting author: Rekha Raja, University of California Davis, Davis, CA (Rekha Raja, David Slaughter, Steven Fennimore) 1900029

**7:50am** *Development of a Robotic Inspection System for Early Detection and Locating of Biotic Stresses in Greenhouse Crops* • Presenting author: Tamir Mhabary, Agricultural Engineering Institute, ARO, Rishon Lezion, Israel (Aviad Ozeri, Shimon Y. Nof, Yang Tao, Avital Bechar) 1900773

**8:05am** *A New Greenhouse Plant Phenotyping Robot Based on LeafSpec, Purdue's Handheld Hyperspectral Leaf Imager*

• Presenting author: Zhihang Song, Purdue University, West Lafayette, IN (Zhihang Song, Jian Jin) 1900947

# Wednesday, July 10

**8:20am** *Scheduling Performance of Harvest-Aiding Crop-Transport Robots under Varying Earliness in Access to Transport-Request Predictions* • Presenting author: Chen Peng, University of California, Davis, CA (Stavros Vougioukas) 1901310

**8:35am** **BREAK**

**8:45am** *An Automated Robotic System to Measure Stem Diameter of Maize and Sorghum Plants in Greenhouse* • Presenting author: Abbas Atefi, Lincoln, NE (Yufeng Ge, Santosh Pitla) 1900891

**9:00am** *FarmBot—A Platform for Backyard Precision Farming: Installation and Initial Experimental Layout* • Presenting author: Jesu Raj Pandya, University of Maryland Eastern Shore, Princess Anne, Maryland (Abhijit Nagchaudhuri, T.Ford, K.Davis) 1900194

**NO-SHOW** *Auto-Steering Based Collaborative Operating System for In-field Fleet Management* • Presenting author: Caicong Wu, China Agricultural University, Beijing China (Chen Zhibo, Song Bingbing, Liang Yajie, Yang Lili) 1901356

**9:30am** *Methodology of Design and Simulation of a Custom Autonomous Agricultural Robot within ROS/Gazebo* • Presenting author: Jawad Iqbal, University of Georgia, Athens, GA (Piyish Pandey) 1901227

## **306 UAV for Sensing, Imaging, and Agricultural Aquacultural Applications Part II**

Wednesday, July 10, 7:30am-10:00am

Location: Tremont

Sponsored by: ITSC

Moderator: Yu Jiang, University of Georgia, Athens, GA

**7:35am** *Principal Variable Selection to Explain Grain Yield Variations in Winter Wheat from UAV-Derived Growth Dynamics* • Presenting author: Jiating Li, University of Nebraska, Lincoln, NE (Jiating Li, Madhav Bhatta, Nicholas D. Garst, Hannah Stoll, Arun-Narenthiran Veeranampalayam-Sivakumar, P. Stephen Baenziger, Vikas Belamkar, Reka Howard, Yufeng Ge, Yeyin Shi) 1901618

**7:50am** *Field-Region and Plant-Level Classification of Cotton Root Rot Based on UAV Remote Sensing* • Presenting author: Tianyi Wang, Texas A&M University, College Station, TX (Tianyi Wang, J. Alex Thomasson, Chenghai Yang, Thomas Isakeit) 1901311

**8:05am** *Tree 'Face' Recognition In Unmanned Aerial Images* • Presenting author: Haoyu Niu, University of California, Merced, CA (Tiebiao Zhao, Yonghuan Yang, Haoyu Niu, Dong Wang, YangQuan Chen) 1901838

**8:20am** *Detection of Autumn Blooming in Pear Orchards Using Images Acquired by UAV and Machine Learning* • Presenting author: Raphael Linker, Technion, Haifa Israel (Mery Dafny-Yelin) 1900509

**8:35am** **BREAK**

**8:45am** *Weed Location and Type Identification Using UAV Imagery and Deep Learning* • Presenting author: Aaron Etienne, Purdue University, West Lafayette, IN (Dharmendra Saraswat) 1901363

**9:00am** *Combining UAV-Based Vegetation Indices, Canopy Height and Canopy Coverage to Improve Rice Yield Prediction*

*under Different Nitrogen Levels* • Presenting author: Liang Wan, Zhejiang University, Hangzhou, Zhejiang Province, China (Liang Wan, Haiyan Cen, Jiangpeng Zhu, Yijian Li, Yueming Zhu, Dawei Sun, Haiyong Weng, Yong He) 1900626

**9:15am** *Research on the Influence of Leaf Surface Wettability on Droplet Deposition Effect* • Presenting author: Shupeixiao, Zhejiang University, Hangzhou, Zhejiang Province, China (Shupeixiao, Hui Fang, Yong He) 1900296

**9:30am** *Calibrating UAV-based Thermal Remote-Sensing Images of Crops with Temperature Controlled References* • Presenting author: Xiongze Han, Texas A&M University, College Station, TX (Xiongze Han, J. Alex Thomasson, Jeffrey Siegfried, Rahul Raman, Nithya Rajan, Haly Neely) 1900662

**9:45am** *sUAS Intra-Canopy Sensing for Automated Stress Diagnosis Using Convolutional Neural Nets* • Presenting author: Christopher Wiegman, The Ohio State University, Columbus, OH (Christopher Wiegman, Scott Shearer, Andrew Klopfenstein) 1901277

## **307 Precision Application of Chemicals and Fertilizers**

Wednesday, July 10, 7:30am-10:00am

Location: Vineyard

Sponsored by: MS-54; MS-23/6/1; MS-60

Moderator: Daniel Martin, USDA ARS, College Station, TX

**7:35am** *Nozzle Flowrate, Pressure Drop and Response Time of Different Pulse Width Modulation (PWM) Nozzle Control Systems* • Presenting author: Jonathan V. Fabula, Kansas State University, Manhattan, KS (Ajay Sharda, Daniel Flippo, Edwin Brokesh) 1901528

**7:50am** *Accuracy and Response Time of Pulse Width Modulated (PWM) Agricultural Self-Propelled Sprayer* • Presenting author: Jonathan V. Fabula, Kansas State University, Manhattan, KS (Ajay Sharda, Ignacio Ciampitti) 1901529

**8:05am** *Control of Insects and Diseases with Intelligent Variable-Rate Sprayers in Ornamental Nurseries* • Presenting author: Liming Chen, USDA ARS ATRU, Wooster, OH (Liming Chen, Matthew Wallhead, Heping Zhu, Amy Fulcher) 1900147

**8:20am** *Analysis of Advanced Airblast Sprayer Systems for Tree Crop Production* • Presenting author: Peter Ako Larbi, University of California, Parlier, CA (Franz Niederholzer) 1900985

**8:35am** **BREAK**

**8:45am** *Effect of Emitter Modifications on Spraying Attributes of a Solid Set Canopy Delivery System (SSCDS) Configured for a High-Density Apple Orchard* • Presenting author: Rajeev Sinha, Washington State University, Prosser, WA (Lav Khot, Gwen-Alyn Hoheisel, Mark Ledebuhr, Matthew Grieshop) 1901221

**9:00am** *Design Modifications to an Automated Solid Set Canopy Delivery System (SSCDS) for Scale-Up and Improved Spray Uniformity* • Presenting author: Rakesh Ranjan, Washington State University, Prosser, WA (Rakesh Ranjan, Rajeev Sinha, Guobin Shi, Lav R Khot, Gwen-Alyn Hoheisel, Matthew J Grieshop) 1901253

**9:15am** *Sensor for Measuring Mass Flow of Dry Fertilizer in an Air Stream* • Presenting author: Edwin Brokesh, Kansas State University, Manhattan, KS (Ajay Sharda) 1901283

# Wednesday, July 10

## **331 Advanced ISO Standards Training—INVITED**

Wednesday, July 10, 7:30am-10:00am

Location: MIT

Sponsored by: MS-23; US TAG ISO/TC23

Moderator: Nathan Turnis, John Deere, Bettendorf, IA

*Edward Terhune, Senior Program Manager, American National Standards Institute (ANSI), New York, NY*

## **308 Climate Change Impacts and Adaptation: Water Availability and Quality, & Agricultural Production**

Wednesday, July 10, 7:30am-10:00am

Location: Clarendon

Sponsored by: NRES-22; NRES-21; NRES-223; NRES-25; NRES-26; NRES-28

Moderators: Anita Thompson, University of Wisconsin, Madison, WI; Vahid Rahmani, Kansas State University, Manhattan, KS

**7:35am** *Potential Climate Change Adaptation Strategies for Cotton Production in the Texas High Plains* • Presenting author: Srinivasulu Ale, Texas A&M AgriLife Research, Vernon, TX (Kritika Kothari, Srinivasulu Ale, James Bordovsky, Clyde Munster, Gerrit Hoogenboom) 1900648

**7:50am** *Multiple Crop Models Projection of Irrigation Management for Wheat Production under Future Climate Change Scenarios in the Guanzhong Plain, China* • Presenting author: Qaisar Saddique, Northwest A&F University, Yangling, Shaanxi China (Qaisar Saddique, Huanjie Cai) 1900415

**8:05am** *The Effects of Future Extreme Precipitation Events on Stream Hydrology and Hydraulics of Stream Crossing Structures* • Presenting author: Daniel Gambill, US Army ERDC-Construction Engineering Research Laboratory, Champaign, IL (Heidi Howard) 1900158

**NO-SHOW** *Assessing the Impact of Climate Change on Water Security Status of the Grand River Watershed in South-Western Ontario, Canada* • Presenting author: Baljeet Kaur, University of Guelph, Guelph, Ontario Canada (Narayan Shrestha, Prasad Daggupati, Ramesh P. Rudra, Rituraj Shukla, Nabil Allataifeh, Fahimeh Jafarianlari) 1901231

**8:35am BREAK**

**8:45am** *Identifying Estuaries At-Risk of Eutrophication under Future Climate and Land Use Change Scenarios in the Southeast United States* • Presenting author: Lise Montefiore, North Carolina State University, Raleigh, NC (Natalie Nelson) 1901443

**9:00am** *Watershed Responses to Climate Change Conditions* • Presenting author: Emily Steinweg, University of Minnesota, Saint Paul, MN (Gary Sands, Bruce Wilson, Brent Dalzell) 1900136

**9:15am** *Evaluating Climate Change Impacts on Water Quantity and Quality of the Upstream Everglades System* • Presenting author: Satbyeol Shin, University of Florida, Gainesville, FL (Satbyeol Shin, Younggu Her, Yogesh Khare) 1900588

**9:30am** *Assessing the Potential Impacts of Climate and Land Use Change on Water Fluxes and Sediment Transport in a Coupled Natural and Human System* • Presenting author: Subhasis Giri, Rutgers University, New Brunswick, NJ (Subhasis Giri, Nazia N. Arbab, Richard G. Lathrop) 1901510

**9:45am** *Climate Change versus Critical Source Area and Pollution Export: An Adaptation Strategies through Conservation Practices* • Presenting author: Subhasis Giri, Rutgers University, New Brunswick, NJ (Subhasis Giri, Richard G. Lathrop) 1901509

## **309 Flooding and Dams: Keeping Communities Safe—HYBRID**

Wednesday, July 10, 7:30am-10:00am

Location: Berkeley

Sponsored by: NRES-25; NRES-2581; NRES-26

Moderators: Alica Ketchem, USDA NRCS, Richmond, VA; Emine Fidan, North Carolina State University, Raleigh, NC

**7:35am** *Operation of Multipurpose Dams Using Artificial Neural Network* • Presenting author: Seokhyeon Kim, Seoul National University, Seoul, South Korea (SeokHyeon Kim, Sangmin Jun, Kyeong Kim, Soonho Hwang, Moonseong Kang) 1900999

**7:50am** *Reservoir Sediment Impacts on the Rehabilitation of NRCS-Assisted Flood Control Dams in Virginia* • Presenting author: Alica J. Ketchem, USDA Natural Resources Conservation Service, Richmond, VA (Mathew Lyons, Rebecca Evans) 1900198

**8:05am** *Rehabilitation of NRCS Floodwater Retarding Dams in Massachusetts* • Presenting author: Deron Davis, State Conservation Engineer, Jim Lyons, Civil Engineer, USDA-NRCS, MA 1901911

**8:35am BREAK**

**8:45am** *Using Machine Learning and Remotely Sensed Data to Develop Spatiotemporal Maps of Flood Surge and Retreat* • Presenting author: Emine Fidan, North Carolina State University, Raleigh, NC (Emine Fidan, Natalie Nelson) 1900479

**9:00am** *Development of Prediction Model for Flooded Areas by Reservoir Collapse* • Presenting author: JongHyuk Lee, Seoul National University, Seoul, Republic of Korea (Jong-Hyuk Lee, Sang-Ik Lee, Jeong-Bae Jeon, Jun-Gu Lee, Won Choi) 1901335

**9:15am** *Effects of Climate Variability and Land Use Changes on Urban Flooding in Houston Area* • Presenting author: Muhammed Chowdhury, Doctoral Candidate, Kingsville, TX (Tushar Sinha) 1901207

**9:30am** *Private Drinking Water Well Contamination Following Hurricane Florence* • Presenting author: Randall Etheridge, East Carolina University, Greenville, NC (Randall Etheridge, Jacob Hochard, Ariane Peralta, Jamie Kruse) 1901145

# Wednesday, July 10

## **310 Hydrologic and Climate Data: Challenges and Opportunities**

Wednesday, July 10, 7:30am-10:00am

Location: Arlington

Sponsored by: NRES-21; NRES-28

Moderators: Sushant Mehan, Formation Environmental LLC, Sacramento, CA; Subhasis Giri, Rutgers University, New Brunswick, NJ

**7:35am** *Effects of Daily Mean Temperature Calculation Methods on Potential Evapotranspiration Estimates by Two Widely Used Methods for a Grass and a Forest Sites in SC*

• Presenting author: Devendra Amatya, USDA Forest Service, Cordsville, SC (Devendra Amatya, Andy Harrison) 1900238

**7:50am** *Modeling Non-Stationary Time Series for Groundwater Level Prediction Using Additive Models* • Presenting author: Olufemi Abimbola, University of Nebraska-Lincoln, Lincoln, NE (Olufemi Abimbola, Aaron Mittelstet) 1901507

**8:05am** *Analysis of Interaction between Probable Maximum Precipitation and Climatic Cycles under Climate Change in Texas*

• Presenting author: Kyungtae Lee, Texas A&M University, College Station, TX (Vijay Singh) 1900444

**NO-SHOW** *Effect of Weather Variability on the Yield of Millet in North-Central, Nigeria* • Presenting author: Olumuyiwa Idowu Ojo, Ladoko Akintola University of Technology, Ogbomoso, Nigeria (Olumuyiwa Ojo, Sunday Asaolu, Kehinde Ateniola) 1901292

**8:35am BREAK**

**8:45am** *L-Moments Based Bias Correction of Extreme Precipitation Projected by Climate Models* • Presenting author: Rohith A N, Indian Institute of Technology Madras, Chennai, Tamil Nadu, India (Rohith A N, Sudheer K P, Indrajeet Chaubey, Margaret W. Gitau) 1900829

**NO-SHOW** *Variation in Minimum Temperature in South-West Nigeria* • Presenting author: Olumuyiwa Idowu Ojo, Ladoko Akintola University of Technology, Ogbomoso, Nigeria (Ateniola Omoleye, Titus Alonge, Olumuyiwa Ojo) 1901295

**NO-SHOW** *Climate Change Impact Assessment and Mitigation Strategies for Sustainable Water and Agriculture Management in the Prince Edward Island* • Presenting author: Ahmad Zeeshan Bhatti, University of Prince Edward Island, Charlottetown, PE Canada (Aitazaz Farooque, Bishnu Acharya, Nick Krouglicof) 1901234

**9:30am** *Changes in the Frequency of Hot, Humid Conditions in the Mississippi River Basin* • Presenting author: Ameneh Tavakol, Department of Biological and Agricultural Engineering, Kansas State University, Manhattan, KS (Ameneh Tavakol, Vahid Rahmani) 1901502

## **311 Irrigation Management in Humid and Sub-Humid Regions**

Wednesday, July 10, 7:30am-10:00am

Location: Provincetown

Sponsored by: NRES-24; NRES-241; NRES-244

Moderators: Stacia Davis Conger, Louisiana State University, Bossier City, LA; Jasreman Singh, University of Nebraska, Lincoln, NE

**7:35am** *Regionalizing Seasonal Precipitation Patterns for Rainfed Agriculture in the Southeastern United States*

• Presenting author: Clement Sohoulade, USDA-ARS Coastal Plains Soil Water and Plant Research Center, Florence, SC (Ariel Szogi, Kenneth Stone, Phil Bauer) 1901900

**7:50am** *Irrigation Considerations for Grain Crops in Ohio*

• Presenting author: Vinayak Shedekar, The Ohio State University, Columbus, OH (Asmita Murumkar, Kevin King, Margaret Kalcic, Rafiq Islam, Larry Brown) 1901133

**8:05am** *Evaluating the Necessity of Supplementary Irrigation in Songnen Plain of Northeast China Using a Distributed Agro-Hydrological Model* • Presenting author: Jun Wang, China Institute of Water Resources and Hydropower Research, Beijing, China (Jun Wang, Jiusheng Li, Yanfeng Li) 1900493

**8:20am** *A Mathematical Model to Adjust Crop Water Production Functions to Local Conditions* • Presenting author: Joao Carlos Cury Saad, FCA-UNESP, Botucatu, SP, Brazil (Ana Paula Russo Schimidt Jefery, Deyver Bordin, Camila Pires Cremasco Gabriel, Luis Roberto Almeida Gabriel Filho, Joao Carlos Cury Saad) 1900295

**8:35am BREAK**

**8:45am** *Experimental Determination of Growth-Stage-Specific Crop Coefficient of *Jatropha curcas* in Sub-Humid Region of Nigeria* • Presenting author: Ewemoje T. A., Agricultural and Environmental Engineering Department, University of Ibadan, Ibadan, Nigeria (Fagbayide S. D., Ewemoje T. A., Oluwasemire K. O.) 1900465

**9:00am** *Improving Water Use Efficiency and Yield of Field Grown Pepper (*Capsicum annum L.*) under Drip Irrigation in South Western Nigeria* • Presenting author: Anthony Amori, Federal Polytechnic Ilaro, Ogun State, Nigeria (Samuel Fagbayide, Joshua Akintade, Mayiwa Okusanya) 1900301

**9:15am** *Maize Yield Response to Irrigation and Planting Population on a Coarse-Textured Soil* • Presenting author: Vasudha Sharma, University of Minnesota, Saint Paul, MN (Vasudha Sharma, Jeppe Kjaersgaard) 1901486

**9:30am** *Development of a Wireless Sensor Network for Tracking Flood Irrigation Management in Production-Sized Rice Fields in the Mid-South* • Presenting author: Yin-Lin Chiu, USDA-ARS, Jonesboro, AR (Yin-Lin Chiu, Michele L. Reba) 1901887

# Wednesday, July 10

## **312 Low Impact Development and Ecohydrology**

Wednesday, July 10, 7:30am-10:00am

Location: Nantucket

Sponsored by: NRES-28; NRES-22

Moderators: Fouad Jaber, Texas A&M University, Dallas, TX;  
Christopher Nzediegwu, McGill University, Ste-Anne-de-Bellevue, Quebec Canada

**7:35am** *Hydrologic and Water Quality Impacts of a Green Street Retrofit in Fayetteville, North Carolina* • Presenting author: Sarah Waickowski, NC State University, Raleigh, NC (Kathryn Shaneyfelt, William Hunt) 1900323

**7:50am** *Enhancing Landscape Eco-hydrologic Function: Mitigating Compaction and Kick-Starting the Soil Development Process in New Residential Developments* • Presenting author: Eban Bean, University of Florida, Gainesville, FL (Allan Bacon, Jovana Radovanovich, Victoria Steinnecker) 1901094

**8:05am** *Biochar and Bioretention—Studies Evaluating Water Quality and Hydrologic Performance for Biochar Amended Bioretention* • Presenting author: John McMaine, South Dakota State University, Brookings, SD (Farhana Akhter) 1901170

**8:20am** *Aging Bioretention: A Retrospective Comparison of Nutrient Treatment Efficiency in a 17-Year Old Bioretention Cell* • Presenting author: William Hunt, NC State University, Raleigh, NC (William Hunt) 1901442

**8:35am** **BREAK**

**8:45am** *Precipitation Trends and Low Impact Development Resiliency at South Central Missouri US Army Installation* • Presenting author: Daniel Gambill, US Army ERDC-Construction Engineering Research Laboratory, Champaign, IL (Heidi Howard) 1900160

**9:00am** *The Role of Tree Phenology on Urban Stormwater Management: A Case Study of Two Small Watersheds in the Kansas City Metropolitan Area* • Presenting author: Alireza Nooraei Beidokhti, Kansas State University, Manhattan, KS (Alireza Nooraei Beidokhti, Trisha Lynn Moore) 1900860

**9:15am** *Expanded Tree Pits as Part of a Low Impact Development Strategy for Urban Stormwater Management* • Presenting author: Jing Ren, McGill University, Montreal, Quebec, Canada (Jing Ren, O. Grant Clark) 1901158

**9:30am** *Treating Urban Stormwater with Suspended Pavement Systems and Street Trees* • Presenting author: Kathleen Balaze, North Carolina State University, Raleigh, NC (Sarah Waickowski, William Hunt III) 1901665

**9:45am** *Cold Temperature Effects on Nitrate Removal in Wood Chip Bioreactors Treating Subsurface Tile Drainage from Forage Production* • Presenting author: Lordwin Jeyakumar, St. John's Research and Development Ctr, St. John's, NL Canada (Lordwin Jeyakumar, David McKenzie) 1901909

## **313 Modeling of Water Quality and Hydrology**

Wednesday, July 10, 7:30am-10:00am

Location: Orleans

Sponsored by: NRES-21

Moderators: Chelsie Boles, Limno Tech, Ann Arbor, MI;  
Wenlong Liu, North Carolina State University, Raleigh, NC

**7:35am** *Modeling the Impacts of Grassland Conversion on River Flow Regimes in Skunk Creek Watershed, Upper Midwest United States* • Presenting author: Laurent Ahiablame, University of California, San Diego, CA (Aleksey Y. Sheshukov, Esther Mosase, Jiyeong Hong) 1901232

**7:50am** *Development and Utilization of a SWAT Watershed Model to Evaluate Benefits Associated with 4R Nutrient Stewardship in the Western Lake Erie Basin* • Presenting author: Chelsie Boles, LimnoTech, Ann Arbor, MI (Derek Schlea, Todd Redder) 1901743

**8:05am** *Predicting Impacts of the NOAA-NWS Runoff Risk Advisory Forecast on Water Quality with Multiple SWAT Watershed Models in the Western Lake Erie basin, USA* • Presenting author: Asmita Murumkar, The Ohio State University, Columbus, OH (Asmita Murumkar, Jay Martin, Margaret Kalcic, Grey Evenson, Anna Apostel, Jeffrey Kast, Dustin Goering, Abram DaSilva, Andrea Thorstensen, Chelsie Boles, Todd Redder, Remegio Confesor) 1900625

**8:20am** *Coastal water quality Dynamics and Modeling in Biscayne Bay, Florida* • Presenting author: Pawan Upadhyay, Iowa State University, Ames, IA (Pawan Upadhyay, Anna Linhoss) 1900227

**8:35am** **BREAK**

**8:45am** *Enhancing Agro-ecosystem Services Using Integrated Hydro-Ecologic and Socio-Cultural Models* • Presenting author: Juan S. Acero Triana, UIUC, Urbana, IL (Juan S. Acero Triana, Maria L. Chu, Nathan Shipley, Carena van Riper, William Stewart, Cory Suski, Jorge A. Guzman) 1900004

**9:00am** *Hydrologic Modeling of Extreme Events in Large-Scale Basin* • Presenting author: Yu Zhang, Texas A&M University, College Station, TX (Yu Zhang, Vijay Singh) 1901272

**9:15am** *Impact of Groundwater Withdrawal for Irrigation on Surface and Groundwater Interactions in the Lower Apalachicola-Chattahoochee-Flint River Basin, USA* • Presenting author: Ritesh Karki, Auburn University, Auburn, AL (Puneet Srivastava, Jasmeet Lamba) 1900949

**9:30am** *Characterization of Potential Groundwater Recharge in the Limpopo River Basin: A Validation Study of SWAT-MODFLOW* • Presenting author: Esther Mosase, South Dakota State University, Brookings, SD (Esther Mosase, Laurent Ahiablame, Seonggyu Park, Ryan Bailey) 1901463

# Wednesday, July 10

## **314 Nutrient Transport and Cycling: Measurements**

Wednesday, July 10, 7:30am-10:00am

Location: Falmouth

Sponsored by: NRES-22; NRES-224; NRES-23; NRES-25;  
NRES-26; NRES-28

Moderators: Rebecca Muenich, Arizona State University,  
Phoenix, AZ; Cibir Raj, Penn State University, University  
Park, PA

**7:35am** *An Automated Chamber System to Complement Manual Measurements of Greenhouse Gas Fluxes from Agricultural Soil* • Presenting author: Liam Fitzpatrick, McGill University, Montreal, Quebec, Canada (O.G. Clark, M.Y. Boh) 1901424

**7:50am** *Long-Term Variation of Nitrate Concentration-Stream Discharge (C-Q) Relationship for an Agricultural Watershed in Midwest U.S.* • Presenting author: Wenlong Liu, North Carolina State University, Raleigh, NC (Shiyang Tian, Mohamed Youssef, George Chescheir, François Birgand) 1901796

**NO-SHOW** *Spatiotemporal Challenges for Nutrient Trading Approaches to Water Quality* • Presenting author: Daniel Andersen, Iowa State University, Ames, IA (Daniel Andersen, D.R. Raman, M.J. Helmers) 1901729

**8:20am** *Measuring Water and Nutrient Movement in Compact Bed Plasticulture for Fresh Produce* • Presenting author: Kira Hansen, University of Florida, Immokalee, FL (Sanjay Shukla, Rajendra Sishodia, Gregory Hendricks) 1901832

**8:35am** **BREAK**

**8:45am** *Spatial and Temporal Patterns of Phosphorus Transport across Landscape Gradient from Agricultural Fields to Floodplain and Stream* • Presenting author: Qualla Ketchum, Virginia Tech, Blacksburg, VA (W. Cully Hession) 1901774

**9:00am** *Determining the Mineralization Rates of Nitrogen in Liquid Dairy Manure during Storage* • Presenting author: Jactone Ogejo, Virginia Tech, Blacksburg, VA (Yihuai Hu, Jactone Arogo Ogejo) 1900899

**9:15am** *An In-Situ Soil Nitrate Nitrogen Detection System Based on Ion-Selective Electrode* • Presenting author: Miao Zhang, China Agricultural University, Beijing, Beijing, China (Ming Chen, Miao Zhang, Qingliang Yang, Lan Yao, Xuming Wang) 1901453

## **315 Practices for Nutrient Loss Reduction in Drained Landscapes**

Wednesday, July 10, 7:30am-10:00am

Location: Yarmouth

Sponsored by: NRES-23

Moderators: Matthew Helmers, Iowa State University,  
Ames, IA; Johann Vera, Purdue University, West  
Lafayette, IN

**7:35am** *A Review and Synthesis of Control Factors on Dissolved Reactive Phosphorus Loads in Lake Erie Basin from Recent Studies* • Presenting author: Xiaojing Ni, United States Environmental Protection Agency, Durham, NC (Yongping Yuan) 1900027

**7:50am** *Quantifying Particulate Phosphorus Fluxes and Dynamics in Fine-textured Tile Drained Landscapes of Ohio* • Presenting author: Saeid Nazari, University of Kentucky, Lexington, KY (Saeid Nazari, William Ford, Kevin King) 1901607

**8:05am** *Dynamics of Phosphorus Transport from a Subsurface-Drained Field with Commercial Fertilizer Application* • Presenting author: Md Sami Bin Shokrana, Michigan State University, East Lansing, MI (Ehsan Ghane) 1901612

**8:20am** *Phosphorus Leaching as Influenced by Lime Application in Undisturbed Soil Columns with Different Soil Textures* • Presenting author: Faezeh Eslamian, McGill University, Montreal, Quebec, Canada (Zhiming Qi, Mike Tate) 1900623

**8:35am** **BREAK**

**8:45am** *Denitrifying Woodchip Bioreactor Performance in the "Real World"* • Presenting author: Laura Christianson, University of Illinois, Urbana, IL (Laura Christianson, Ruth Book, Lauren Lurkins, Lyndsey Ramsey, Ryan Arch, Hannah Dougherty, Jeff Kirwan, Todd VerHeecke, Michael Ganschow, Josh Joseph) 1901117

**9:00am** *Comparison between Simulated and Field Measured Infiltration in Frozen and Unfrozen Soils in the Red River of the North Basin* • Presenting author: Debjit Roy, Bangladesh Rice Research Institute, Gazipur, Bangladesh (Debjit Roy, Xinhua Jia, Jennifer Jacobs) 1900943

**9:15am** *Impact of Hydraulic Residence Time and Woodchip Properties on Nitrate Removal in Pilot-Scale Woodchip Bioreactors* • Presenting author: Michelle Soupir, Iowa State University, Ames, IA (Michelle Soupir, Emily Martin, Natasha Hoover, Morgan Davis, Gary Feyereisen, Thomas Isenhardt, Thomas Moorman) 1900206

**9:30am** *Water and Nutrient Budgets in Tile Drained Landscapes with and without Cover Crops* • Presenting author: Kevin King, USDA-ARS Soil Drainage Research Unit, Columbus, OH (Kevin W. King, Vinayak S. Shedekar, Emily Duncan, Brittany Hanrahan, Margaret Kalcic) 1901891

**9:45am** *Estimating Effectiveness of Drainage Water Management in Paired Field Studies* • Presenting author: Vinayak Shedekar, The Ohio State University, Columbus, OH (Kevin King, Margaret Kalcic, Norman Fausey, Larry Brown) 1900624

## **316 Precision Irrigation**

Wednesday, July 10, 7:30am-10:00am

Location: Hyannis

Sponsored by: NRES-24; MS-54

Moderators: Isaya Kisekka, University of California, Davis,  
CA; Abhilash Chandel, Washington State University,  
Prosser, WA

**7:35am** *Irrigation Advancements in Furrow Irrigated Rice* • Presenting author: Chris Henry, University of Arkansas, Stuttgart, AR (C. G. Henry, R. Mane, V. Kandpal, D. M. Pickelmann) 1901451

**7:50am** *Application of Precision Irrigation for Intensively Grazed Pastures* • Presenting author: Jake LaRue, Valmont Irrigation, Omaha, NE 1900031

# Wednesday, July 10

**8:05am** *Design: Self-Monitoring Drip Irrigation Emitter for Precise Water Application* • Presenting author: Hadi Al-agele, Oregon State University, Corvallis, OR (Chad Higgins) 1900880

**8:20am** *Technological Innovation of Irrigation in Agriculture from Past to Future to Improve Water Application Efficiency and Crop Production* • Presenting author: Hadi Al-agele, Oregon State University, Corvallis, OR (Chad Higgins) 1900882

**8:35am** **BREAK**

**8:45am** *Deep Reinforcement Learning Irrigation Optimization and Automated Scheduling for Fixed Zone Irrigation Systems* • Presenting author: Hongxin Kong, Texas A&M University, College Station, TX (Yanxiang Yang, Jiang Hu, Dana Porter, Thomas Marek, Kevin Heflin, Hongxin Kong, Lijia Sun) 1900765

**9:00am** *Evaluation of Independent Irrigation Management of Different Almond Varieties within the Same Orchard during Pre-Harvest and Post-Harvest Periods* • Presenting author: Kelley Drechsler, University of California, Davis, CA (Kelley Drechsler, Isaya Kisekka) 1900128

**9:15am** *Morning Crop Water Stress Index as a Sensitive Indicator of Water Status in Apple Trees* • Presenting author: Abdelmoneim Z. Mohamed, Washington State University, Prosser, WA (Yossi Osroosh, R. Troy Peters, Travis Bates, Colin S. Campbell, Francesc Ferrer-Alegre) 1900577

## **317 PAFS Distinguished Lecture Series—INVITED**

Wednesday, July 10, 7:30am-10:00am

Location: Simmons

Sponsored by: PAFS-40; PAFS-07/1; PAFS-20; PAFS-20/4; PAFS-234; PAFS-30; PAFS-40; PAFS-40/3/1; PAFS-50

Moderator: Brett Ramirez, Iowa State University, Ames, IA

**7:30am** *Simulation of Hydrogen Sulfide Emission from Deep-Pit Manure Storage During Agitation* • Presenting author: Hongjian Lin, Department of Bioproducts and Biosystems Engineering, University of Minnesota, St. Paul, MN

**8:00am** *Carbon Footprint Assessment of a Large-Scale Pig Production System in Northern China: A Case Study* • Presenting author: Hongmin Dong, Institute of Environmental and Sustainable Development in Agriculture (IEDA), Chinese Academy of Agriculture Sciences (CAAS), Beijing, China

**8:30am** *Dimensions of the Modern Pig* • Presenting author: Jeremiah Davis, National Poultry Technology Center; Associate Professor, Department of Biosystems Engineering, Auburn University, Auburn, AL

**9:00am** *Henry Giese Award Winner* • Presenting author: Baoming Li, Department of Agricultural Structure & Bioenvironmental Engineering, China Agricultural University, Beijing, China

## **318 Artificial Intelligence and Data Science (Big Data) in Processing**

Wednesday, July 10, 7:30am-10:00am

Location: Boylston

Sponsored by: PRS-703; MS-23/7/2; PRS-280; PRS-701; PRS-702; ASE-16; ITSC-230; ITSC-254; ITSC-312; ITSC-318; ITSC-348

Moderator: Griffiths Atungulu, University of Arkansas, Fayetteville, AR

**7:35am** *Intelligent Aerated Bulk Storage System for Maintaining In-Shell Peanut Quality and Safety in the Tropics* • Presenting author: Jose D. Guzman, Cagayan State University, Tuguegarao City, Cagayan, Philippines 1901367

**7:50am** *Mortality of Adult Red Flour Beetles in a Packed-Bed of Canola Seeds during 50 ohm RF Heating at Various Power Levels* • Presenting author: Dayo Oke, University of Saskatchewan, Saskatoon, Saskatchewan, Canada (Tolen Tombung Moirangthem, Dayo Oke, Oon-Doo Baik) 1901560

**8:05am** *Multivariate Near Infrared Spectroscopy for Predicting Polyhydroxybutyrate Production Cultured on Alkaline Pretreatment Liquor from Corn Stover* • Presenting author: Mengxing Li, University of Nebraska-Lincoln, Lincoln, NE (Nuwan Wijewardane, Yufeng Ge, Mark Wilkins) 1900619

**8:20am** *Risk Prediction and Traceability Database Construction of Peanut Purchase and Storage Process* • Presenting author: Hubo Xu, China Agricultural University, Beijing, China (Lingjuan Zhao, Kefei Yang, Hubo Xu, Bing Lu, Xiuying Tang) 1900395

## **319 Food Process Engineering Part II**

Wednesday, July 10, 7:30am-10:00am

Location: Columbus I

Sponsored by: PRS

Moderator: Ewunbua Monono, North Dakota State University, Fargo, ND

**7:35am** *Vitamins Stability in Thermally Pasteurized Mashed Potato: Influence of Process, Encapsulation, and Package Oxygen Transmission Rate* • Presenting author: Chandrashekhar Sonar, Washington State University, Pullman, WA (Chandrashekhar Sonar, Ashutos Parhi, Fang Liu, Barbara Rasco, Juming Tang, Shyam Sablani) 1900925

**7:50am** *Effects of Spray Drying Process Conditions on the Quality Properties of Instant Herbal Black Tea Powder* • Presenting author: Dr Rakesh Kumar Raigar, CAEPHT, Central Agricultural University Imphal, Ranipool, Gangtok, Sikkim, India (Lalremruati) 1901444

**8:05am** *Performance of an Open Source Automatic Dry Aging System* • Presenting author: Soon Kiat Lau, University of Nebraska-Lincoln, Lincoln, NE (Felipe Azevedo Ribeiro, Jeyamkondan Subbiah, Chris R. Calkins) 1901539

# Wednesday, July 10

**8:20am** *Impact of Post-harvest Electron Beam Irradiation and Storage Conditions on Quality Characteristics of Long-Grain Hybrid Rice* • Presenting author: Zeinab Mohammadi Shad, University of Arkansas, Fayetteville, AR (Zeinab Mohammadi Shad, Emiel Steen, Griffiths G. Atungulu) 1900095

**8:35am** **BREAK**

**8:45am** *Effects of Transglutaminase in Product Formulation on Physico-Textural Properties of Protein Rich Extruded Snacks* • Presenting author: Felix Akharume, University of Kentucky, Lexington, KY (Felix Akharume, Youling L. Xiong, Akinbode Adedeji) 1900306

**9:00am** *Effects of Air Dehumidification on the Performance of a Fluidized Bed Dryer and the Rice Quality* • Presenting author: Kaushik Luthra, University of Arkansas, Little Rock, AR (Sammy Sadaka) 1900322

**9:15am** *Sensory Profiling and Consumer Evaluation of Solar Dried Tomato Processed with a Mixed Mode Passive Solar Dryer* • Presenting author: Mavis Owureku-Asare, Biotechnology and Nuclear Agriculture Research Institute, GAEC, Kwabenya, Accra, Ghana (Mavis Owureku-Asare, Ibok Oduro, Charles Tortoe, Firibu K. Saalia, Joyce Agyei-Amponsah, Maame Yaakwaah Blay Adjei, Kingsly Ambrose) 1900347

## **320 Grain Drying, Storage and Aeration Systems—INVITED**

Wednesday, July 10, 7:30am-10:00am

Location: Columbus II

Sponsored by: PRS-702

Moderator: Kingsly Ambrose, Purdue University, West Lafayette, IN

**7:35am** *Impact of Drying and Storage Conditions on the Physical Quality of Green and Semi-Green Soybeans* • Presenting author: Ibukunoluwa Ajayi-Banji, North Dakota State University, Fargo, ND (Ibukunoluwa Ajayi-Banji, Kenneth Hellevang, Ewumbua Monono, Jasper Teboh) 1900557

**7:50am** *Evaluation of Low-Power, Wireless Sensors for Automated Quality Monitoring and Management of Stored Grain Inventory* • Presenting author: Guy Roger Aby, Dirk Maier, Iowa State University, Ames, IA (Roger Guy Aby, Dirk Maier) 1901850

**8:05am** *Fissuring Kinetics of Rough Rice during Drying* • Presenting author: Zephania Odek, University of Arkansas, Fayetteville, AR (Z. Odek, T.J. Siebenmorgen) 1901851

**8:20am** *Pressure Testing to Estimate Grain Storage Structure Leakiness* • Presenting author: Carol L Jones, Oklahoma State University, Stillwater, OK (Carol Jones, Taylor Conley, Mark Casada, Frank Arthur) 1901852

**8:35am** **BREAK**

**8:45am** *Effect of Storage Moisture Content on Milling Characteristics of Rice* • Presenting author: Bhagwati Prakash, University of Arkansas, Fayetteville, AR (B. Prakash, T. J. Siebenmorgen, K. E. Gibson, S. Kumari) 1900199

**9:00am** *Physical Disturbance Time Interval Optimization for Control of Weevils in Stored Maize* • Presenting author: Mike

Sserunjogi, Iowa State University, Ames, IA (Carl Bern, Thomas Brumm, Dirk Maier) 1900243

**9:15am** *Using an Eighth-Scale Grain Drying System to Compare Effects of Drying with Ambient Air versus Heated Air* • Presenting author: Micah Lewis, USDA ARS, Athens, GA (Micah Lewis, Samir Trabelsi, Stuart O. Nelson) 1901892

## **321 Physical Properties Related to Processing and Handling**

Wednesday, July 10, 7:30am-10:00am

Location: St. Botolph

Sponsored by: PRS-702; PRS-701

Moderator: Igathinathane Cannayen, North Dakota State University, Fargo, ND

**7:35am** *Effects of High-Intensity Ultrasound Processing on the Hydrodynamic Properties, Color, Particles Size, Pectin, and Microstructure of Kiwifruit Juice* • Presenting author: Jin Wang, McGill University, Sainte-Anne-de-Bellevue, Quebec Canada (Jin Wang, Vijaya Raghavan) 1900271

**7:50am** *Evaluation of Physical and Mechanical Properties of Carrot Rejects/Waste for the Design and Development of Carrot Processing Equipment* • Presenting author: Gaganjyot Madanpotra, University of Guelph, Guelph, Ontario Canada (Ranbeer Singh Sandhu, Ashutosh Singh) 1901422

**NO-SHOW** *Modeling of Fine Materials Distribution in an experimental Silo Using Dimensional Analysis* • Presenting author: Shubham Subrot Panigrahi, University of South Australia, Adelaide Australia (D. Zare, A. Nourmohamadi-Moghadam, Chandra B. Singh, Richard L. Stroshine, Shubham Subrot Panigrahi) 1900972

**8:20am** *Consistency Assessment of Rice Milling Quality Results from USDA-FGIS Laboratory Mill and Commercial Mills* • Presenting author: Ragab Khir, University of California, Davis, Davis, CA (Zhaokun Ning, Cathleen Brenner, Tara McHugh, Zhongli Pan) 1901250

**8:35am** **BREAK**

**8:45am** *Characterizing Adhesion Force of Dust to Corn Kernels* • Presenting author: Benjamin Plumier, Purdue University, West Lafayette, IN (Yumeng Zhao, Mark Casada, Ronaldo Maghirang, Kingsly Ambrose) 1900668

**9:00am** *Water Activity Change of Egg Powders at Elevated Temperatures Modeled by Clausius Clapeyron Equation* • Presenting author: Marco Esteban Pérez Reyes, Washington State University, Pullman, WA (Marco Esteban Pérez Reyes, Juming Tang, Mei-Jun Zhu, Gustavo Barbosa Cánovas) 1900676

**9:15am** *Study of Total Volatile Basic Nitrogen Content in Chilled Beef for Freshness Evaluation by Texture Profile Analysis* • Presenting author: Hubo Xu, Northeastern University, Boston, MA (Hubo Xu, Yingzi Lin, Beibei Zhang, Xiuying Tang) 1900351

**9:30am** *Characterization of Proteins Extracted from Eggshell Membrane Fraction of Processed Eggshell Waste* • Presenting author: Mary-Grace Danao, University of Nebraska-Lincoln, Lincoln, NE (Patricia A. Reyes, Mary-Grace C. Danao, Kaustav Majumder) 1900461

# Wednesday, July 10

## **302 Dealing with Ethical Issues in Engineering Standards—INVITED**

Wednesday, July 10, 10:15am-12:15pm

Location: MIT

Sponsored by: EOPD

Moderator: Robert J. Gustafson, Professor Emeritus, Ohio State University, Delaware, OH

**10:20am** *Keynote Speaker: Mr. Christian Dubay, P.E., Vice President and Chief Engineer, National Fire Protection Association, Quincy, MA* • Mr. Dubay will address his experience and perspectives on Ethics Issues in Standards Development and Application. This will be followed by a panel discussion. Participants in the panel will include ASABE members with a wide range of experience with standards.

**10:40am** *Panel Discussion*

## **322 EOPD—Education, Outreach, & Professional Development POSTER SESSION**

Wednesday, July 10, 10:15am-12:15pm

Posters will be displayed for the entire session, but authors will be present at posters as follows:

10:15am-11:15am, authors with ODD numbered posters present

11:15am-12:15pm, authors with EVEN numbered posters present

Location: Gloucester

Sponsored by: EOPD

Moderator: Richard Beard, Utah State University, Logan, UT

**NO-SHOW** *New Education of Farmers for Water Saving to a Drought Measure* • Presenting author: Jong-Won Do, Korea Rural Community Corporation, Daejeon, Republic of Korea (Jong-Won Do, Kyung-Sook Choi, Seul-Gi Lee, Kwang-Ya Lee, Tae-Hyun Ha, Seung-Yong Lee, Eui-Yup Jung) 1900690

## **323 Biomass Feedstock Supply Logistics and Modeling**

Wednesday, July 10, 10:15am-12:15pm

Location: Boston University

Sponsored by: ES-220; ASE-12

Moderator: Igathinathane Cannayen, North Dakota State University, Fargo, ND

**10:20am** *Techno-Economic Analysis of a Hybrid Solar-Biomass System for Domestic Energy Supplying* • Presenting author: Congguang Zhang, The Ohio State University, Wooster, OH (Congguang Zhang, Ajay Shah) 1901605

**10:35am** *Biomass Pretreatment by Magnesium Oxide for Reducing Sugar Degradation and Water Consumption in Biofuel Production* • Presenting author: Jun Li, Kansas State University, Manhattan, KS (Meng Zhang, Donghai Wang) 1900157

**10:50am** *Developing a Viable Biomass Feedstock Supply Chain to Meet the Renewable Fuel Standards* • Presenting author: Daniela S. Jones, North Carolina State University, Raleigh, NC (Daniela S. Jones, Stephen Searcy) 1900104

**11:05am** *Why a Multi-bale Handling Unit is Essential for Efficient Feedstock Logistics* • Presenting author: Robert Grisso, Virginia Tech, Blacksburg, VA (Robert "Bobby" Grisso, John S. Cundiff, Kevin Comer) 1900802

**11:20am** *Evaluating Uncertainties in Feedstock Supply Systems for a Lignocellulosic Biorefinery* • Presenting author: Ashish Manandhar, The Ohio State University, Wooster, OH (Ashish Manandhar, Ajay Shah) 1901644

**11:35am** *Evaluating the Physical and Compositional Characteristics of Corn Residues during the Drydown Period* • Presenting author: Asmita Khanal, The Ohio State University, Columbus, Ohio (Asmita Khanal, Seyed Hashem Mousavi Avval) 1901610

**11:50am** *Comparison of Vertical Hydro-Transport of Lignocellulosic Biomass with Conventional Solids* • Presenting author: Kashif Javed, University of Alberta, Edmonton, Alberta, Canada (Kashif Javed, Mahdi Vaezi, Vinoj Kurian, Amit Kumar) 1900872

## **324 Energy Utilization and Lighting in Agricultural Operations and Facilities**

Wednesday, July 10, 10:15am-12:15pm

Location: Harvard

Sponsored by: ES-300; ES-310; ES-311

Moderator: Kip Pheil, USDA NRCS, Portland, OR

**10:20am** *Expanded LED Benefits through an Automated Long Day Lighting System at a 3x Milking Dairy Farm* • Presenting author: Benjamin VanZweden, Michigan State University, East Lansing, MI (Benjamin VanZweden, Aryn Thomas, Aluel Go, Truman Surbrook) 1900042

**10:35am** *A Decision Support and Optimization Platform for Energy Technology Investments on Dairy Farms* • Presenting author: Philip Shine, Cork Institute of Technology, Cork, Ireland (Michael Breen, John Upton, Adam O'Donovan, Michael D. Murphy) 1901055

**10:50am** *Energy Efficiency Improvements on Kentucky Dairy and Poultry Farms* • Presenting author: Doug Overhults, University of Kentucky, Lexington, KY (Sam McNeill, Aaron Turner) 1901313

**11:05am** *A Summary of Energy Audits for Grain Driers in Kentucky* • Presenting author: Samuel McNeill, University of Kentucky, Princeton, KY (Samuel McNeill, Aaron Turner, Douglas Overhults, Michael Montross) 1901792

**11:20am** *Modelling the Thin Layer Drying Kinetics of Cocoa Beans in a Passive Solar Dryer and under Open Sun* • Presenting author: Okonkwo Wilfred Ifeanyi, University of Nigeria, Nsukka, Enugu State, Nigeria (Eusebius Tobechukwu Okorie) 1900244

**11:35am** *Analytical Estimation and Experimental Validation of Wind Energy Utilization Using Turbine for Mechanical Aeration of Small Scale Ear Corn Drying* • Presenting author: Akinbode A. Adedeji, University of Kentucky, Lexington, KY (Francis Agbali, Akinbode Adedeji) 1901091

**11:50am** *The Efficiencies, Environmental Impacts and Economics of Energy Consumption for Groundwater-based Irrigation in Oklahoma* • Presenting author: Divya Handa, Oklahoma State University, Stillwater, OK (Divya Handa, Robert S. Frazier, Saleh Taghvaeian, Jason G. Warren) 1900665

# Wednesday, July 10

**12:05pm** *Mint Distillation Condenser Cooling Water Recirculation System to Reduce Water Usage* • Presenting author: Scott Sanford, University of Wisconsin-Madison, Madison, WI (David Bohnhoff, Amanda Beistle, Wilhelm Heider, Derek Vanstone, Tanner Wik) 1900612

## **325 Lighting Systems for Plant Production —Standards, Systems, and Science—INVITED**

Wednesday, July 10, 10:15am-12:15pm

Location: Brandeis

Sponsored by: ES-311

Moderator: Carl Bloomfield, Intertek Testing Services, Arlington Heights, IL

**10:25am** *Standard 640—Definitions* • Presenting author: Jianzhong Jiao (Jianghong Jiao) 1901954

**10:35am** *Standard 642—Testing* • Presenting author: Carl Bloomfield, Intertek Testing Services, Arlington Heights, IL (Carl Bloomfield) 1901952

**10:45am** *Standard 644—Performance* • Presenting author: Kip Pheil, USDA NRCS, Portland, OR (Kip Pheil) 1901956

**10:55am** *DesignLights Consortium Program for Horticultural Lighting Products* • Presenting author: Damon Bosetti, DesignLights Consortium, Medford, MA (Damon Rosetti) 1901953

**11:15am** *Designing and Manufacturing Horticultural Luminaires to Meet Industry Specifications and Growers Needs* • Presenting author: Roy Harvey, Osram Sylvania Inc, Wilmington, MA (Roy Harvey) 1901955

**11:35am** *Designing and Manufacturing Horticultural Luminaires to Meet Industry Specifications and Growers Needs* • Presenting author: Rachele Winningham, Signify Lighting, Rosemont, IL 1901997

**11:55am** *Roundtable Discussion*

## **326 Apps in Agricultural Applications**

Wednesday, July 10, 10:15am-12:15pm

Location: Northeastern

Sponsored by: ITSC-254

Moderator: Mario R. Mondaca, University of Wisconsin, Madison, WI

**10:20am** *Soil Sampling Utility: A Windows-Based Freeware Application for Precision Soil Sampling* • Presenting author: Kendall Kirk, Clemson University, Blackville, SC (Kendall R. Kirk) 1901789

**10:35am** *Smartphone Warn Producers When to Irrigate Mango Trees* • Presenting author: Federico Hahn, Universidad Autonoma Chapingo, Texcoco, Edo. Mexico (Federico Hahn, Jesús García) 1900596

**NO-SHOW** *Irrigation Advisory Services for Farmers of Pakistan —A Success in Agro-Environmental Communication* • Presenting author: Ahmad Zeeshan Bhatti, University of Prince Edward Island, Charlottetown, PE Canada (Ahmad Zeeshan Bhatti, Faisal Hossain, Muhammad Ashraf, Aitazaz Ahmad Farooque) 1901237

**NO-SHOW** *Smartphone Based Evaluation of the Operating Behaviors of Agricultural Machinery* • Presenting author: Jiahua

Huang, China Agricultural University, Beijing, China (Jiahua Huang, Shuo Liang, Zhihong Kou, Zhouyu Xiong, Xin Zhao, Caicong Wu) 1901568

**11:20am** *Web Tool for Classification and Quantification of Flowers for Pollinators Interaction Using R* • Presenting author: Subhashree Navaneetha Srinivasagan, North Dakota State University, Fargo, ND (Sunoj Shajahan, Igathinathane Cannayen, Jose Franco, Rachel Mallinger, David Archer) 1901275

**11:35am** *Adjusting Sowing Decisions to Reduce the Risk of Extreme Weather Events with AgroClimate Crop Season Planning Tool* • Presenting author: Daniel Perondi, University of Florida, Gainesville, FL (Daniel Perondi, Clyde Fraisse, Caroline Staub, Vinicius Cerbaro, Daniel Barreto, Diego Pequeno, Michael Mulvaney, Patrick Troy, Willingthon Pavan) 1901727

**11:50am** *Metadata App—Streamlining the Generation of the Backstory* • Presenting author: Dennis Buckmaster, Purdue University, Rossville, IN (John Scott, Dharmendra Saraswat, Alex Layton, Ben Hancock, James Krogmeier) 1900553

## **327 Biosensors and Bioelectronics**

Wednesday, July 10, 10:15am-12:15pm

Location: Tufts

Sponsored by: ITSC-230; ITSC-353

Moderators: Mei He, University of Kansas, Lawrence, KS; Sindhuja Sankaran, Washington State University, Pullman, WA

**10:20am** *ABE-Stat 3: New Applications and Upgraded Hardware for Improved Performance* • Presenting author: Daniel Jenkins, University of Hawaii, Honolulu, HI (Daniel Jenkins, Bog-Eum Lee, José Reyes-De-Corcuera, Eric McLamore, Soojin Jun) 1901678

**10:35am** *A Portable Sensing Device with Magnetic Separation and Quantum Dots Labeling for Simple, Rapid and Quantitative Detection of Salmonella Typhimurium* • Presenting author: Xinge Xi, University of Arkansas, Fayetteville, AR (Xinge Xi, Ronghui Wang, Ping Yao, Jianhan Lin, Ming Liao, Yanbin Li) 1900564

**10:50am** *Research Progress on the Detection of Heavy Metal Ions by Electrochemical Biosensors* • Presenting author: Qiuying Zou, Shenyang Agricultural University, Shenyang, Liaoning China (Ronghui Wang, Yanbin Li) 1901797

**11:05am** *A Nanobiosensor Based on Integrated Nanochannel-Electrode System for Rapid Detection of Salmonella in Chicken Products* • Presenting author: Yingchun Fu, Zhejiang University, Hangzhou, Zhejiang China (Wenyue Zhu, Yuqing Li, Yingchun Fu, Yanbin Li) 1900995

**NO-SHOW** *User Scribed Graphene Sensors for Point of Use Detection of Listeria monocytogenes* • Presenting author: Eric McLamore, University of Florida, Gainesville, FL (Nicholas Cavallaro, Eric McLamore, Carmen Gomes) 1901766

**11:35am** *Dual-Channel Aptasensor for Mercury Ions Sensing in Maize Using Au@Ag/graphene-UCNPs as MEF and SERS Signal Indicators* • Presenting author: Huanhuan Li, Jiangsu University, Zhenjiang, Jiangsu China (Huanhuan Li, Quansheng Chen, Zhiming Guo) 1900363

# Wednesday, July 10

**11:50am** *Rapid Detection of Inorganic Arsenic: A Real-Time Screening Method Based on De-Aggregation of Gold Nanoparticles* • Presenting author: Mike Bismuth, Institute of Agricultural Engineering, Agricultural Research Organization, the Volcani Center, Rishon Le'Zion, Israel (Mike Bismuth, Giorgi Shtenberg) 1900719

**12:05pm** *Enhancement of Alcohol Oxidase and Alcohol Oxidase Biosensors Using High Hydrostatic Pressure* • Presenting author: Daoyuan Yang, University of Georgia, Athens, GA (Jose I. Reyes De Corcuera, Daniel Jenkins) 1901388

## **328 Robotics and Co-Robotics for Agriculture Part II**

Wednesday, July 10, 10:15am-12:15pm

Location: Simmons

Sponsored by: ITSC

Moderator:

**10:20am** *Development of a Modular Agricultural Robot for High Throughput Phenotyping* • Presenting author: Rui Xu, Athens, GA (Jawad Iqbal, Changying Li, Andrew H. Paterson, Javad Mohammadpour Velni) 1900597

**10:35am** *Navigation Control of Automated Ground Robots with Articulated Steering for Field-Based Plant Phenotyping* • Presenting author: Lie Tang, Iowa State University, Ames, IA (Wenyu Zhang, Taylor Tuel, Lie Tang) 1901340

**10:50am** *Visual Kinematics Control of Cotton-Picking Rover Manipulator Using a ROS-independent Finite State Machine* • Presenting author: Kadege G Fue, University of Georgia, Tifton, GA (Kadege Fue, Edward Barnes, Wesley Porter, Glen Rains) 1900779

**11:05am** *Mobile Robotics Platform for Whole-Poultry-House Approach to Compartmentalized Egg Production Management* • Presenting author: Guoqiang Ren, Zhejiang University, Hangzhou, Zhejiang, China (Guoqiang Ren, Zhixian Lin, Tao Lin, Yibin Ying, Girish Chowdhary, K.C. Ting) 1900685

**11:20am** *Complete Coverage Infield-path Planning for Auto-guided Tillaging in Polygonal Paddy Fields* • Presenting author: Chan-Woo Jeon, Seoul National University, Seoul, Republic of Korea (Chan-Woo Jeon, Hak-Jin Kim, Changho Yun, Min-Suk Kang, Xiong Zhe Han) 1901037

**11:35am** *Hybrid Systems Based Modeling and Control of Heterogeneous Agricultural Robots for Field Operations* • Presenting author: Chanyoung Ju, Chonnam National University, Gwangju, Gwangju, Republic of Korea (Chanyoung Ju, Hyoung Il Son) 1900316

**11:50am** *Non-GPS Based Unmanned Ground Autonomous Robotic Navigation Strategies for Under-Canopy Sensing* • Presenting author: Ryan Humphrey, University of Nebraska-Lincoln, Lincoln, NE (Ryan Humphrey, CheeTown Liew, Santosh Pitla, Tyler Troyer) 1901798

**12:05pm** *Implementation, Analysis and Control Using the ifm O3M151 3D Sensor on J1939 CANbus Network* • Presenting author: Josh Murman, University of Nebraska-Lincoln, Lincoln, NE (Josh Murman, Santosh Pitla) 1901154

## **329 Sensors and Control Systems for Food Production and Processing**

Wednesday, July 10, 10:15am-12:15pm

Location: Vineyard

Sponsored by: ITSC

Moderator:

**10:20am** *Performance of a New Non-Destructive Firmness Device, Comparisons with Other Devices for Kiwifruit Measurement and the Surprising Effect of Storage Age*

• Presenting author: Andrew McGlone, Plant & Food Research, Hamilton, New Zealand (Andrew McGlone, Ellen Bayliss, Anne White, Mark Wohlers, Peter Schaare) 1900151

**10:35am** *Different Numerical Analysis Algorithms for Egg's Dynamic Weighing Using Digital Signal Processor* • Presenting author: Chaojie Li, College of Biosystems Engineering and Food Science, Zhejiang University, Hangzhou China (Chaojie Li, Xiaotian Chen, Limin Zou, Jianping Wang) 1900318

**10:50am** *An Investigation into Using Air Pulse Excitation for Rapid Non-Contact Fruit Firmness Measurement* • Presenting author: Samuel Langdon-Arms, The New Zealand Institute for Plant and Food Research Ltd., Hamilton, New Zealand (Andrew McGlone, Peter Schaare, Rod McDonald) 1900188

**11:05am** *Comparison of Signal Drifting Calibration Methods for ISEs based Hydroponic Macronutrients Monitoring* • Presenting author: Miao Zhang, China Agricultural University, Beijing, China (Qingliang Yang, Miao Zhang, Linpei Pan, Ming Chen, Maohua Wang) 1900672

**11:20am** *Florida Polytechnic University's Intelligent Garden* • Presenting author: Melissa Morris, Florida Polytechnic University, Lakeland, FL (Melissa Morris, Grant Percy, Nicoleta Hickman) 1901490

## **330 Handling, Storage, Transport, and Processing of Forages and Biomasses**

Wednesday, July 10, 10:15am-12:15pm

Location: Clarendon

Sponsored by: MS-23/7/2

Moderator: Elizabeth Miller, John Deere, Ottumwa, IA

**10:20am** *Industrial Hemp Harvesting and Decorticating Review* • Presenting author: Jude Liu, Penn State University, University Park, PA (Alyssa Collins, Jeffrey Graybill, Gregory Roth) 1901505

**10:35am** *Postharvest Handling of Chopped Biomass Feedstocks through Densification for Long-Term Storage* • Presenting author: Carrie Sanford, Lucas Mitchell, Hannah Monroe, NC State University, Raleigh, NC (Lucas Mitchell, Hannah Monroe, Edward Godfrey, Matthew Whitfield, Mari Chinn) 1901770

**10:50am** *Flow Field Analysis and Structure Improvement of Sugarcane Chopper Harvester Extractor* • Presenting author: Shaochun Ma, CAU, Beijing, China (Haonan Xing, Shaochun Ma, Fenglei Wang, Jing Bai, Jinzhi Ma, Wenli Ke, Shili Gao) 1900641

# Wednesday, July 10

**NO-SHOW** *Design and Test of Flexible Low-Loss Maize Picking Device for Fresh Corn* • Presenting author: Tianyu Li, Northeast Agricultural University, Harbin, Heilongjiang Province, China (Li Tianyu, Zhou Fujun, Xu Chunlin) 1900689

**11:20am** *Compressibility and Angle of Repose of Different Pelleted Material* • Presenting author: Josh Jackson, University of Kentucky, Lexington, KY (Mike Montross, Aaron Turner) 1900842

**11:35am** *Statics and Modal Analysis of the Main Structure of Multi-Dimensional Sieving Machine* • Presenting author: Jing Zhang, Jiangsu University, Zhenjiang, Jiangsu, China (Qizhi Yang, Jing Zhang, Li Xu, Guanlong Huang, Guangyu Du, M. Addy) 1901562

## **332 Precision Agricultural Utilization in Chemical and Fertilizer Applications**

Wednesday, July 10, 10:15am-12:15pm

Location: Arlington

Sponsored by: MS-23/6; MS-54

Moderator: Chris Bursiek, John Deere, Ankeny, IA

**10:20am** *Evaluation of Airborne Spray Drift and Ground Loss from Laser-Guided Variable-Rate Spray Applications* • Presenting author: Heping Zhu, USDA-ARS, Wooster, OH (Kyunok You, Heping Zhu, Huseyin Guler, Zhihong Zhang, Liming Chen, Tingting Yan) 1900225

**10:35am** *Development of a Laser-Guided Boom Spray System for Greenhouse Applications* • Presenting author: Heping Zhu, USDA-ARS ATRU, Wooster, OH (Tingting Yan, Heping Zhu, Xiaochan Wang, Peter Ling) 1900200

**10:50am** *Spray Performance Comparisons between Retrofitted Intelligent Sprayers and Conventional Constant-Rate Sprayers in Vineyard Applications* • Presenting author: Heping Zhu, USDA-ARS ATRU, Wooster, OH (Huseyin Guler, Heping Zhu, Kyusuk You, Zhihong Zhang, Liming Chen, Tingting Yan, Erdal Ozkan) 1900202

**11:05am** *On and Off-Target Spray Deposition from a Solid Set Canopy Delivery System and an Axial-Fan Airblast Sprayer Tested for Vineyard Spray Applications* • Presenting author: Rajeev Sinha, Washington State University, Prosser, WA (Lav Khot, Gwen-Alyn Hoheisel, Matthew Grieshop, Rakesh Ranjan) 1901228

**11:20am** *Measuring and Modeling the Movement of Spray Droplets into Off-Target Areas* • Presenting author: Brian L. Steward, Iowa State University, Ames, Iowa (Brian L. Steward, H. Mark Hanna, Philip M. Dixon, Rithana K. Mompremier) 1901496

**11:35am** *Evaluation of Laser-Guided Intelligent Sprayer to Control Insects and Diseases in Fruit Plants* • Presenting author: Liming Chen, USDA ARS ATRU, Wooster, OH (Liming Chen, Heping Zhu, Matthew Wallhead, Michael Reding, Leona Horst) 1900146

**11:50am** *Interactions of Hairy Trichomes with Sprayed Droplet Adhesion and Spreading on Leaves* • Presenting author: JohnPaul R. Abbott, ARS-USDA-ATRU, Wooster, OH (Heping Zhu) 1900219

## **333 Applications of Remote Sensing and UAVs in Irrigation Management**

Wednesday, July 10, 10:15am-12:15pm

Location: Falmouth

Sponsored by: NRES-24; NRES-241; NRES-244

Moderators: Charles Hillyer, IFF, Amarillo, TX; Abdelmoneim Mohamed, Washington State University, Prosser, WA

**10:20am** *Identification of Drought Stress in Turfgrass Using Multispectral and Hyperspectral Remote Sensing* • Presenting author: Kyle Cheung, UC Davis, Davis, CA (Alireza Pourreza, German Zuniga-Ramirez, Maggie Reiter, Amir Haghverdi) 1900900

**10:35am** *Estimation of Surface Evapotranspiration in Daxing District based on SEBS Model Validated by Large Aperture Scintillator* • Presenting author: Xin Han, IWHR, Haidian District, Beijing China (Xin Han, Baozhong Zhang, Zheng Wei, He Chen, Yinong Li, Taisheng Du) 1900494

**10:50am** *Investigating Artificial Hot and Cold Reference Surfaces for Estimating Water Use with Thermal Images* • Presenting author: Behnaz Molaei, Washington State University, Prosser, WA (R. Troy Peters, Abhilash Kumar Chandel, Lav Ramchandra Khot, Azeem Khan, Fidel Maureira Sotomayor, Claudio Osvaldo Stockle) 1900933

**11:05am** *Assessment of Thermal Infrared Sensors and their Accuracy in Low Altitude Unmanned Aerial System Remote Sensing* • Presenting author: Mitchell Maguire, University of Nebraska Lincoln, Lincoln, NE (Christopher Neale, Wayne Woldt) 1900855

**11:20am** *Remote Sensing Data as Decision Support Tool for Center Pivot Irrigation Management* • Presenting author: Anh Nguyen, University of Missouri Columbia, MO (Allen L. Thompson, Kenneth A. Sudduth, Earl Vories) 1900811

**11:35am** *A Comparison of UAVs and Remote Sensing to Schedule Irrigation for High Value Processing Crops* • Presenting author: Chandra Madramootoo, McGill University, Ste. Anne de Bellevue, Quebec Canada (Chandra A. Madramootoo) 1901860

**11:50am** *Low Altitude High Resolution Remote Sensing Based Evapotranspiration Mapping for Potato Crop* • Presenting author: Abhilash Chandel, Biological Systems Engineering, Washington State University, Prosser, WA (Abhilash Chandel, Behnaz Molaei, Lav R. Khot, Troy Peters, Claudio Stockle) 1901847

## **334 CN Hydrology and Alternative Approaches for Runoff Volume or Runoff Rate**

Wednesday, July 10, 10:15am-12:15pm

Location: Provincetown

Sponsored by: NRES-21; NRES-25; ASCE-EWRI

Moderators: Ernest Tollner, University of Georgia, Athens, GA; Vamsi Krishna Vema, West Lafayette, IN

**10:20am** *Assessing Runoff Using Modified SME-CN Method for a Drained Forest Watershed on North Carolina Atlantic Coastal Plain* • Presenting author: Andrzej Walega, University of Agriculture

# Wednesday, July 10

in Krakow, Krakow, Poland and Devendra M Amatya, USDA Forest Service, Cordesville, SC (Andrzej Walega, Devendra Amatya) 1900080

**10:35am** *Overview of Regional Runoff Risk Decision Support Tools for Nutrient Reduction Developed through NOAA NWS and Great Lakes States Partnerships* • Presenting author: Dustin Goering, NOAA-NWS-NCRFC, Chanhassen, MN (Andrea Thorstensen) 1901297

**10:50am** *SCS-CN Modification for Green Infrastructure Infiltration-Based Designs* • Presenting author: John Tyner, University of Tennessee, Knoxville, TN (John Tyner, Daniel Yoder, John Buchanan, Andrea Ludwig) 1901148

**11:05am** *Nitrogen Fate in the Nitrogen Cycle in an Agro-Production System* • Presenting author: Congyu Hou, UIUC, Urbana, IL (Congyu Hou, Maria L. Chu, Alejandra Botero, Jorge Alberto Guzman Jaimés) 1900832

**11:20am** *Herbicide Runoff in Small Sloping Watersheds: A RZWQM Simulation* • Presenting author: Yue Wang, McGill University, Montreal, QC, Canada (Yue Wang, Zhiming Qi, Martin Shipitalo) 1900761

**11:35am** *Evaluation of How CMIP5 GCMs Reproduce Statistical Rainfall Event Characteristics in Florida* • Presenting author: Jung-Hun Song, University of Florida, Homestead, FL (Younggu Her, Sat-Byeol Shin) 1900539

**11:50am** *Resilience of the Middle Oconee River to Anthropomorphic Watershed Impacts and Precipitation Extremes* • Presenting author: Ernest Tollner, University of Georgia, Athens, GA (E. Ehmed, B. Bledsoe, M. Lan) 1901374

## **335 Defining Ecological Engineering through Practice—HYBRID**

Wednesday, July 10, 10:15am-12:15pm

Location: Nantucket

Sponsored by: NRES-28

Moderators: Trisha Moore, Kansas State University, Manhattan, KS; Jay Martin, Ohio State University, Columbus, OH

**10:20am** *Ecological Engineering at Multiple Scales—A Few Case Studies* • Presenting author: Ani Jayakaran, Washington State University, Puyallup, WA (AD Ward, JF Martin) 1900958

**10:44am** *Defining and Applying Ecological Engineering* • Presenting author: Jay Martin, Ohio State University, Columbus, OH (Jay Martin) 1900144

**11:06am** *Ecological Engineering: Designing for EcoSYSTEM Function* • Presenting author: Stacy Hutchinson, Kansas State University, Manhattan, KS (Stacy L. Hutchinson) 1901815

**11:28am** *Ecological Engineering and Waste-to-Energy Technologies: Anaerobic Digestion and Algal Turf Scrubbers* • Presenting author: Stephanie Lansing, University of Maryland, College Park, MD (Stephanie Lansing) 1900614

**11:50am** *Ecological Engineering: Remembering We Are Part of the Ecosystem* • Presenting author: Theresa Thompson, Biological Systems Engineering, Virginia Tech, Blacksburg, VA 1901178

## **336 Denitrifying Bioreactors: Present State and Future Opportunities—RAP**

Wednesday, July 10, 10:15am-12:15pm

Location: Yarmouth

Sponsored by: NRES-23

Moderators: Chris Hay, Iowa Soybean Association, Ankeny, IA; Gary Feyereisen, USDA ARS SWMRU, St. Paul, MN

*Denitrifying bioreactors represent one technology that has promise to reduce nitrate losses from subsurface drainage systems. The first field bioreactors are now reaching a decade in age and issues, problems, and opportunities for advancement are surfacing. This session is an opportunity for researchers and practitioners to meet to brainstorm and discuss existing needs and a path forward to make bioreactors a viable practice for large-scale implementation.*

## **337 Drought and Water Security—HYBRID**

Wednesday, July 10, 10:15am-12:15pm

Location: Berkeley

Sponsored by: NRES-25; NRES-251; NRES-21; NRES-24; NRES-28; NRES-26

Moderators: Tushar Sinha, Texas A&M University, Corpus Christi, TX; Emily Steinweg, University of Minnesota, St. Paul, MN

**10:20am** *Global Water Security for Agriculture and Natural Resources—Recommendations from Global Engagement Initiative* • Presenting author: Indrajeet Chaubey, Dean of the College of Agriculture, Health, and Natural Resources, University of Connecticut, CT (Indrajeet Chaubey, R. Daren Harmel, Indra Mani) 1901910

**10:50am** *A review on Agricultural Drought Analysis Modeling* • Presenting author: Subhashree Navaneetha Srinivasagan, North Dakota State University, Fargo, ND (Igathinathane Cannayen, John Hendrickson, David Archer) 1901271

**11:05am** *Declining Soil Moisture Threatens Water Availability in the U.S. Great Plains* • Presenting author: Kelsey McDonough, Kansas State University, Manhattan, KS (Stacy L. Hutchinson, J.M. Shawn Hutchinson) 1901316

**11:20am** *Long-Term Drought Forecasting Using an Entropy Theory: A Case Study in Texas* • Presenting author: Jeongwoo Han, Texas A&M University, College Station, TX (Jeongwoo Han, Vijay P. Singh) 1901480

**11:35am** *Capability of Remote Sensing and In-Situ Drought Indices for Detecting Drought and Streamflow in the MINK Region from 2003-2017* • Presenting author: Devon Baddad, Kansas State University, Manhattan, KS (Vahid Rahmani) 1901276

**11:50am** *Quantifying Surface Water and Groundwater Availability in the Brazos River Basin, Texas* • Presenting author: Tushar Sinha, Texas A&M University-Kingsville, Kingsville, TX (Hao-Po Chang, Momtahana Habib, Tushar Sinha) 1901679

# Wednesday, July 10

## **338 Measurement and Modeling of Ecosystem Services**

Wednesday, July 10, 10:15am-12:15pm

Location: Orleans

Sponsored by: NRES-28; NRES-21; NRES-25

Moderators: Sanjay Shukla, University of Florida,  
Immokalee, FL; Natasha Bell, Clemson University,  
Clemson, SC

**10:20am** *A Spatially Explicit Multi-Criteria Decision Analysis Tool for Prioritizing Land Conservation Projects* • Presenting author: Anna Linhoss, Mississippi State University, Starkville, MS (Anna Linhoss, Kristine Evans, Sathish Samiappan, Jiangdong “Chuck” Liu, Jennifer Roberts, Andrew Shamaskin, Steve Ashby, John Tirpak) 1901825

**10:35am** *Determination of Environmental Flows to Support a Threatened Fish Species of the Great Plains* • Presenting author: Lucie Guertault, NC State University, Raleigh, NC (Lucie Guertault, Garey Fox, Shannon Brewer, Mallory Alman) 1900585

**10:50am** *Influences of Climate and Soil Properties on Hydrological Function and Soil Carbon Sequestration under Different Grazing Management Practices* • Presenting author: Srinivasulu Ale, Texas A&M AgriLife Research, Vernon, TX (Srinivasulu Ale, JungJin Kim, W Richard Teague) 1901337

**11:05am** *Modelling Greenhouse Gas Emissions from Biosolids-Fertilized Soils Using the DeNitrification and DeComposition (DNDC) Model* • Presenting author: Okenna Obi-Njoku, McGill University, Montreal, Quebec Canada (O. Grant Clark, Michael Y. Boh) 1901526

**11:20am** *Performance Comparison of the APSIM and CERES-Wheat Models in Guanzhong Plain, China* • Presenting author: Qaisar Saddique, Northwest A&F University, Yangling, Shaanxi China (Qaisar Saddique, Jianmei Ji, Xu Jiatur, Zou Yufeng, Jianqiang He, Huanjie Cai) 1900416

**11:35am** *Porewater Velocity as an Important Factor for Nitrate Removal Rates in Woodchip Bioreactors* • Presenting author: Francois Birgand, NC State University, Raleigh, NC (S. Blackman, C. Chen, B.M. Maxwell, F. Birgand) 1901787

**11:50am** *The Spatiotemporal Influence of Urban Development Patterns on Flood Mitigation Ecosystem Services* • Presenting author: Kelsey McDonough, Kansas State University, Manhattan, KS (Stacy L. Hutchinson, Jia Liang, Trevor Hefley, Shawn Hutchinson) 1901317

## **339 Nutrient Transport and Cycling: Modeling**

Wednesday, July 10, 10:15am-12:15pm

Location: Hyannis

Sponsored by: NRES-22; NRES-224; NRES-23; NRES-25;  
NRES-26; NRES-28

Moderators: Rabin Bhattarai, University of Illinois, Urbana,  
IL; Jasmeet Lamba, Auburn University, Auburn, AL

**10:20am** *Nitrogen Leaching from Central Valley Irrigated Lands: A Multi-scale Modeling Study* • Presenting author: Iael Raji Hoffman, UC Davis, Davis, CA (Thomas Harter, Isaya Kisekka) 1900803

**10:35am** *Development and Application of a Reach-Scale Model to Quantify In-Stream Nutrient Fate in a Karst Agroecosystem Stream with Bedrock Control* • Presenting author: Nolan Bunnell, University of Kentucky, Lexington, KY (William Ford, Alex Fogle, Joseph Taraba) 1900853

**10:50am** *Influence of Cover Cropping on Year-Round Measured and Modeled N<sub>2</sub>O Emissions* • Presenting author: Mary E. Foltz, University of Illinois at Urbana-Champaign, Urbana, IL (Julie Zilles, Sotiria Koloutsou-Vakakis) 1901561

**11:05am** *Comparing a Simple Carbon Nitrogen Model with Complex RZWQM Model* • Presenting author: Anupam Bhar, Iowa State University, Ames, IA (Anupam Bhar, Ratnesh Kumar, Robert Malone) 1901394

**11:20am** *Quantification of Nitrate Leaching from Almond Fields in Central Valley of California Using SWAT* • Presenting author: Sushant Mehan, Formation Environmental LLC, Sacramento, CA (George Paul, Yohannes Tadesse Yimam, John Dickey, Andrea Schmid, Timothy K. Hartz, Brian Schmid) 1900813

**11:35am** *Testing DRAINMOD-P for Predicting Surface and Subsurface Phosphorus Loss from a Subsurface-Drained Field with Cracking Soil in Northwestern Ohio* • Presenting author: Manal Askar, NC State University, Raleigh, NC (Manal H. Askar, Mohamed A. Youssef, George M. Chescheir, Kevin W. King, R. Wayne Skaggs, Ehsan Ghane) 1900693

**11:50am** *A Novel Electrohydraulic Discharge Process for Handling High-Conductivity Wastewaters* • Presenting author: Sarah Wu, University of Idaho, Moscow, ID (Sarah Wu, Anilkumar Krosuri) 1901402

## **345 Sustainability Metrics—Concept, Evaluation, and Advances**

Wednesday, July 10, 10:15am-12:15pm

Location: Boylston

Sponsored by: NRES-26; ASE-16

Moderators: Yongping Yuan; USEPA, Research Triangle  
Park, NC; Veronika Vazhnik, Idaho National Laboratory,  
Idaho Falls, ID

**10:20am** *Integrated Farming Practices and Water Quality* • Presenting author: Yongping Yuan, USEPA-Office of Research and Development, Research Triangle, NC (Wenhui Hu) 1900041

**10:35am** *Crafting an Irrigation Sustainability Framework: The case of the Northern High Plains, US* • Presenting author: Francisco Munoz-Arriola, University of Nebraska-Lincoln, Lincoln, NE (Francisco Munoz-Arriola, Gengxin Ou, Craig R. Allen, D. Martin, J. Carroll) 1901648

**10:50am** *Application of Input-Output Model in Quantifying the Food-Water-Energy Nexus in the Pacific Northwest* • Presenting author: Ganti S Murthy, Oregon State University, Corvallis, OR (Ganti S Murthy) 1901813

**11:05am** *Designing a Sustainable Eco-Efficient Food System: An Integrated Lifecycle and Data Envelopment Approach* • Presenting author: Ebenezer Kwofie, McGill University, Ste Anne-de-

# Wednesday, July 10

Bellevue, Quebec Canada (John Izuchukwu, Ebenezer Kwofie, Michael Ngadi) 1901737

**11:20am** *Virtual Water Use in Cassava Propagation and Processing in Southwestern Nigeria* • Presenting author: Temitayo Abayomi Ewemoje, University of Ibadan, Ibadan, Oyo State, Nigeria (Adegoke Eyeowa, Emmanuel Alabi, Temitayo Ewemoje) 1900600

**11:35am** *Stakeholder Mapping of Controlled Environment Agriculture Utilizing the Technological Innovation System Framework* • Presenting author: Ronald J. Smith, Purdue ABE, West Lafayette, IN (Ronald J. Smith, Robert M. Stwalley III) 1901274

**11:50am** *Emergy Analysis of a Plant-Scale Domestic Solar-Biomass Energy Supply System in Northwest China* • Presenting author: Congguang Zhang, The Ohio State University, Wooster, OH (Congguang Zhang, Jia Cheng, Jiaming Sun, Ling Qiu, Ajay Shah) 1901606

## **340 PAFS—Plant, Animal and Faculty Systems POSTER SESSION**

Wednesday, July 10, 10:15am-12:15pm

Posters will be displayed for the entire session, but authors will be present at posters as follows:

10:15am-11:15am, authors with ODD numbered posters present

11:15am-12:15PM, authors with EVEN numbered posters present

Location: Gloucester

Sponsored by: PAFS

Moderator: Tim Shepherd, Iowa State University, Ames, IA

**2** *Swine Production across the North Carolina Landscape* • Presenting author: Amanda Dean (Amanda Dean, Natalie Nelson, Lingjuan Wang-Li, Praveen Kolar, Ralph Noble, Edgar Oviedo-Rondón, Mahmoud Sharara) 1901974

**3** *Identifying Hotspots of Future Animal Climate Control Needs in the U.S.* • Presenting author: Asya Macon (Asya Macon, Mahmoud Sharara, Natalie Nelson, Praveen Kolar, Ralph Noble, Edgar Oviedo-Rondón, Lingjuan Wang-Li) 1901976

**4** *Analyzing the Post-WWII History of U.S. Animal Agriculture to Predict Future Production Trends* • Presenting author: Austin Brown (Austin Brown, Mahmoud Sharara, Edgar Oviedo-Rondón, Praveen Kolar, Natalie Nelson, Ralph Noble, Lingjuan Wang-Li) 1901975

**5** *Comparative Analysis of U.S. and Chinese Swine and Poultry Production Systems* • Presenting author: Elise Laudenslager (Elise Laudenslager, Lingjuan Wang-Li, Natalie Nelson, Praveen Kolar, Ralph Noble, Edgar Oviedo-Rondón, Mahmoud Sharara) 1901978

**6** *How do Environmental Conditions in Poultry Barns impact Poultry Performance?* • Presenting author: Gail Murray (Gail Murray, Lingjuan Wang-Li, Edgar Oviedo-Rondón, Praveen Kolar, Natalie Nelson, Ralph Noble, Mahmoud Sharara) 1901973

**7** *Analysis and Interpretation for Agricultural Wastewater Treatment Data* • Presenting author: Jasmine Gibson (Jasmine Gibson, Praveen Kolar, Mahmoud Sharara, Natalie Nelson, Ralph Noble, Edgar Oviedo-Rondón, Lingjuan Wang-Li) 1901977

**8** *Portion Type Seed Selection Device* • Presenting author: Yang Yu, China Agricultural University, Beijing China (Weishuai Liu, Binbin Zhu, Yang Yu) 1901609

**9** *Improving the Flow of Cohesive Powders Using Portable Flow Aids* • Presenting author: Karthik Salish, Purdue University, West Lafayette, IN (Karthik Salish, Kingsly Ambrose) 1900606

**10** *The Method Cooperating Multi-Factors to Evaluation the Commercial Value of Cotton in Saw-Gin Processes* • Presenting author: Wanhuai Zhou, Anhui University of Finance and Economics, Anhui China (Wanhuai Zhou, Hao Li, Houjun Liang, Shoudong Xv, Dengfei Jie) 1900213

**11** *The Quantitative Detection of Botanical Impurities Contained in Seed Cotton with Near Infrared Spectroscopy Method* • Presenting author: Wanhuai Zhou, Anhui University of Finance and Economics, Bengbu Anhui Province, China (Wanhuai Zhou, Hao Li, Shoudong Xv, Houjun Liang, Congjiu Liu, Dengfei Jie) 1900401

**12** *The Research of the Color-Level Inspection Equipment of Seed Cotton* • Presenting author: Xv Shoudong, Anhui University of Finance and Economics, Bengbu China (Shoudong Xv, Yijin Leng, Guoxin Wu) 1900400

**13** *Supplying Water Warmed by Exhaust Heat from Closed Vertical Composting Facility for Dairy Cows Part 2—Effect of Supplying Warmed Water on Milk Production* • Presenting author: Yoichiro Kojima, CARC NARO, Nasushiobara, Tochigi, Japan (Ryoh Nakakubo, Mitsuyoshi Ishida, Yoshiyuki Abe) 1900281

**14** *The Effect of Pen Surface Amendments for Reducing Greenhouse Gas Emission from Beef Feedlots* • Presenting author: Bryan Woodbury, USDA-ARS, Clay Center, NE (Bryan L. Woodbury, Mindy J. Spiels, David B. Parker) 1901904

**15** *Mechanistic Modeling of Ammonia Emission from Laying Hen Manure on a Laboratory-Scale Manure Belt* • Presenting author: Lingying Zhao, The Ohio State University, Columbus, OH (Xinjie Tong, Lingying Zhao, Albert Heber, Ji-Qin Ni) 1901332

**16** *Effect of Storage Periods on Concentration of Odor Compounds in Deep Pit Slurry* • Presenting author: Min-Woong Jung, Rural Development Administration National Institute of Animal Science, Jeollabuk-Do, Rep.Of Korea (MinWoong Jung, YuNa Jang, DeugWoo Han, GwangGon Jo) 1900897

**17** *Automatic Vaccine Injection System for Grass Carp* • Presenting author: Junyang Chen, Zhejiang University, Hangzhou, Zhejiang, China (Junyang Chen, Jianping Li, Dongdong Li, Songming Zhu) 1900340

**18** *Calibration of an Automated System to Deliver Biologics to Channel Catfish (*Ictalurus punctatus*) in Commercial Catfish Production Systems* • Presenting author: Wes Lowe, Mississippi State University, Mississippi State, MS (Ganesh Bora, Daniel Chesser Jr, Joseph Purswell, David Wise) 1901375

**19** *Liquid Desiccant Climate Control System for Greenhouses Based upon Diurnal Changes in Ambient Temperature and Humidity* • Presenting author: Ryan Lefers, King Abdullah University of Science and Technology, Thuwal, Makka, Saudi Arabia (TorOve Leiknes) 1901586

# Wednesday, July 10

**20** *Study on the Adhesion Characteristics of Particulate Matter on Greenhouse Permeable Materials* • Presenting author: Eunmi Hong, Kangwon National University, Gangwon, Korea (Won Choi, Seung-Jae Lee, Jae-Han Lee) 1901604

**21** *Design of the Chassis Copying Device for the Greenhouse Self-Propelled Car* • Presenting author: Yaohui Zhang, China Agricultural University, Beijing China (Binbin Zhu, Yang Yu, Jiannong Song, Jicheng Wang, Cailing Liu, Xiangqian Dong, Weishuai Liu, Chao Zhang) 1901734

**22** *Robotic Gantry for Automated Imaging, Sensing, Crop Input Application, and High-Throughput Analysis* • Presenting author: Alex Drozda, University of Nebraska-Lincoln, Lincoln, NE (Santosh Pitla, Harkamal Walia, Yufeng Ge, Pranav Palli) 1901519

**23** *Study on Assistant Pollination of Facility Tomato by Unmanned Aerial Vehicle* • Presenting author: Qiang Shi, Jiangsu University, Zhenjiang, Jiangsu Province, China (Qiang Shi, Hanping Mao, Xianping Guan, Mingxiong Ou) 1900055

**24** *Carbon Footprints and Sustainable Agriculture under Environmental Conditions of Prince Edward Island* • Presenting author: Rimsha Khan, University of Prince Edward Island, Charlottetown, PEI Canada (Rimsha Khan, Aitazaz Farooque, Carolyn Brown, Bishnu Acharya, Qamar Zaman) 1900484

**25** *Improving the Efficiency of a Fan-and-Pad Evaporative Cooling System in Humid Climates Using a Liquid Desiccant System* • Presenting author: Waleed Bin Masoud, University of Florida, Gainesville, FL (Melanie Correll, Xin Zhao, Wendell Porter, Herbert Ingley, Ray Bucklin) 1901542

**26** *Effect on Yield Increase and Energy Saving in Partial Heating for High-Bed Strawberries by Using an Air to Water Heat Pump* • Presenting author: Jongpil Moon, Protected Horticulture Research Institute, Hamangun, Gyeongsangnam-do, Republic of Korea (Jongpil Moon, Jinkyung Kwon, Seunghee Kim, Younkoo Kang, Seokho Park, Jaehan Lee) 1900656

**27** *Leafy Greens Grown under Variable Nutrient Solutions Using Nutrient Film Technique* • Presenting author: Sarah Van Brunt, Clemson University, Clemson, SC (Sarah Van Brunt, Jeffrey Adelberg, Tom Owino) 1901617

**28** *Infrared Proximity Measurement System Development and Validation for Classifying Sow Posture* • Presenting author: Benjamin Smith, Iowa State University, Ames, IA (Brett Ramirez, Steven Hoff) 1900327

**29** *A 2D Stick Model for Simulation of Sow Walking* • Presenting author: Xiaojie Yan, University of Manitoba, Winnipeg, Manitoba, Canada (Xiaojie Yan, Qiang Zhang, Laurie Connor, Nicolas Devillers, Kristopher Dick) 1900589

**30** *Development of Vocal Recording and Analysis System for Laying Hens Based-On Cloud-Computing* • Presenting author: Dae-Hyun Jung, KIST/Seoul National University, Gangleung, Gangwon South Korea (Dae-Hyun Jung, Soo Hyun Park, Unseok Lee, Hyung Seok Kim) 1900952

**31** *Sensor-Based Automatic Retractable Cattle Shades* • Presenting author: John K. Schueller, University of Florida, Gainesville, FL (John K. Schueller, Ray Bucklin, Luxi Zhang, Vinay Vijayakumar, Jonathan Chiputula, Emmanuel Ajayi, Waleed Bin Masoud) 1900228

**32** *Development of a Mobile App to Improve Farmer Access to Poultry Housing Decision Tools and to Maintain Records of Use* • Presenting author: Kelly Griggs, Auburn University, Auburn, AL (Jesse Campbell, Jeremiah Davis, Dennis Brothers, Jonas Bowersock, June Shin) 1901182

## **341 Bioprocess Modeling, Sustainability and Technoeconomic Analysis**

Wednesday, July 10, 10:15am-12:15pm

Location: Columbus I

Sponsored by: PRS-280; ES-220

Moderator: Sammy Sadaka, University of Arkansas, Little Rock, AR

### **10:20am Kinetic Modeling of Organic Acid Inhibition and Exchange in Genetically Engineered Microbial Consortia**

• Presenting author: Ashley Beck, North Carolina State University, Raleigh, NC (Ross Carlson) 1901320

### **10:35am Model Predictive Control of Cellulose Hydrolysis**

• Presenting author: Ganti S Murthy, Oregon State University, Corvallis, OR (Ganti S Murthy, Haider J Kadhum) 1901461

### **10:50am Hybrid Modeling and Optimization of Agrobacterium Fermentation Process**

• Presenting author: Dengfeng Liu, Jiangnan University, Wuxi, Jiangsu, China (Dengfeng Liu, Yuqian Shao, Yuan Zong, Yi-an Liu) 1900548

### **11:05am Techno-Economic Analysis of a Combined Anaerobic Digestion and Hydrothermal Carbonization System for Sewage Sludge Processing**

• Presenting author: Luis Huezo, The Ohio State University, Wooster, OH (Luis Huezo, Ajay Shah) 1901202

### **11:20am Techno-Economic Analysis of Butanol Production from Sweetpotatoes: Impacts of Feedstock Properties and Post-Harvest Processing on Production Costs**

• Presenting author: Ana Zuleta-Correa, North Carolina State University, Raleigh, NC (Ana Zuleta-Correa, Kelly D. Zering, Jose M. Bruno-Barcena, Mari S. Chinn) 1901488

### **11:35am Techno-Economic Analysis of Pennycress Conversion to Aviation Biofuel**

• Presenting author: Seyed Hashem Mousavi Avval, The Ohio State University, Wooster, OH (Ajay Shah) 1901656

### **11:50am Life Cycle Assessment of Biochar and Hydrochar Production from Anaerobic Digestion Effluent and Land Application**

• Presenting author: Juliana Vasco-Correa, Department of Food, Agricultural and Biological Engineering, The Ohio State University, Wooster, OH (Juliana Vasco-Correa, Ajay Shah) 1900808

### **12:05pm Technoeconomic Assessment of Co-Hydrothermal Carbonization of a Coal-Miscanthus Blend**

• Presenting author: Kyle McGaughy, Ohio University, Athens, OH (Akbar Saba, Kyle McGaughy, M. Toufiq Reza) 1900905

# Wednesday, July 10

## **342 System Approach to Develop Sustainable Food and Organic Wastes/Byproducts Management Solutions**

Wednesday, July 10, 10:15am-12:15pm

Location: Columbus II

Sponsored by: PRS-707

Moderator: Sarah Wu, University of Idaho, Moscow, ID

### **10:20am *Integrated Anaerobic Digestion and Hydrothermal Carbonization (iAD-HTC) System for Food and Yard Waste***

• Presenting author: Juliana Vasco-Correa, Department of Food, Agricultural and Biological Engineering, The Ohio State University, Wooster, OH (Juliana Vasco-Correa, Ajay Shah) 1900810

### **10:35am *Hydrothermal Liquefaction Value-Added Products and Compost Applications for Plant and Environmental Enhancement***

ξ • Presenting author: Hengameh Bayat, New Mexico State University, Las Cruces, NM (Emily F. Creegan, Hengameh Bayat, Ryan Zowada, Umakanta Jena, Catherine E. Brewer, Robert Flynn) 1900636

**10:50am *Valorization of Almond Co-Products Using Black Soldier Fly Larvae*** • Presenting author: Jean VanderGheynst, UC Davis, Davis, CA (Lydia Palma, Jesus Fernandez-Bayo, Ferisca Putri) 1901254

**11:05am *A Food-Energy-Water Nexus Solution to Sustainably Manage Organic Wastes*** • Presenting author: Wei Liao, Michigan State University, East Lansing, MI (Wei Liao) 1901633

## **343 Publishing in the ASABE Journals: Navigating the Publishing Process and the Future of the Journals**

### **—PANEL**

Wednesday, July 10, 10:15am-12:15pm

Location: St. Botolph

Sponsored by: ASABE

Moderator: Garey Fox, Editor-in-Chief of ASABE Journals, North Carolina State University, Raleigh, NC

Panelists: Joe Walker, ASABE Director of Publications; Kasiviswanath Muthukumarappan, South Dakota State University and Community Editor, Energy Systems; Deepak Keshwani, University of Nebraska and Community Editor, Education, Outreach, and Professional Development (EOPD)

*Meet the Editor-in-Chief, Director of Publications, and several of the Community Editors; learn about new initiatives and directions for the ASABE journals; learn how to navigate the publication process; hear best tips and tricks for getting your articles published; share your thoughts and input on the future direction of the ASABE journals.*

## **344 Autonomous Field Equipment—The Future of Standardization**

Wednesday, July 10, 2:30pm-6:30pm

Location: Suffolk

Sponsored by: MS

Moderator: Jean Walsh, ASABE Standards, St. Joseph, MI

Cost: \$30 Attendees/\$10 Students

### **2:45pm *State of Automation in Agricultural Equipment***

• Presenting author: J. Alex Thomasson, Texas A&M University, College Station, TX; Professor Craig Baillie, University of Southern Queensland, Toowoomba, Queensland, Australia 1901995

### **4:00pm *The AEF Automation Project*** • Presenting author:

Norbert Schlingmann, Agricultural Electronics Foundation (AEF), Frankfurt, Germany 1901996

# Committees to Convene

All meetings take place at the Marriott Copley Place. Subject to change. As of May 31, 2019.

## EXECUTIVE

### ASABE Board of Trustees

Sunday, July 7 10:30am-1:30pm  
Location: Regis

### ASABE Board of Trustees

Thursday, July 11 10:30am-3:00pm  
Location: Wellesley

### E-02 Constitution and Bylaws

not meeting

### E-05 Marketing and External Communications

Wednesday, July 10 2:30pm-5:00pm  
Location: Hyannis

### E-05/1 E-Week Coordinating Committee

Tuesday, July 9, 12:30pm-2:15pm  
Location: Hyannis

### E-05/2 FFA Coordinating Committee

Tuesday, July 9, 12:30pm-2:15pm  
Location: Boylston

### E-05/3 Digital Strategy

Monday, July 8, 12:15pm-2:15pm  
Location: MIT

### E-06 Foundation Liaison Committee

not meeting

### E-06/1 KEYS Fund Management Committee

not meeting

### E-06/2 Giving Back Fund

not meeting

### E-07 Issues Management & Social Action

Monday, July 8, 6:30am-7:30am  
Location: MIT

### E-08 Fellows

Monday, July 8, 12:15pm-2:15pm  
Location: Harvard

### E-20 Finance

Sunday, July 7 9:00am-10:00am  
Location: MIT

### E-20 Initiative Fund Evaluation Subcommittee

not meeting

### Editor in Chief Oversight Committee

Sunday, July 7 5:00pm-5:45pm  
Location: Provincetown

### Foundation Mission/Vision Subcommittee 2019

not meeting

### Nominating Committee

Monday, July 8, 11:00am-2:30pm  
Location: St. Botolph

### Nominating Committee

Wednesday, July 10 9:00am-12:00pm  
Location: Regis

### Strategic Partnering Task Force of BOT

Sunday, July 7 3:30pm-5:30pm  
Location: Regis

## MEETINGS COUNCIL

### Meetings Council

Sunday, July 7 1:30pm-3:30pm  
Location: Harvard

### Meetings Council

Thursday, July 11 8:00am-10:00am  
Location: Yarmouth

### Community Program Chairs

Wednesday, July 10 5:00pm-6:30pm  
Location: Regis

## MEMBERSHIP DEVELOPMENT COUNCIL

### Membership Development Council

Sunday, July 7 1:30pm-3:30pm  
Location: MIT

### Membership Development Council

Thursday, July 11 8:00am-10:00am  
Location: Orleans

### Values Growth Committee

Sunday, July 7 3:30pm-4:30pm  
Location: MIT

### M-102 Awards Coordinating

Tuesday, July 9, 8:00am-9:15am  
Location: Boylston

### M-111 John Deere/McCormick-Case Gold Medal

not meeting

### M-112 Massey-Ferguson Gold Medal

not meeting

### M-113 Engineering Concept of the Year

not meeting

### M-114 Young Researcher (New Holland)

not meeting

### M-115 Young Educator (A.W. Farrall)

not meeting

### M-116 Young Designer (Sunkist)

not meeting

### M-117 Larry W. Turner Young Extension Professional

not meeting

### M-122 Stewart Engineering Humanities

not meeting

### M-130 Sukup Global Food Security Award

not meeting

### M-131 Fellows Screening

not meeting

**M-132 Lalit & Aruna Verma Excellence in Global Engagement**

not meeting

**M-151 Henry Giese Structures & Environment**

not meeting

**M-152 ADS/Hancor Soil & Water Engineering**

not meeting

**M-154 International Food Engineering Award**

not meeting

**M-155 Gunlogson Countryside Engineering**

not meeting

**M-156 Kishida International**

not meeting

**M-157 SMV Technologies Ergonomics, Safety and Health**

not meeting

**M-158 Mayfield Cotton Engineering**

not meeting

**M-159 Award for the Advancement of Surface Irrigation**

not meeting

**M-160 Evelyn E. Rosentreter Standards Award**

not meeting

**M-161 PEI Professional Engineer of the Year**

not meeting

**M-162 Heermann Sprinkler Irrigation Award**

not meeting

**M-163 Gale A. Holloway Professional Development Award**

not meeting

**M-164 Yoerger Preprofessional Engineer of the Year Award**

not meeting

**M-166 James R. and Karen A. Gilley Academic Leadership Award**

not meeting

**M-167 Netafim Award for the Advancements in Microirrigation**

not meeting

**M-170 Historic Commemoration**

Monday, July 8, 6:30am-7:30am

Location: Brandeis

## INTERNATIONAL

**E-2050 Global Engagement**

Monday, July 8, 12:15pm-1:15pm

Location: Yarmouth

**E-2050 Executive Committee for Global Engagement**

Monday, July 8, 12:15pm-1:15pm

Location: Yarmouth

**E-2050/1 International Member Support**

not meeting

**E-2050/2 International Membership Community Support**

not meeting

**E-2050/4 Global Partners**

Monday, July 8, 11:45am-12:15pm

Location: Yarmouth

**E-2050/5 Global Conference Committee**

Monday, July 8, 1:15pm-2:00pm

Location: Yarmouth

## STUDENT ORGANIZATIONS & AWARDS

**P-120 Student Organizations**

Tuesday, July 9, 8:00am-9:15am

Location: Tufts

**P-121 G.B. Gunlogson Student Environ Design Competition**

Monday, July 8, 7:00pm-9:00pm

Location: Harvard

**P-122 Boyd-Scott Graduate Research Award**

not meeting

**P-123 K.K. Barnes Student Paper Competition**

Tuesday, July 9, 1:00pm-2:00pm

Location: Tufts

**P-124 AGCO National Student Design Competition**

not meeting

**P-126 1/4 Scale Tractor Design Competition**

not meeting

**P-127 Robotics Student Design Competition**

not meeting

**P-128 Engineering Ethics Competition Committee**

not meeting

**P-129 Student Oral/Poster Presentation Competition Committee**

not meeting

## PUBLICATIONS COUNCIL

**Publications Council**

Sunday, July 7 1:30pm-3:30pm

Location: Northeastern

**Publications Council**

Thursday, July 11 8:00am-10:00am

Location: Hyannis

**P-511 Journal Editorial Board**

Tuesday, July 9, 7:00pm-8:30pm

Location: Vineyard

**P-513 Resource Editorial Board**

Tuesday, July 9, 1:00pm-2:30pm

Location: Vineyard

**P-515 Textbooks and Monographs**

Tuesday, July 9, 8:00am-9:30am

Location: Hyannis

## STANDARDS & TECHNICAL COUNCIL

**Standards & Technical Council**

Sunday, July 7 1:30pm-3:30pm

Location: Brandeis

## **Standards & Technical Council**

Thursday, July 11 8:00am-10:00am

Location: Vineyard

### **STC-01 Standards Policy & Procedures**

not meeting

### **STC-02 International Standardization**

not meeting

## **APPLIED SCIENCE & ENGINEERING**

### **ASE-01 Applied Science and Engineering Executive**

not meeting

### **ASE-05 Publications**

not meeting

### **ASE-09 Environmental Quality Coordinating Committee**

not meeting

### **ASE-12 Forest Engineering**

Tuesday, July 9, 5:15pm-7:00pm

Location: Boylston

### **ASE-134 US TAG to ISO TC 134 Fertilizers & Soil**

#### **Conditioners**

not meeting

### **ASE-16 Engineering for Sustainability**

not meeting

## **EDUCATION, OUTREACH & PROFESSIONAL DEVELOPMENT**

### **EOPD-01 Executive/Steering**

Wednesday, July 10 6:00am-7:30am

Location: Boston University

### **EOPD-04 Refereed Publications Review and Paper**

#### **Awards**

not meeting

### **EOPD-203 Undergraduate & Graduate Instruction**

Tuesday, July 9, 5:15pm-7:00pm

Location: Salon I

### **EOPD-204 Engineering & Technology Accreditation**

Tuesday, July 9 7:30 AM - 9:15AM

Location: Northeastern

### **EOPD-205 Engineering Technology & Management**

#### **Education**

Monday, July 8, 12:15pm-2:15pm

Location: Salon J

### **EOPD-206 Ag Technology & Mgmt Curriculum Review &**

#### **Pgm Recog**

Monday, July 8, 12:15pm-2:15pm

Location: Salon J

### **EOPD-208 Extension**

Tuesday, July 9, 5:15pm-7:00pm

Location: Columbus 1

### **EOPD-210 Academic Program Administrators**

Monday, July 8, 5:00pm-5:45pm

Location: Salon J

### **EOPD-412 Professional Ethics**

Tuesday, July 9, 7:00am-8:00am

Location: Columbus 1

### **EOPD-414 Engineering Licensure**

not meeting

### **EOPD-416 Continuing Professional Development**

not meeting

## **ENERGY SYSTEMS**

### **ES-01 Energy Systems Executive**

Monday, July 8, 5:15pm-7:00pm

Location: Brandeis

### **ES-02 Energy Systems Steering**

Monday, July 8, 5:15pm-7:00pm

Location: Brandeis

### **ES-03 Energy Systems Standards Oversight**

Monday, July 8, 6:30am-7:30am

Location: Harvard

### **ES-04 Publications Review**

Tuesday, July 9, 8:00am-9:15am

Location: Boston University

### **ES-210 Renewable Power Generation**

Tuesday, July 9, 5:15pm-7:00pm

Location: Columbus II

### **ES-220 Bio-based Energy, Fuels and Products**

Tuesday, July 9, 7:00am-8:00am

Location: Salon K

### **ES-238 Solid Biofuels and US TAG for ISO TC 238**

not meeting

### **ES-255 US TAG to ISO TC255 Biogas**

not meeting

### **ES-300 Energy Utilization & Application**

Tuesday, July 9, 12:30pm-2:30pm

Location: Boston University

### **ES-310 Ag Lighting Group**

not meeting

### **ES-311 Electromagnetic Radiation Application for Plants**

Wednesday, July 10 2:45pm-5:00pm

Location: Brandeis

### **ES-330 Fan Testing**

not meeting

### **ES-340 Standby Electric Power**

not meeting

### **ES-400 Electrical Code for Agriculture**

not meeting

## **ERGONOMICS, SAFETY & HEALTH**

### **ESH-01 Ergonomics, Safety, and Health Executive/ Oversight**

not meeting

### **ESH-02 ESH Policy and Forward Planning**

Wednesday, July 10 8:00am-9:30am

Location: Wellesley

**ESH-03 Ergonomics, Safety, and Health Standards Oversight**

Tuesday, July 9, 12:30pm-2:30pm  
Location: Suffolk

**ESH-03/1 External Standard Development**

Tuesday, July 9, 12:30pm-2:30pm  
Location: Suffolk

**ESH-03/2 Internal Standard Development**

Tuesday, July 9, 12:30pm-2:30pm  
Location: Suffolk

**ESH-04 Technology Exchange**

Tuesday, July 9, 8:00am-9:15am  
Location: MIT

**ESH-04/1 Journal of Agricultural Safety and Health**

Tuesday, July 9, 8:00am-9:15am  
Location: MIT

**ESH-04/2 Farmers With Disabilities Technology Exchange**

Tuesday, July 9, 8:00am-9:15am  
Location: MIT

**ESH-05 Nominations**

not meeting

**INFORMATION TECHNOLOGY,  
SENSORS & CONTROL SYSTEMS**

**ITSC-01 ITSC Executive**

Sunday, July 7 3:30pm-5:30pm  
Location: Wellesley

**ITSC-02 ITSC Steering**

Wednesday, July 10 2:45pm-5:00pm  
Location: Yarmouth

**ITSC-04 Publications Review and Paper Awards**

Tuesday, July 9, 7:00am-8:00am  
Location: Harvard

**ITSC-06 Programs**

not meeting

**ITSC-217 Computational Methods, Simulations & Applications**

Tuesday, July 9, 5:15pm-7:00pm  
Location: Salon K

**ITSC-230 Biosensors**

Monday, July 8, 12:15pm-2:15pm  
Location: Tufts

**ITSC-254 Emerging Information Systems**

Tuesday, July 9, 12:30pm-2:30pm  
Location: MIT

**ITSC-312 Machine Vision**

Tuesday, July 9, 8:00am-9:15am  
Location: Harvard

**ITSC-318 Mechatronics & Biorobotics**

Tuesday, July 9, 7:00pm-9:00pm  
Location: Salon K

**ITSC-348 Electromagnetics & Spectroscopy**

Monday, July 8, 5:15pm-7:00pm  
Location: Northeastern

**ITSC-353 Instrumentation & Controls**

Monday, July 8, 7:00pm-9:00pm  
Location: Northeastern

**MACHINERY SYSTEMS**

**MS-01 Machinery Systems Executive**

Sunday, July 7 6:00pm-8:00pm  
Location: Suffolk

**MS-01 Machinery Systems Executive**

Wednesday, July 10 7:00am-8:00AM  
Location: Wellesley

**MS-02 Machinery Systems Steering**

Sunday, July 7 6:00pm-8:00pm  
Location: Suffolk

**MS-02 Machinery Systems Steering**

Wednesday, July 10 7:00am-8:00am  
Location: Wellesley

**MS-03 Machinery Systems Standards Oversight**

Wednesday, July 10 8:00pm-10:00pm  
Location: Suffolk

**MS-03/2 Farm Materials Handling and Transport**

not meeting

**MS-04 Publications Review**

Tuesday, July 9, 7:00am-8:00am  
Location: Brandeis

**MS-05 Nominating**

not meeting

**MS-23 & US TAG ISO/TC23**

Wednesday, July 10 6:30pm-8:00pm  
Location: Suffolk

**MS-23/14 Ag Mach.—Sym., Disp & Man & US TAG ISO TC23/SC14**

Monday, July 8, 7:00am-8:00am  
Location: Suffolk

**MS-23/19 Ag Electronics & US TAG ISO TC23/SC19**

Tuesday, July 9, 2:30pm-4:30pm  
Location: Wellesley

**MS-23/19/1 Electronics for Mobile Equipment (ISOBUS)**

not meeting

**MS-23/19/3 Electronics for Identification (Animal)**

not meeting

**MS-23/19/5 Standards for Wireless Communications in Agr.**

not meeting

**MS-23/19/8 ISO 25119 Parts 1-4 revision**

not meeting

**MS-23/2 Ag Mach.—Common Tests & US TAG ISO TC23/SC2**

Monday, July 8, 2:00pm-3:00pm  
Location: Suffolk

**MS-23/2/1 Environment Within Ag Vehicle Enclosures**

Monday, July 8, 1:00pm-2:00pm

Location: Suffolk

**MS-23/2/2 ATSC ROPS Subcommittee**

Monday, July 8, 10:00am-11:00am

Location: Suffolk

**MS-23/3 Ag Mach.—Operator Comfort & US TAG ISO TC23/SC3**

Tuesday, July 9, 10:30am-12:30pm

Location: Suffolk

**MS-23/4 Tractors and US TAG ISO TC23/SC4**

Wednesday, July 10 10:00am-12:30pm

Location: Suffolk

**MS-23/4/1 Agricultural Equipment Braking**

Tuesday, July 9, 2:30pm-4:30pm

Location: Suffolk

**MS-23/4/2 Agricultural Loaders**

not meeting

**MS-23/4/3 Lighting & Marking**

Monday, July 8, 3:30pm-5:30pm

Location: Suffolk

**MS-23/4/4 Tractor & Implement Hydraulics**

Tuesday, July 9, 7:00am-8:00am

Location: Wellesley

**MS-23/4/5 Tractor Implement Interface/PTO**

Tuesday, July 9, 8:00am-10:00am

Location: Wellesley

**MS-23/6 Application Sys & US TAG ISO TC23/SC6**

Tuesday, July 9, 4:30pm-6:30pm

Location: Suffolk

**MS-23/6/1 Liquid Materials Application**

Monday, July 8, 5:30pm-7:30pm

Location: Suffolk

**MS-23/6/2 Aviation**

Tuesday, July 9, 1:00pm-2:30pm

Location: Wellesley

**MS-23/6/3 Dry Materials**

Monday, July 8, 11:30am-1:00pm

Location: Wellesley

**MS-23/6/4 Spray Application Modeling**

Sunday, July 7 1:00pm-3:00pm

Location: Wellesley

**MS-23/6/5 Anhydrous Ammonia Application Equipment**

Monday, July 8, 1:00pm-3:00pm

Location: Wellesley

**MS-23/7 Harvest and US TAG ISO TC23/SC7**

Tuesday, July 9, 4:30pm-6:30pm

Location: Wellesley

**MS-23/7/1 Grain Harvesting**

not meeting

**MS-23/7/2 Forage & Biomass Engineering**

Monday, July 8, 5:30pm-7:30pm

Location: Wellesley

**MS-23/7/3 Cotton Engineering**

Monday, July 8, 11:00am-1:00pm

Location: Suffolk

**MS-45 Soil-Plant-Machine Dynamics**

Tuesday, July 9, 5:15pm-7:00pm

Location: Tremont

**MS-47 Distinguished Lecture Series**

not meeting

**MS-48 Specialty Crop Engineering**

Tuesday, July 9, 5:15pm-7:00pm

Location: Northeastern

**MS-49 Crop Production Systems, Machinery, and Logistics**

Tuesday, July 9, 7:00am-8:00am

Location: Suffolk

**MS-54 Precision Agriculture**

Tuesday, July 9, 9:00am-10:30am

Location: Suffolk

**MS-58 Agricultural Equipment Automation**

Monday, July 8, 9:30am-11:30am

Location: Wellesley

**MS-60 Unmanned Aerial Systems**

Tuesday, July 9, 5:15pm-7:00pm

Location: Tufts

**NATURAL RESOURCES & ENVIRONMENTAL SYSTEMS****NRES-01 NRES Executive**

Sunday, July 7 3:30pm-5:30pm

Location: Harvard

**NRES-02 NRES Steering**

Wednesday, July 10 2:45pm-5:00pm

Location: Nantucket

**NRES-03 NRES Standards Oversight**

not meeting

**NRES-03/2 US TAG for ISO TC23/SC18**

not meeting

**NRES-04 Program**

Sunday, July 7 3:30pm-5:30pm

Location: Harvard

**NRES-05 Publications Review**

not meeting

**NRES-06 Paper Awards**

not meeting

**NRES-07 Nomenclature**

not meeting

**NRES-09 Forward Planning**

Sunday, July 7 3:30pm-5:30pm

Location: Harvard

**NRES-21 Hydrology Group**

Tuesday, July 9, 8:00am-9:15am

Location: Nantucket

**NRES-22 Erosion Control Group**

Tuesday, July 9, 12:30pm-2:30pm

Location: Berkeley

**NRES-223 Erosion Control Research**

Tuesday, July 9, 12:30pm-2:30pm

Location: Berkeley

**NRES-224 Sediment and Associated Pollutants**

Tuesday, July 9, 12:30pm-2:30pm

Location: Berkeley

**NRES-225 Conservation Systems**

Tuesday, July 9, 12:30pm-2:30pm

Location: Berkeley

**NRES-23 Drainage Group**

Tuesday, July 9, 5:15pm-7:00pm

Location: Vineyard

**NRES-24 Irrigation Group**

Tuesday, July 9, 5:15pm-7:00pm

Location: Berkeley

**NRES-241 Sprinkler Irrigation**

Tuesday, July 9, 5:15pm-7:00pm

Location: Berkeley

**NRES-242 Surface Irrigation & Water Supply**

not meeting

**NRES-244 Irrigation Management**

Tuesday, July 9, 5:15pm-7:00pm

Location: Berkeley

**NRES-245 Microirrigation**

Tuesday, July 9, 5:15pm-7:00pm

Location: Berkeley

**NRES-246 Turf & Landscape Irrigation**

Tuesday, July 9, 7:00pm-9:00pm

Location: Berkeley

**NRES-25 Streams, Reservoirs, and Wetlands Group**

Tuesday, July 9, 5:15pm-7:00pm

Location: Provincetown

**NRES-251 Hydraulic Structures**

Tuesday, July 9, 5:15pm-7:00pm

Location: Provincetown

**NRES-252 Geomorphlogy, Streambank Stblty & In-Stream Processes**

Tuesday, July 9, 5:15pm-7:00pm

Location: Provincetown

**NRES-253 Riparian Zones, Floodplains, & Wetlands**

Tuesday, July 9, 5:15pm-7:00pm

Location: Provincetown

**NRES-26 Sustainable Land Resources**

Monday, July 8, 1:15pm-2:15pm

Location: Salon I

**NRES-262 Home Sewage Disposal**

not meeting

**NRES-265 Soil and Groundwater Remediation**

not meeting

**NRES-27 Ag By-products & Animal Mortality Management Systems**

Tuesday, July 9, 12:30pm-2:30pm

Location: Nantucket

**NRES-28 Ecological Engineering**

Tuesday, July 9, 8:00am-9:15am

Location: Provincetown

**PLANT, ANIMAL & FACILITY SYSTEMS****PAFS-01 Executive**

Sunday, July 7 3:30pm-5:30pm

Location: Brandeis

**PAFS-02 Steering**

Wednesday, July 10 2:45pm-5:00pm

Location: Orleans

**PAFS-03 Standards Oversight**

Wednesday, July 10 10:00am-12:00pm

Location: Tremont

**PAFS-04 Paper Awards**

not meeting

**PAFS-05 Publications Review**

not meeting

**PAFS-06 Program**

not meeting

**PAFS-07/1 Agri-Industrial Facility Design and Operation**

Monday, July 8, 12:15pm-2:15pm

Location: Falmouth

**PAFS-20 Structures Group**

Tuesday, July 9, 5:15pm-7:00pm

Location: Hyannis

**PAFS-20/4 Bulk Solids Handling and Storage**

Monday, July 8, 12:15pm-2:15pm

Location: Falmouth

**PAFS-234 Fisheries & Aquaculture**

not meeting

**PAFS-30 Plant Systems Group**

Tuesday, July 9, 12:15pm-2:15pm

Location: Falmouth

**PAFS-40 Facilities & Systems Group**

Monday, July 8, 5:15pm-7:00pm

Location: Boylston

**PAFS-403/1 Milk Handling Equipment**

not meeting

**PAFS-50 Environmental Air Quality**

Tuesday, July 9, 8:00am-9:15am

Location: Falmouth

**PROCESSING SYSTEMS****PRS-01 Processing Systems Executive & Steering**

Sunday, July 7 3:30pm-5:30pm

Location: Northeastern

**PRS-01 Processing Systems Executive & Steering**

Wednesday, July 10 2:45pm-5:00pm

Location: Falmouth

**PRS-02/2 Processing Systems Nominating**

not meeting

**PRS-03 Processing Systems Standards Oversight**

not meeting

**PRS-04 Publications**

Monday, July 8, 6:30am-7:30am

Location: Columbus I

**PRS-06 General Program**

not meeting

**PRS-280 Bioconversion and Bioprocesses**

Monday, July 8, 12:15pm-2:15pm

Location: Salon K

**PRS-293 US TAG for ISO TC 293 Feed Machinery**

not meeting

**PRS-34/17 Management Systems for Food Safety**

not meeting

**PRS-701 Physiochemical Properties of Biological Products**

Monday, July 8, 5:15pm-7:00pm

Location: Columbus II

**PRS-702 Crop & Feed Processing & Storage**

Monday, July 8, 7:00am-8:00am

Location: Salon K

**PRS-703 Food Processing**

Monday, July 8, 5:15pm-7:00pm

Location: Salon K

**PRS-707 Food & Organic Waste Management & Utilization**

Monday, July 8, 1:00pm-2:15pm

Location: Columbus II

**PROFESSIONAL ENGINEERING  
INSTITUTE**

**PEI Professional Engineers Institute**

not meeting

**OTHER COMMITTEES**

**ABET Outcomes Assessment and Updates—**

**Panel Discussion**

Sunday, July 7 1:30pm-3:30pm

Location: Nantucket

**AETC Planning Committee**

not meeting

**NRCS**

Tuesday, July 9, 7:00pm-9:00pm

Location: MIT

**USDA Agricultural Research Service All-Hands Meeting**

Sunday, July 7 6:30pm-8:30pm

Location: MIT

**X271 Revision of D271, Psychrometric Data**

not meeting

**X401 Development Group**

not meeting

**X475 Storages for Bulk, Fall-Crop Irish Potatoes**

not meeting

**SDC for X559**

not meeting

**X621 development**

not meeting

**X627 Standardized Testing Protocol for Smart  
Controllers**

not meeting

**X633 Testing Soil Moisture Sensors for Landscape  
Irrigation**

Tuesday, July 9, 7:00pm-9:00pm

Location: Berkeley

**X643 Putting Green and Sports Field Design**

not meeting

**X653 HVAC for indoor growers**

Sunday, July 7 9:00am-4:00pm

Location: Tufts

**Young Professionals Community Business Meeting**

Tuesday, July 9, 5:15pm-7:00pm

Location: Orleans