

ASABE 2020 Annual International Meeting
July 12-15, 2020
Omaha, Nebraska USA

CALL FOR ABSTRACTS

Please review this document prior to your submission. There are 123 sessions to submit to. All submitted abstracts will be evaluated and scored based on four criteria: innovation and originality, significance to the field, technical merit, and progress to completion. This multi-criteria review is designed to help session organizers select the highest quality abstracts for their session. Authors are encouraged to prepare their abstracts with these criteria in mind.

Oral presentations are not guaranteed.

ASE - Applied Science & Engineering

Session Title: *Applied Science & Engineering POSTER SESSION*
Type of Session: *Poster Technical Session*
Description of Session: *Quickly communicate findings to a broad community audience with opportunities for discussion, feedback, and networking with other scientists.*
Sponsoring Committee: *ASE-12 Forest Engineering*
Co-Sponsoring Committees: *ASE-01 POSTER SESSION*

Session Title: *Forest Harvest & Processing Machinery*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *ASE-12 Forest Engineering*
Co-Sponsoring Committees: *MS-23 & US TAG ISO/TC23*

Session Title: *Forest Roads and Streams*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *ASE-12 Forest Engineering*
Co-Sponsoring Committees: *NRES-22 Erosion Control Group, NRES-25 Streams, Reservoirs, and Wetlands Group, NRES-28 Ecological Engineering*

Session Title: *Wood-Based Carbon Materials Applications*
Type of Session: *Oral Technical Session*
Description of Session: *Application and uses of carbon materials such as biochar and activated carbon from woody biomass sources.*
Sponsoring Committee: *ASE-12 Forest Engineering*
Co-Sponsoring Committees: *ES-220 Biomass Energy & Industrial Byproducts*

Session Title: *Wood-Based Carbon Materials Production*
Type of Session: *Oral Technical Session*
Description of Session: *Production of carbon materials such as biochar from woody biomass.*
Sponsoring Committee: *ASE-12 Forest Engineering*
Co-Sponsoring Committees: *ES-220 Biomass Energy & Industrial Byproducts*

Session Title: *Woody Biomass Conversion Methods*
Type of Session: *Oral Technical Session*
Description of Session: *Conversion methods for woody biomass materials. Discussions include pyrolysis, hydrolysis, and others.*
Sponsoring Committee: *ASE-12 Forest Engineering*
Co-Sponsoring Committees: *ES-220 Biomass Energy & Industrial Byproducts*

Session Title: *Woody Materials Supply Chain and Processing*
Type of Session: *Oral Technical Session*
Description of Session: *Supply chain logistics and processing equipment and techniques for woody biomass pretreatment and feedstocks preparations.*
Sponsoring Committee: *ASE-12 Forest Engineering*
Co-Sponsoring Committees: *ES-220 Biomass Energy & Industrial Byproducts*

EOPD - Education, Outreach, & Professional Development

Session Title: *Education, Outreach, and Professional Development POSTER SESSION*
Type of Session: *Poster Technical Session*
Description of Session: *Quickly communicate findings to a broad community audience with opportunities for discussion, feedback, and networking with other scientists.*
Sponsoring Committee: *EOPD-01 POSTER SESSION*
Co-Sponsoring Committees: *EOPD-203 Undergraduate & Graduate Instruction, EOPD-205 Engineering Technology & Management Education, EOPD-206 Ag Technology & Mgmt Curriculum Review & Pgm Recog*

Session Title: *Innovations and Integration of Instruction*
Type of Session: *Oral Technical Session*
Description of Session: *This session is important for the exchange of ideas to further engineering and technology based educational programs. This session will focus on innovative and integrated instruction that address curriculum demands for undergraduate degree programs in agricultural systems technology management as well as engineering technology.*
Sponsoring Committee: *EOPD-205 Engineering Technology & Management Education*
Co-Sponsoring Committees: *EOPD-203 Undergraduate & Graduate Instruction, EOPD-206 Ag Technology & Mgmt Curriculum Review & Pgm Recog, EOPD-211 Undergraduate Engineering Prgm & Instructional Chairs*

Session Title: *Success and Failure in Teaching & Learning*
Type of Session: *Oral Technical Session*
Description of Session: *Case studies in innovating in teaching and learning, including lessons learned about what works well and where there are challenges. Presenters will be provided with a template to facilitate running this session as a series of 5-minute lightning talks, to allow plenty of time for dialogue.*
Sponsoring Committee: *EOPD-203 Undergraduate & Graduate Instruction*
Co-Sponsoring Committees: *EOPD-205 Engineering Technology & Management Education, EOPD-211 Undergraduate Engineering Prgm & Instructional Chairs*

ES - Energy Systems

Session Title: *Advanced and Drop-In Biofuels Production - Biochemical Approach*
Type of Session: *Oral Technical Session*
Description of Session: *Biochemical approaches for producing drop-in fuels.*
Sponsoring Committee: *ES-220 Biomass Energy & Industrial Products*
Co-Sponsoring Committees: *PRS-280 Bioconversion and Bioprocesses*

Session Title: *Advances in Biomass Preprocessing and Pretreatment*
Type of Session: *Oral Technical Session*
Description of Session: *Mechanical preprocessing and chemical and thermal pretreatments to improve biomass physical, chemical and energy properties for biochemical and thermochemical conversions.*
Sponsoring Committee: *ES-220 Biomass Energy & Industrial Products*
Co-Sponsoring Committees: *MS-23/7/2 Forage & Biomass Engineering, ASE-12 Forest Engineering*

Session Title: *Biomass Bulk Flow Properties Measurement, Modeling, and Application*
Type of Session: *Oral Technical Session*
Description of Session: *Improved engineering data and methods are needed to support the design and operation of reliable, cost effective, continuous feeding of biomass feedstocks into process equipment at biorefineries and other bio-products facilities.*
Sponsoring Committee: *ES-220 Biomass Energy & Industrial Products*
Co-Sponsoring Committees: *PAFS-20/4 Bulk Solids Handling and Storage, PRS-701 Physical Properties of Ag & Biological Products, PRS-702 Crop & Feed Processing & Storage*

Session Title: *Biomass Feedstock Supply Logistics and Modeling*
Type of Session: *Oral Technical Session*
Description of Session: *Biomass harvest, collection, preprocessing, handling, transport, and supply chain interactions from field to factory. Field activities as well as mathematical modeling of these processes.*

Sponsoring Committee: *ES-220 Biomass Energy & Industrial Products*
Co-Sponsoring Committees: *MS-23/7/2 Forage & Biomass Engineering, ASE-12 Forest Engineering*

Session Title: *Energy Systems POSTER SESSION*
Type of Session: *Poster Technical Session*
Description of Session: *This session invites posters related to biomass logistics, conversion to biofuels and bioproducts and techno-economic and lifecycle analyses. Quickly communicate findings to a broad community audience with opportunities for discussion, feedback, and networking with other scientists.*

Sponsoring Committee: *ES-01 POSTER SESSION*
Co-Sponsoring Committees: *MS-23/7/2 Forage & Biomass Engineering, PRS-701 Physical Properties of Ag & Biological Products, ASE-12 Forest Engineering, ES-220 Biomass Energy & Industrial Byproducts*

Session Title: *Energy Utilization and Lighting for Plants and Agricultural Facilities*
Type of Session: *Oral Technical Session*
Description of Session: *This session is looking for papers on agricultural energy use, energy benchmarks, applications of equipment to reduce energy consumption, energy efficient lighting systems and the effects of management decisions on energy consumption. This could include animal agriculture, processing of agricultural commodities, grain drying, cooling and cold storage of produce, field operations, controlled environment agriculture, etc.*

Sponsoring Committee: *ES-300 Electrical Utilization & Energy Apps*
Co-Sponsoring Committees: *PAFS-30 Plant Systems Group, ES-310 Ag Lighting Group, ES-311 Plant Growth LED Lighting*

Session Title: *Production, Processing, and Conversion of Algae*
Type of Session: *Oral Technical Session*
Description of Session: *Cultivation (open raceway, photobioreactors, marine land), harvesting, drying (low temperature drying, solar vs thermal drying), processing (protein/lipid extraction) and conversion (pelleting, liquefaction, anaerobic digestion etc.) of micro and macro algae for biofuels and non-food/feed applications.*

Sponsoring Committee: *ES-220 Biomass Energy & Industrial Products*
Co-Sponsoring Committees: *PRS-280 Bioconversion and Bioprocesses*

Session Title: *Renewable Energy Resources and Technologies*
Type of Session: *Oral Technical Session*
Description of Session: *Achievements and improvements (e.g. efficiency, cost) of current renewable energy resources and technologies including solar, wind, biomass, hydro, etc.*

Sponsoring Committee: *ES-210 Renewable Power Generation Committee*
Co-Sponsoring Committees: *NONE*

Session Title: *Techno-Economic and Life Cycle Assessment of Biomass Conversion*
Type of Session: *Oral Technical Session*
Description of Session: *This session invites abstracts dealing with sustainability analysis using process modeling or life cycle assessment of agricultural and bioenergy systems, including production of biofuels, energy, bio-products, bio-feedstocks. Abstracts related to LCA methodologies and assumptions affecting the results are also welcomed.*
Sponsoring Committee: *ES-220 Biomass Energy & Industrial Products*
Co-Sponsoring Committees: *PRS-280 Bioconversion and Bioprocesses*

Session Title: *Thermochemical Conversions of Biomass*
Type of Session: *Oral Technical Session*
Description of Session: *Catalytic and thermochemical conversion of biomass to fuels, intermediate products and/or chemicals via processes such as torrefaction, pyrolysis, gasification and liquifaction.*
Sponsoring Committee: *ES-220 Biomass Energy & Industrial Products*
Co-Sponsoring Committees: *NONE*

Session Title: *Value-Added Chemicals and Lignin Valorization*
Type of Session: *Oral Technical Session*
Description of Session: *Value-added chemicals and products from biobased resources through biochemical, catalytic, thermochemical and hybrid conversion routes.*
Sponsoring Committee: *ES-220 Biomass Energy & Industrial Products*
Co-Sponsoring Committees: *NONE*

ESH - Ergonomics, Safety & Health

Session Title: *Ergonomics, Safety and Health POSTER SESSION*
Type of Session: *Poster Technical Session*
Description of Session: *This session will highlight programmatic efforts in the areas of ergonomics, safety and health. This session will provide a platform to facilitate collaboration and discussion regarding engineering innovations, training programs, and program evaluations.*
Sponsoring Committee: *ESH-01 POSTER SESSION*
Co-Sponsoring Committees: *ESH-03 Standards, ESH-04/1 Journal of Agricultural Safety and Health, ESH-04/2 Farmers With Disabilities Technology Exchange*

Session Title: *Innovations and Strategies for Agricultural Safety and Health*
Type of Session: *Oral Technical Session*
Description of Session: *Presentations will focus on development or evaluation of workplace safety systems. Session topics may include applied theory, evaluation of product safety, training evaluation or methods that optimize safety and human well-being within the context of agricultural, food, and energy production systems.*

Sponsoring Committee: *ESH-04 Technology Exchange*
Co-Sponsoring Committees: *EOPD-205 Engineering Technology & Management Education, EOPD-208 Extension, ESH-03 Standards, ESH-03/1 External Standard Development, ESH-03/2 Internal Standard Development, ESH-04/2 Farmers With Disabilities Technology Exchange*

Session Title: *Strategies and Considerations for Safety Programming in Agriculture*
Type of Session: *Oral Technical Session*
Description of Session: *Presentations will focus on development and evaluation of safety programming and communication strategies in agriculture. Topics may focus on but not limited to special populations (youth, aging operators, women in agriculture, underrepresented populations, etc.), interdisciplinary approaches, injury and fatality surveillance efforts, or technology developments.*

Sponsoring Committee: *ESH-04 Technology Exchange*
Co-Sponsoring Committees: *EOPD-205 Engineering Technology & Management Education, EOPD-208 Extension, ESH-03 Standards, ESH-04/1 Journal of Agricultural Safety and Health, ESH-04/2 Farmers With Disabilities Technology Exchange*

ITSC - Information Technology, Sensors & Control Systems

Session Title: *3D Machine Vision for Sensing and Automation*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *ITSC-312 Machine Vision*
Co-Sponsoring Committees: *NONE*

Session Title: *Advanced Computational Approaches for Solving Agricultural and Biological Engineering Problems*
Type of Session: *Oral Technical Session*
Description of Session: *This session has increased in number of submission and attendance marking it as an area of interest in our field.*
Sponsoring Committee: *ITSC-217 Computational Methods, Simulations & Applications*
Co-Sponsoring Committees: *NONE*

Session Title: *Apps in Agricultural Applications*
Type of Session: *Oral Technical Session*
Description of Session: *This session is for apps for mobile devices that have been developed for agricultural applications. Most presentations on this topic may also be suitable in another technical session closely related to the subject addressed by the app. This session is particularly focused on novel and unusual applications and new techniques for implementing apps. Presentations in this session*

should be valuable for any other expert developing agricultural apps regardless of particular target subjects.

Sponsoring Committee: *ITSC-254 Emerging Information Systems*
Co-Sponsoring Committees: *NONE*

Session Title: *Big Data and Data Science for Precision Agriculture*
Type of Session: *Oral Technical Session*
Description of Session: *Precision agriculture, which aims at producing sustainable production through precise and resource-efficient farming decisions, is driving revolution in agriculture. Big data from various sensors and platforms, brings both challenges and opportunities for precision agriculture. With the advance of data science, big data analysis approaches have been applied in different agricultural applications, such as crop health monitoring, soil mapping, yield prediction, plant phenotyping, and so on. This session will focus on showcasing research methodologies and applications for the use of Big Data for precision agricultural applications. We invite you to share findings throughout the chain of data collection, storage, transfer, transformation, analytics and discuss how to achieve the goal of more productive and sustainable agriculture production.*

Sponsoring Committee: *ITSC-254 Emerging Information Systems*
Co-Sponsoring Committees: *NONE*

Session Title: *Biosensors for Food and Agriculture – Issues for Practical Deployment*
Type of Session: *Oral Technical Session*
Description of Session: *Several biosensor technologies have reached the commercialization stage. However, such technologies have not reached their expected potential in food and agriculture. This session focuses on current efforts to bridge laboratory research to practical applications. This session welcomes papers that shed light in to the issues that currently prevent biosensor commercialization such as sample pre-treatments, miniaturization, stabilization, and portability of biosensors for food and agriculture. Submissions are encouraged to address strategies to address these issues.*

Sponsoring Committee: *ITSC-230 Biosensors*
Co-Sponsoring Committees: *PRS-703 Food Processing, ITSC-353 Instrumentation & Controls*

Session Title: *Cloud Computing and Internet of Things in Agriculture*
Type of Session: *Oral Technical Session*
Description of Session: *Precision agriculture involves using technology and data to observe, measure, and respond to site-specific conditions when making decisions. Precision agriculture applications have seen continued research on and adoption of internet connectivity solutions to better utilize input resources and measure ongoing processes. This session will focus the internet of things (IoT) and*

cloud computing technologies in agriculture, spanning all aspects including the physical, connectivity, and computing (cloud and edge) resources. These technologies will continue to be important tools to engage suppliers, farmers, technicians, distributors, merchants, and consumers in the analysis and decision making pipeline for agriculture.

Sponsoring Committee: *ITSC-254 Emerging Information Systems*

Co-Sponsoring Committees: *ITSC-217 Computational Methods, Simulations & Applications*

Session Title: *Computational Fluid Dynamics (CFD) Applications in Agriculture*

Type of Session: *Oral Technical Session*

Description of Session: *Computational Fluid Dynamics is an increasingly important topic in Agriculture answering a wide range of problems from animal housing to greenhouses and pneumatic equipment design. Additionally, the number of submissions has increased in past years.*

Sponsoring Committee: *ITSC-217 Computational Methods, Simulations & Applications*

Co-Sponsoring Committees: *NONE*

Session Title: *Dielectric Properties and Sensing Applications*

Type of Session: *Oral Technical Session*

Description of Session: *Description not provided*

Sponsoring Committee: *ITSC-348 Electromagnetics & Spectroscopy*

Co-Sponsoring Committees: *PRS-701 Physical Properties of Ag & Biological Products, PRS-703 Food Processing*

Session Title: *Discrete Element Modelling (DEM) Applications in Agriculture*

Type of Session: *Oral Technical Session*

Description of Session: *Submissions and attendance to these session have increased since its introduction a few years ago.*

Sponsoring Committee: *ITSC-217 Computational Methods, Simulations & Applications*

Co-Sponsoring Committees: *NONE*

Session Title: *Emerging Biological Sensing Technology in Food, Agriculture, and Animal Health*

Type of Session: *Oral Technical Session*

Description of Session: *Whether a new plant or animal pathogen emerges, a new cultivar is produced, or a new pesticide is introduced into the market, it is critical to develop biological sensing devices to monitor and control arising changes that challenge our food supply. This session brings together experts in novel materials and technologies for biological sensing including nano-scale-enabled sensors, biomimetic sensors, novel applications of portable wireless technologies for in-field applications, and new sensor architectures. Research showing proof-of-concept results and novel applications of biological sensing to food, agriculture and animal health are encouraged.*

Sponsoring Committee: *ITSC-230 Biosensors*
Co-Sponsoring Committees: *PRS-703 Food Processing, ITSC-353 Instrumentation & Controls*

Session Title: *Hyperspectral Imaging Advances & Applications*
Type of Session: *Oral Technical Session*
Description of Session: *Hyperspectral Imaging is evolving rapidly from a typical bench top equipment to the portable field units. Several advances in instrumentation configurations, optics and data acquisition has added momentum to its meaningful applications in agricultural production management. This session is thus critical for providing the opportunity to the domain experts to share pertinent advances to the ASABE community.*

Sponsoring Committee: *ITSC-348 Electromagnetics & Spectroscopy*
Co-Sponsoring Committees: *NONE*

Session Title: *Imaging Technologies for High Throughput Phenotyping*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *ITSC-312 Machine Vision*
Co-Sponsoring Committees: *MS-48 Specialty Crop Engineering, ITSC-348 Electromagnetics & Spectroscopy*

Session Title: *Information Technology, Sensors & Control Systems POSTER SESSION*
Type of Session: *Poster Technical Session*
Description of Session: *Quickly communicate findings to a broad community audience with opportunities for discussion, feedback, and networking with other scientists.*
Sponsoring Committee: *ITSC-01 POSTER SESSION*
Co-Sponsoring Committees: *NONE*

Session Title: *Machine Vision Applications in Agriculture and Food*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *ITSC-312 Machine Vision*
Co-Sponsoring Committees: *NONE*

Session Title: *Machine Vision Applications in Vegetables and Fruits*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *ITSC-312 Machine Vision*
Co-Sponsoring Committees: *NONE*

Session Title: *Machine Vision for Precision Agriculture and Robotics*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*

Sponsoring Committee: *ITSC-312 Machine Vision*
Co-Sponsoring Committees: *MS-54 Precision Agriculture*

Session Title: *Robotics and Co-Robotics for Agriculture*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *ITSC-318 Mechatronics & Biorobotics*
Co-Sponsoring Committees: *NONE*

Session Title: *Spectroscopic Sensing and Imaging*
Type of Session: *Oral Technical Session*
Description of Session: *Large domain experts are working on making relevant advances in terms of developing and applying spectroscopic sensing and imaging technologies for biotic and abiotic crop stressors as well as produce quality/spoilage detection. This session provides a platform where such research is shared to the ASABE community.*
Sponsoring Committee: *ITSC-348 Electromagnetics & Spectroscopy*
Co-Sponsoring Committees: *NONE*

Session Title: *Tools and Technologies for High Throughput Phenotyping*
Type of Session: *Oral Technical Session*
Description of Session: *Tools and technological needs for high throughput phenotyping of row, field and tree fruit crops vary greatly. Besides traditional machine vision approaches, researchers are developing novel ground (IoT enabled) and aerial platforms, mobile spectral sensing and imaging tools and pertinent data mining algorithms, cloud computing as well as real time data visualization techniques. This session is thus critical for the relevant domain experts/researchers to get together and share their findings/advances.*
Sponsoring Committee: *ITSC-318 Mechatronics & Biorobotics*
Co-Sponsoring Committees: *MS-60 Unmanned Aerial Systems, ITSC-254 Emerging Information Systems*

Session Title: *UAV for Sensing, Imaging, Agricultural, and Aquaculture Applications*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *ITSC-318 Mechatronics & Biorobotics*
Co-Sponsoring Committees: *NONE*

MS - Machinery Systems

Session Title: *Automated Agricultural Field Machinery Data Collection, Analysis, and Utilization*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *MS-58 Agricultural Equipment Automation*

Co-Sponsoring Committees: *MS-54 Precision Agriculture, ITSC-254 Emerging Information Systems, ITSC-318 Mechatronics & Biorobotics*

Session Title: *Automation Systems for Agricultural Field Machinery*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *MS-58 Agricultural Equipment Automation*
Co-Sponsoring Committees: *MS-54 Precision Agriculture, ITSC-254 Emerging Information Systems, ITSC-318 Mechatronics & Biorobotics*

Session Title: *Automation, Robotics, and AI for Vegetable, Fruit and Other Specialty Crops*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *MS-48 Specialty Crop Engineering*
Co-Sponsoring Committees: *NONE*

Session Title: *Cotton Engineering*
Type of Session: *Oral Technical Session*
Description of Session: *Technical engineering work related to cotton production, harvesting, ginning, and utilization as related to Committee MS 23/7/3*
Sponsoring Committee: *MS-23/7/3 Cotton Engineering*
Co-Sponsoring Committees: *MS-23/7/3 Cotton Engineering, MS-49 Crop Production Systems, Machinery, and Logistics, MS-54 Precision Agriculture, PRS-701 Physical Properties of Ag & Biological Products, MS-01 POSTER SESSION, MS-23 & US TAG ISO/TC23*

Session Title: *Crop and Soil Sensing*
Type of Session: *Oral Technical Session*
Description of Session: *Topics involving sensing of soil properties, and crop growth/health characteristics*
Sponsoring Committee: *MS-54 Precision Agriculture*
Co-Sponsoring Committees: *MS-60 Unmanned Aerial Systems*

Session Title: *Data Management in Precision Agriculture*
Type of Session: *Oral Technical Session*
Description of Session: *Data collection, methods, analysis, prescription, and decision support for precision ag implementation in ag production.*
Sponsoring Committee: *MS-54 Precision Agriculture*
Co-Sponsoring Committees: *NONE*

Session Title: *Engineering for Hemp Production*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *MS-48 Specialty Crop Engineering*

Co-Sponsoring Committees: *PAFS-30 Plant Systems Group*

Session Title: *Innovations Applied to Chemical and Fertilizer Application*
Type of Session: *Oral Technical Session*
Description of Session: *Nutrient management (along with chemical drift) are key topics for the society. advancement in application of nutrients is important for the society to move toward meeting goals for water quality while maintaining productivity in production agriculture.*
Sponsoring Committee: *MS-23/6 Application Sys & US TAG ISO TC23/SC6*
Co-Sponsoring Committees: *MS-54 Precision Agriculture*

Session Title: *Innovations in Precision Agriculture*
Type of Session: *Oral Technical Session*
Description of Session: *Innovation around precision agriculture technology, systems, and practices to enhance productivity, efficiency, and profitability.*
Sponsoring Committee: *MS-54 Precision Agriculture*
Co-Sponsoring Committees: *NONE*

Session Title: *Machinery Data & Task Optimization*
Type of Session: *Oral Technical Session*
Description of Session: *This session covers a broad range of topics pertinent to the MS-49: Crop Production Systems, Machinery, and Logistics Committee. Different topics fall under this title that allow for presentations related to engine performance, machinery/crop interactions, and machinery logistics that are pertinent to the current machinery systems research landscape.*
Sponsoring Committee: *MS-49 Crop Production Systems, Machinery, and Logistics*
Co-Sponsoring Committees: *MS-45 Soil-Plant-Machine Dynamics, MS-58 Agricultural Equipment Automation*

Session Title: *Pesticide and Fertilizer Applications Technology, Formulations, and Environmental Effects*
Type of Session: *Oral Technical Session*
Description of Session: *Spray drift and off target movement of chemicals/nutrients is a topic of interest in the society. Many researchers and companies are working on advancements in this space, all the way to weed identification and application by plant species. Continuing the dialog on engagement between chemical/nutrient industry and the application process is important to provide complete system solutions. This is an area the society can grow membership and engagement with others.*
Sponsoring Committee: *MS-23/6 Application Sys & US TAG ISO TC23/SC6*
Co-Sponsoring Committees: *MS-54 Precision Agriculture*

Session Title: *Precision Aerial Spray Applications: UAV/Drones and Manned Aircraft*
Type of Session: *Oral Technical Session*

Description of Session: *Increase use of drones globally for the use of spray application makes this a relevant topic. There is a good body of research happening in the USA to support allowing such application technologies.*

Sponsoring Committee: *MS-23/6/2 Aviation*

Co-Sponsoring Committees: *MS-54 Precision Agriculture, MS-60 Unmanned Aerial Systems*

Session Title: *Precision Agricultural Utilization in Chemical and Fertilizer Applications*

Type of Session: *Oral Technical Session*

Description of Session: *Technology advancement in spray applications is growing in importance as chemical restrictions increase and dialog on off target movement is continuing.*

Sponsoring Committee: *MS-23/6 Application Sys & US TAG ISO TC23/SC6*

Co-Sponsoring Committees: *MS-54 Precision Agriculture*

Session Title: *Precision Application of Chemicals and Fertilizers*

Type of Session: *Oral Technical Session*

Description of Session: *Sensing, automation, technologies, systems, and practices to enhance the accuracy and precision of precision of chemical and fertilizers*

Sponsoring Committee: *MS-54 Precision Agriculture*

Co-Sponsoring Committees: *NONE*

Session Title: *Machinery Systems POSTER SESSION*

Type of Session: *Poster Technical Session*

Description of Session: *Quickly communicate findings to a broad community audience with opportunities for discussion, feedback, and networking with other scientists.*

Sponsoring Committee: *MS-48 Specialty Crop Engineering*

Co-Sponsoring Committees: *NONE*

Session Title: *UAVs in Precision Agriculture*

Type of Session: *Oral Technical Session*

Description of Session: *UAVs are currently a major research topic in agricultural research. They can provide remotely sensed imagery for precision agriculture as well as potentially precision application of inputs.*

Sponsoring Committee: *MS-60 Unmanned Aerial Systems*

Co-Sponsoring Committees: *MS-54 Precision Agriculture, ITSC-312 Machine Vision*

NRES - Natural Resources & Environmental Systems

Session Title: *Advanced Watershed Analytics and Applications of Machine Learning in Water Resources*

Type of Session: *Oral Technical Session*

Description of Session: *This session welcomes presentations demonstrating applications of data analytics, machine learning, and artificial intelligence to the*

study and management of water resources, with water resources including surface, ground, and coastal waters. Presentations may include descriptions of case studies demonstrating the use of analytics and machine learning for water quality/quantity analysis and decision-making, new data analytic approaches and platforms for working with "big" water data, and data-driven methods for predicting and forecasting key hydrologic responses. Applications may span agricultural, urban, and environmental waters.

Sponsoring Committee: *NRES-21 Hydrology Group*
Co-Sponsoring Committees: *NRES-28 Ecological Engineering*

Session Title: *Advances in Agrohydrology: Challenges and Opportunities*
Type of Session: *Oral Technical Session*
Description of Session: *Growing more food with less water while also improving soil health and water quality is a leading multi-disciplinary challenge in the present era of limited water resources. Adaptation of management strategies are the key to addressing these myriad challenges. In this session, we address both science and policy issues related to management practices and their potential impacts on hydrological environment, crop yield, soil health and agro-economy. Potential topics include (but are not limited to): (i) implementation of new technologies, tools, and big data (e.g. remote sensing, machine learning) to improve water management, (ii) soil-water management strategies including deficit irrigation, precision agriculture, managed aquifer recharge, tillage and cover crop management, (iii) applications of agrohydrological models, (iv) sediment and nutrient transport from agricultural watersheds, and (v) socio-economic aspects of agrohydrology.*

Sponsoring Committee: *NRES-21 Hydrology Group*
Co-Sponsoring Committees: *NRES-22 Erosion Control Group, NRES-24 Irrigation Group*

Session Title: *Advances in Aquacultural Engineering*
Type of Session: *Oral Technical Session*
Description of Session: *Focus on advances in equipment, methodology, resource efficiency including water, energy, and nutrients in aquaculture systems; value-added cultured seafood; bioprocess engineering in aquatic systems and related work in aquacultural engineering.*

Sponsoring Committee: *NRES-28 Ecological Engineering*
Co-Sponsoring Committees: *NONE*

Session Title: *Advances in Curve Number Based or other Approaches for Runoff Rate and Volume Estimations*
Type of Session: *Oral Technical Session*
Description of Session: *The session would welcome presentations featuring runoff rates and volumes in rural or urban settings. Urban, agricultural, forest, or other best management practices linked to curve number selection would be germane to the proposed session.*

Comparisons or contrasts with other runoff related hydrology approaches would also be welcome.

Sponsoring Committee: *NRES-21 Hydrology Group*
Co-Sponsoring Committees: *ASCE-EWRI*

Session Title: *Advances in Drainage Design, Monitoring, and Modeling*
Type of Session: *Oral Technical Session*
Description of Session: *"With the increased importance of soil drainage in agricultural landscapes, there is growing interest in design, monitoring and modeling of drainage systems in agricultural (and in some cases non-agricultural) landscapes. The field of drainage research is constantly evolving with several major advances in recent years. This session invites presentation topics that advance the science of drainage research and enhance our understanding of the topic in general. Authors are encouraged to submit presentations based on (but not limited to) the following topics: • Modeling of surface and/or subsurface drainage systems • Innovative approaches to simulate the underlying physical, chemical, or biological processes in agricultural drainage systems (e.g. hydraulics, hydrology, water quality, crop response, soil salinity) • Improvements or enhancements of existing models for better representation of drainage processes"*

Sponsoring Committee: *NRES-23 Drainage Group*
Co-Sponsoring Committees: *NONE*

Session Title: *Advances in Drainage Water Quality: Honoring the Career of Dr. Dan Jaynes*
Type of Session: *Hybrid Session-submitted abstracts and invited speakers*
Description of Session: *This session will honor the career of Dr. Dan Jaynes, USDA-ARS. Dan has been a leader in studying the impacts of agricultural management practices on drainage water quality. This has included studies of 4R nitrogen management, cover crops, and edge-of-field practices. This session will highlight some of his impacts in these areas and how his work has helped to further advance our understanding of drainage water quality.*

Sponsoring Committee: *NRES-23 Drainage Group*
Co-Sponsoring Committees: *NONE*

Session Title: *Advances in Irrigation Management in the Context of Climate Change and Constrained Water Supply*
Type of Session: *Oral Technical Session*
Description of Session: *Improved irrigation management is needed to reduce water withdrawals or to improve yields when supplied with a limited amount of water. Advances in irrigation management range from crop and root zone sensors to complex decision support systems. Irrigation management is also impacted by long-term changes in the amount and distribution of annual precipitation.*

Sponsoring Committee: *NRES-244 Irrigation Management*

Co-Sponsoring Committees: *NRES-241 Sprinkler Irrigation, NRES-242 Surface Irrigation & Water Supply*

Session Title: *Advances in Micro Irrigation*
Type of Session: *Oral Technical Session*
Description of Session: *Micro irrigation can provide reduced losses compared to surface or sprinkler irrigation, and can effectively irrigate a wide range of field sizes, shapes, and topographies. Advancements include both micro irrigation systems as well as micro irrigation management.*
Sponsoring Committee: *NRES-245 Microirrigation*
Co-Sponsoring Committees: *NONE*

Session Title: *Anaerobic Digestion*
Type of Session: *Oral Technical Session*
Description of Session: *This session invites research proposals on anaerobic digestion of all materials. Process design and innovation, gas cleaning, gas utilization, and economics of the process.*
Sponsoring Committee: *NRES-27 Ag Byproducts & Animal Mortality Systems*
Co-Sponsoring Committees: *PRS-707 Food & Organic Waste Management & Utilization*

Session Title: *Barriers and Opportunities of Adoption of Manure Management*
Type of Session: *Oral Technical Session*
Description of Session: *This session encourages work that incorporates areas of social science with fundamental science as it explores the challenges of utilizing animal manure.*
Sponsoring Committee: *NRES-27 Ag Byproducts & Animal Mortality Systems*
Co-Sponsoring Committees: *NONE*

Session Title: *Bridging Social and Physical Sciences to Achieve Water, Energy, and Food SDGs*
Type of Session: *Hybrid Session-submitted abstracts and invited speakers*
Description of Session: *This session focuses on unlocking new potential for addressing interconnected resource challenges through bridging accumulated experiences in modelling interconnections between resource systems with theories in social science and their application. Panel members use pilot implementation projects from several Water-Energy-Food Nexus hotspots globally. They will share lessons learned, regarding the modelling and quantitative analysis of interlinkages, as well as the use of relevant social theories in achieving potential convergence and increasing stakeholder understanding of the trade-offs associated with resource allocation and consumption. Shared research and experiences will contribute to our efforts to operationalize WEF nexus research toward Sustainable Development Goal implementation. Documentation will include a white paper that summarizes the discussions and identifies the session's conclusions and recommendations.*

Sponsoring Committee: *NRES-21 Hydrology Group*
Co-Sponsoring Committees: *NONE*

Session Title: *Conservation Practice Implementation*
Type of Session: *Oral Technical Session*
Description of Session: *This session invites presentations on the application and field implementation of conservation practices and conservation practice standards, either individually or as systems, designed to address natural resource concerns on field sites. Applications can be at the field or watershed scale and include success stories, qualitative practice advantages and disadvantages, and/or implementation/application challenges.*

Sponsoring Committee: *NRES-22 Erosion Control Group*
Co-Sponsoring Committees: *NRES-225 Conservation Systems*

Session Title: *Constructed Treatment Wetlands in Agroecosystems*
Type of Session: *Hybrid Session-submitted abstracts and invited speakers*
Description of Session: *This session will provide an update on the current state of the science and practice of constructed treatment in wetlands in agroecosystems.*

Sponsoring Committee: *NRES-253 Riparian Zones, Floodplains, & Wetlands*
Co-Sponsoring Committees: *NRES-28 Ecological Engineering*

Session Title: *Ecological Engineering Applications*
Type of Session: *Hybrid Session-submitted abstracts and invited speakers*
Description of Session: *Ecological engineering, defined as - the design or restoration of sustainable ecosystems for mutual benefit of human and environment, is increasingly being utilized to solve diverse environmental problems that the society is facing. The key components of ecological engineering include i) integration of nature into solutions, ii) design of ecosystems, and iii) benefit both human and the environment. This session welcomes abstracts for oral or poster presentation in any topics that transects one or more of the key components of ecological engineering at all scales ranging from laboratory to the field studies. The topics include but are not limited to phytoremediation, green infrastructure, low impact development, lake restoration, wetlands and stream restoration, coastal restoration, treatment wetlands, ecosystem services, modeling socio-environmental systems, ecological monitoring, and low-cost waste treatment techniques.*

Sponsoring Committee: *NRES-28 Ecological Engineering*
Co-Sponsoring Committees: *NONE*

Session Title: *Edge of Field Practices for Nutrient Loss Reduction in Drained Landscapes*
Type of Session: *Oral Technical Session*

Description of Session: *Edge of field practices are becoming increasingly looked upon to reduce downstream nutrient loss in drained landscapes through the US and internationally. This session will present up to date research on performance and design of these systems.*

Sponsoring Committee: *NRES-23 Drainage Group*

Co-Sponsoring Committees: *NONE*

Session Title: *Emerging Contaminants, Pathogens, and Antibiotic Resistance*

Type of Session: *Oral Technical Session*

Description of Session: *Waterborne pathogens and emerging contaminants are growing concern for public health, water reuse, and microbial adaptation. Therefore, this session invites speakers to present work from laboratory and field scale projects that have investigated fate and transport and/or ecological and human health impacts of waterborne pathogens and emerging contaminants (i.e. pharmaceuticals, personal care products (PCPs), endocrine disrupting compounds (EDCs)).*

Sponsoring Committee: *NRES-28 Ecological Engineering*

Co-Sponsoring Committees: *NONE*

Session Title: *Erosion Control Research and Case Studies*

Type of Session: *Oral Technical Session*

Description of Session: *This session invites presentations on soil erosion research, including soil erosion by water or wind mechanics, soil erosion prediction technologies and model development, and soil erosion control methods. Erosion control research may be related to agricultural, forested, urban, or other areas where soil detachment by water or wind is prevalent and causing on-site and/or off-site problems. Case studies may encompass project examples designed to treat sheet, concentrated flow, and wave induced erosion on hillsides, channels, and shores in the landscape.*

Sponsoring Committee: *NRES-22 Erosion Control Group*

Co-Sponsoring Committees: *NRES-223 Erosion Control Research*

Session Title: *Erosion and Water Quality in Streams and Wetlands*

Type of Session: *Hybrid Session-submitted abstracts and invited speakers*

Description of Session: *Session will feature latest erosion and water quality research in riparian systems.*

Sponsoring Committee: *NRES-252 Geomorphology, Streambank Stability & In-Stream Processes*

Co-Sponsoring Committees: *NRES-21 Hydrology Group, NRES-22 Erosion Control Group, NRES-28 Ecological Engineering*

Session Title: *Evapotranspiration Measurement and Modeling*

Type of Session: *Hybrid Session-submitted abstracts and invited speakers*

Description of Session: *Evapotranspiration (ET) is one of the major hydrologic processes regulating the water balance on the earth. Therefore, hydrologists,*

engineers, soil scientists, agronomists, atmospheric scientists and environmental scientists all require accurate evapotra
Sponsoring Committee: NRES-24 Irrigation Group
Co-Sponsoring Committees: NRES-21 Hydrology Group

Session Title: *Extreme Climatic Events: Science, Impact Analysis and Management of Natural Resources*
Type of Session: *Hybrid Session-submitted abstracts and invited speakers*
Description of Session: *To enhance our understanding of natural resource systems sustainability, better management of freshwater and land resources is needed to mitigate effects of extreme events under changing climatic and land use conditions and increasing demands of natural resources. Submissions are invited on: (i) development of strategies for better managing freshwater (quantity and quality) and land resources to mitigate effects of droughts and floods, (ii) enhancing reliability and resiliency of agriculture and water resources systems under droughts and floods, (iii) incorporating uncertainty in decision making under extreme events, and (iv) new approaches and techniques that can improve management of water quantity and quality, agricultural practices and ecosystem services under extreme events.*
Sponsoring Committee: *NRES-26 Sustainable Land Resources*
Co-Sponsoring Committees: *NRES-21 Hydrology Group, NRES-22 Erosion Control Group, NRES-25 Streams, Reservoirs, and Wetlands Group, NRES-251 Hydraulic Structures, NRES-28 Ecological Engineering*

Session Title: *Green Infrastructure*
Type of Session: *Oral Technical Session*
Description of Session: *This sessions aims at presenting the latest scientific contributions and case studies that address sustainable drainage systems, Low Impact Development, and Green Stormwater Infrastructure. These can include modeling, implementation and field studies.*
Sponsoring Committee: *NRES-28 Ecological Engineering*
Co-Sponsoring Committees: *NONE*

Session Title: *Hydrology and Climate Data: Challenges and Opportunities*
Type of Session: *Oral Technical Session*
Description of Session: *Long-term continuous data at different temporal scales are needed for successful crop and hydrologic modeling analyses. Any issues including paucity of data, missing values, and bias associated with simulated data can lead to misleading results. There is dire need to identify and resolve these issues for improved modeling studies. Submissions will be accepted on challenges and opportunities related to limited data availability, missing data, uncertainty, and big data handling in hydrological sciences.*
Sponsoring Committee: *NRES-21 Hydrology Group*
Co-Sponsoring Committees: *NONE*

Session Title: *Innovative Water Quality and Hydrologic Monitoring and Analysis*
Type of Session: *Oral Technical Session*
Description of Session: *The processes governing water quality in aquatic ecosystems are complex and even more so when coupled with hydrology. Advancements in hydrologic and water quality measurements, analysis, and data-driven modeling have created ways to further understand and utilize hydrologic and water quality information, though numerous challenges still exist. ASABE is at the forefront of hydrologic and water quality innovation. This session will have presenters from across the world sharing their work on innovative monitoring and analysis methods. For approximately 9 years, this session has been included in AIM.*
Sponsoring Committee: *NRES-21 Hydrology Group*
Co-Sponsoring Committees: *NRES-28 Ecological Engineering*

Session Title: *Institutional Memory in NRES: A Valuable Resource*
Type of Session: *Hybrid Session-submitted abstracts and invited speakers*
Description of Session: *Cross-cutting session proposed to address how ASABE can capture knowledge and other experiential resources held by society's membership.*
Sponsoring Committee: *NRES-251 Hydraulic Structures*
Co-Sponsoring Committees: *NONE*

Session Title: *Long-Term Effectiveness of BMPs on Water Quality: Opportunities and Challenges*
Type of Session: *Hybrid Session-submitted abstracts and invited speakers*
Description of Session: *Understanding and modeling the physical, chemical, and biologic processes affected by BMPs may help understand and predict their long-term effectiveness. This session seeks to spark a conversation between modelers and field scientists regarding model integration of BMP effectiveness at diverse spatial and long temporal scales. Brief presentation topics that advance our understanding of the topic are invited. Authors are encouraged to submit presentations based on (but not limited to) the following topics: • Long-term (≥ 5 years) experimental and modeling case studies of BMPs • Model integration of long-term BMP field experiment results • Over time change in BMP effectiveness • Innovative approaches to simulate the underlying physical, chemical, or biological processes in extended BMP experiments (e.g. hydraulics, hydrology, water quality, crop response, etc.) • Data availability for model improvement to better represent overtime change in BMP effectiveness"*
Sponsoring Committee: *NRES-22 Erosion Control Group*
Co-Sponsoring Committees: *NRES-225 Conservation Systems, NRES-23 Drainage Group*

Session Title: *Managing Manure and Agricultural Byproducts for Sustainability*

Type of Session: *Oral Technical Session*
Description of Session: *This session encourage papers on the utilization and recycling of manure nutrients, or practices that improve our ability to utilize manure resources in a more environmentally sustainable manner.*
Sponsoring Committee: *NRES-27 Ag Byproducts & Animal Mortality Systems*
Co-Sponsoring Committees: *NONE*

Session Title: *Manure Treatment Systems: Economic Solutions for Manure Treatment*

Type of Session: *Oral Technical Session*
Description of Session: *This session invites talks on different methods of manure treatment for reasons including nutrients, metals, bacteria, and pathogens. Discussion on the economics of treatment are encouraged.*

Sponsoring Committee: *NRES-27 Ag Byproducts & Animal Mortality Systems*
Co-Sponsoring Committees: *NONE*

Session Title: *Modeling of Hydrology and Water Quality in Surface, Sub-Surface and Groundwater Systems*

Type of Session: *Oral Technical Session*
Description of Session: *Hydrologic and water quality modeling plays a significant role in the profession of many agricultural and biological engineers, and it is often used to inform important management and regulatory decisions. This session aims at providing a platform to the researchers, engineers, and regulators to demonstrate various applications related to hydrology and water quality in unique hydrologic systems at multiple scales using computer models and statistical modeling. The presentations may include applied and fundamental research performed in different ecosystems. The potential topics are model code enhancements, model input development techniques, parameterization and calibration strategies, uncertainty and sensitivity analyses, and/or unique model applications.*

Sponsoring Committee: *NRES-21 Hydrology Group*
Co-Sponsoring Committees: *NONE*

Session Title: *Nutrient Removal, Recovery, and Recycle*

Type of Session: *Oral Technical Session*
Description of Session: *This session invites speakers to present work related to the removal, recovery, recycling, and regeneration of nutrients from biological system types that range from natural to manmade. Presentations related to engineered designs of nutrient recovery systems, modeling, and analysis of in situ data are all welcome.*

Sponsoring Committee: *NRES-28 Ecological Engineering*
Co-Sponsoring Committees: *NONE*

Session Title: *Nutrient Transport and Cycling: Measurement and Modeling*

Type of Session: *Oral Technical Session*
Description of Session: *This session solicits presentations on all aspects of nutrient cycling and transport measurement and modeling at plot, field and watershed scales in agricultural and urban systems. The focus will be on nitrogen and phosphorus but other nutrients as they affect the productivity and water quality will also be considered.*
Sponsoring Committee: *NRES-22 Erosion Control Group*
Co-Sponsoring Committees: *NRES-224 Sediment and Associated Pollutants, NRES-225 Conservation Systems*

Session Title: *Onsite Wastewater Treatment and Reuse – Research, Demonstration, and Education Activities*

Type of Session: *Oral Technical Session*
Description of Session: *Onsite wastewater treatment and reuse technologies (aka, septic or decentralized systems) offer a sustainable and cost-effective mean for wastewater management in areas not served by public sewer. The 1990 US Census indicated that more than 60 million Americans (about 25% of the population) depend on use of onsite wastewater management. Next year, during the 2020 Census the “septic vs sewer” question will be asked on the American Community Survey (ACS) instead of the American Housing Survey (AHS). The National Association of Onsite Wastewater Recycling (NOWRA) believes that results from ACS “will yield a more accurate estimate on the number of septic systems in the country, and it will also provide useful data at the state and local government levels.” While it is important to know percentage of the population relying on onsite wastewater management, it is equally important to stay current with the status of science and technology utilized for onsite wastewater treatment and reuse, including their effects on and services to the environment. This session provides an opportunity for the academic and industry professionals to share details on their research, demonstration, and education activities related to Onsite Wastewater Treatment and Reuse projects. The state of Texas has reinitiated funding for On-Site Sewage Facility (OSSF) research program and our team is looking forward to presenting details on this program during this session. The Texas OSSF team is inviting all others to do the same, share information from your state or region on this subject with us so that together we offer better services to those who rely on Onsite Systems.*

Sponsoring Committee: *NRES-262 Onsite Water Reuse*
Co-Sponsoring Committees: *NRES-26 Sustainable Land Resources, NRES-265 Soil and Groundwater Remediation, NRES-28 Ecological Engineering*

Session Title: *Natural Resources & Environmental Systems POSTER SESSION*
Type of Session: *Poster Technical Session*
Description of Session: *Quickly communicate findings to a broad community audience with opportunities for discussion, feedback, and networking with other scientists.*

Sponsoring Committee: *NRES-01 POSTER SESSION*
Co-Sponsoring Committees: *NRES-21 Hydrology Group, NRES-22 Erosion Control Group, NRES-23 Drainage Group, NRES-24 Irrigation Group, NRES-25 Streams, Reservoirs, and Wetlands Group, NRES-26 Sustainable Land Resources, NRES-27 Ag Byproducts & Animal Mortality Systems, NRES-28 Ecolog*

Session Title: *Real-Time Systems to Manage Natural Resources and Environmental Systems*
Type of Session: *Oral Technical Session*
Description of Session: *Electronic sensors have become an integral part of natural systems as technology has advanced. Sensors and equipment, along with technologies such as the Internet of Things (IoT), Machine Learning (ML), Artificial Intelligence (AI), and Data Analytics, are starting to be used intelligently to further understand responses of natural systems and allow appropriate reactions and responses to occur. Communication systems deployed in natural and environmental systems allow for a more complete understanding of the system and for actions to be taken to improve the system. Real-time applications assist in informing citizens and stakeholders of what is occurring in natural systems and allow for more efficient reactions. Real-time data collection in natural systems can utilize weather forecast information, process the data received, and implement smart natural resource management strategies to achieve maximum benefits. ASABE should take the lead in real-time system engineering. This session will be offered for the second time in AIM, within the NRES community.*

Sponsoring Committee: *NRES-21 Hydrology Group*
Co-Sponsoring Committees: *NRES-28 Ecological Engineering*

Session Title: *Sustainability Metrics – Concept, Evaluation, and Advances*
Type of Session: *Oral Technical Session*
Description of Session: *Global food demand is projected to be doubled in the next 50 years, which poses huge challenges for the sustainability of food production and terrestrial and aquatic ecosystems as well as the services they provide. New incentives and policies for ensuring the sustainability of agriculture and ecosystem services will be crucial if we are to meet the demands of improving yields without compromising environmental integrity or public health. Agricultural and biological engineers need to work together to design innovative ways to evaluate the sustainability of agricultural landuse, practices and production.*

Sponsoring Committee: *NRES-26 Sustainable Land Resources*
Co-Sponsoring Committees: *ASE-16 Engineering for Sustainability*

Session Title: *UAV and Satellite Remote Sensing for Precision Irrigation*
Type of Session: *Oral Technical Session*

Description of Session: *There is increasing pressure on our water resources, which prompts us to manage our water more precisely. With an increasing demand for food production, precision irrigation is a technology that may improve irrigation water productivity (yield produced per unit of water diverted for irrigation). An increasing array of remote sensing products, including unmanned aircraft vehicles and satellite imagery, provides an opportunity to improve management practices for precision irrigation systems.*

Sponsoring Committee: *NRES-241 Sprinkler Irrigation*

Co-Sponsoring Committees: *NRES-242 Surface Irrigation & Water Supply*

PAFS - Plant, Animal, & Facility Systems

Session Title: *Agri-Industrial Facility Design and Operation*

Type of Session: *Oral Technical Session*

Description of Session: *Latest research results in agriculture based industry operation and design will be essential for development.*

Sponsoring Committee: *PAFS-20 Structures Group*

Co-Sponsoring Committees: *PAFS-07/1 Agri-Industrial Facility Design and Operation, PAFS-20/4 Bulk Solids Handling and Storage, PRS-701 Physical Properties of Ag & Biological Products, PRS-702 Crop & Feed Processing & Storage, PRS-703 Food Processing*

Session Title: *Air Emission from Livestock and Poultry Production*

Type of Session: *Oral Technical Session*

Description of Session: *Description not provided*

Sponsoring Committee: *PAFS-50 Environmental Air Quality*

Co-Sponsoring Committees: *NONE*

Session Title: *Animal Response to Environment*

Type of Session: *Oral Technical Session*

Description of Session: *Description not provided*

Sponsoring Committee: *PAFS-40 Facilities & Systems Group*

Co-Sponsoring Committees: *NONE*

Session Title: *Biosecurity for Livestock and Poultry Production Systems*

Type of Session: *Oral Technical Session*

Description of Session: *Description not provided*

Sponsoring Committee: *PAFS-40 Facilities & Systems Group*

Co-Sponsoring Committees: *PAFS-50 Environmental Air Quality*

Session Title: *Bulk Solids Storage, Bulk Materials Properties*

Type of Session: *Oral Technical Session*

Description of Session: *Description not provided*

Sponsoring Committee: *PAFS-20 Structures Group*

Co-Sponsoring Committees: *PAFS-20/4 Bulk Solids Handling and Storage, PRS-701 Physical Properties of Ag & Biological Products, PRS-702 Crop & Feed Processing & Storage, PRS-703 Food Processing*

Session Title: *Design, Analysis, Testing and Assembly of Structures*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *PAFS-20 Structures Group*
Co-Sponsoring Committees: *PAFS-07/1 Agri-Industrial Facility Design and Operation, PAFS-20/4 Bulk Solids Handling and Storage, PRS-701 Physical Properties of Ag & Biological Products, PRS-702 Crop & Feed Processing & Storage, PRS-703 Food Processing*

Session Title: *Emerging Information Systems for Animal Production Systems*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *PAFS-40 Facilities & Systems Group*
Co-Sponsoring Committees: *ITSC-254 Emerging Information Systems*

Session Title: *Greenhouse and Nursery Technology*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *PAFS-30 Plant Systems Group*
Co-Sponsoring Committees: *NONE*

Session Title: *Indoor Plants Environments; Energy and Automation*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *PAFS-30 Plant Systems Group*
Co-Sponsoring Committees: *ES-300 Electrical Utilization & Energy Application*

Session Title: *Indoor Production of Cannabis and Other High Value Crops*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *PAFS-30 Plant Systems Group*
Co-Sponsoring Committees: *NONE*

Session Title: *Measurement, Mitigation and Modeling of Air Pollution from Livestock and Poultry Facilities*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *PAFS-50 Environmental Air Quality*
Co-Sponsoring Committees: *NONE*

Session Title: *New and Recommended Changes in Building Codes and Standards*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *PAFS-20 Structures Group*
Co-Sponsoring Committees: *PAFS-07/1 Agri-Industrial Facility Design and Operation, PAFS-20/4 Bulk Solids Handling and Storage, PRS-701 Physical Properties of Ag & Biological Products, PRS-702 Crop & Feed Processing & Storage, PRS-703 Food Processing*

Session Title: *Plant, Animal, & Facility Systems POSTER SESSION*
Type of Session: *Poster Technical Session*
Description of Session: *Quickly communicate findings to a broad community audience with opportunities for discussion, feedback, and networking with other scientists.*
Sponsoring Committee: *PAFS-01 POSTER SESSION*
Co-Sponsoring Committees: *NONE*

Session Title: *Precision Animal Management*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *PAFS-40 Facilities & Systems Group*
Co-Sponsoring Committees: *NONE*

Session Title: *Sustainable Building Technology*
Type of Session: *Oral Technical Session*
Description of Session: *Description not provided*
Sponsoring Committee: *PAFS-20 Structures Group*
Co-Sponsoring Committees: *PAFS-07/1 Agri-Industrial Facility Design and Operation, PAFS-20/4 Bulk Solids Handling and Storage, PRS-701 Physical Properties of Ag & Biological Products, PRS-702 Crop & Feed Processing & Storage, PRS-703 Food Processing*

PRS - Processing Systems

Session Title: *Artificial Intelligence and Data Science (Big Data) in Processing*
Type of Session: *Oral Technical Session*
Description of Session: *This session represents the latest developments in data science including handling of big data applied to agricultural processing systems.*
Sponsoring Committee: *PRS-703 Food Processing*
Co-Sponsoring Committees: *MS-23/7/2 Forage & Biomass Engineering, PRS-280 Bioconversion and Bioprocesses, PRS-701 Physical Properties of Ag & Biological Products, PRS-702 Crop & Feed Processing & Storage, ASE-16 Engineering for Sustainability, ITSC-230 Biosensors, ITSC-254 Emergin*

Session Title: *Biochemical Conversion and Bioprocess Modeling*
Type of Session: *Oral Technical Session*
Description of Session: *This session accepts submissions in biochemical conversion processes that include the use of live organisms and/or enzymes for the generation of bioproducts of commercial significance for a variety of industries, and the transformation of biomass for the enhancement of the circular bioeconomy. In addition, submissions that make use of modeling and simulation techniques, such as kinetic modeling, CFD, LCA, and TEA for the assessment, scale-up, and prediction of the feasibility of new and existing biochemical processes are also welcomed.*
Sponsoring Committee: *PRS-280 Bioconversion and Bioprocesses*
Co-Sponsoring Committees: *ES-220 Biomass Energy & Industrial Byproducts*

Session Title: *Drying, Handling and Storage of Grain Crops*
Type of Session: *Oral Technical Session*
Description of Session: *Postharvest management of cereal grains is important to meet the rapidly increasing global food demand. Challenges during large scale handling, drying and storage of grains include quality deterioration, fluctuation in moisture content, mold and mycotoxin growth, and insect pest infestation. In addition, all these factors are highly influenced by the changing weather conditions. So, it is important to define grain postharvest management strategies through dedicated research. In this session, various topics related to advances in grain postharvest management such as sensor development, preventing grain quality deterioration, grain aeration strategies, etc will be included that will benefit both grain industry and academia.*
Sponsoring Committee: *PRS-702 Crop & Feed Processing & Storage*
Co-Sponsoring Committees: *PRS-702 Crop & Feed Processing & Storage*

Session Title: *Food Process Engineering*
Type of Session: *Oral Technical Session*
Description of Session: *Fundamental session that captures the recent advances and research in the area of food process engineering.*
Sponsoring Committee: *PRS-703 Food Processing*
Co-Sponsoring Committees: *PRS-701 Physical Properties of Ag & Biological Products*

Session Title: *Management and/or Utilization Technologies for Food and Organic Wastes*
Type of Session: *Oral Technical Session*
Description of Session: *Successful management or utilization technologies for food and organic wastes*
Sponsoring Committee: *PRS-707 Food & Organic Waste Management & Utilization*
Co-Sponsoring Committees: *NONE*

Session Title: *Modeling Crop and Feed Drying, Handling and Storage*
Type of Session: *Oral Technical Session*
Description of Session: *There are several models used to study the process of drying, handling and storage of grains and feeds. Some of these models are very useful to the industry and others are used in research only. In this session, different models will be reviewed its usefulness for different applications in the grain and feed industry. Finite element method, finite difference method, finite volume method, computational fluid dynamics (CFD), discrete element method, mathematical models are some of the examples of models. These models are used to study heat transfer, moisture transfer, momentum transfer, species transfer, structural stress analysis, loading and unloading stress, conditioning for lump formation, temperature and humidity effect and so on.*
Sponsoring Committee: *PRS-702 Crop & Feed Processing & Storage*
Co-Sponsoring Committees: *PRS-701 Physical Properties of Ag & Biological Products, ITSC-217 Computational Methods, Simulations & Applications*

Session Title: *Particle Technology in Grain, Food and Feed Handling*
Type of Session: *Oral Technical Session*
Description of Session: *This session would cover the importance of applying particle concepts in unit operations related to processing and handling of grain, food and feed materials. In addition, the use of discrete element method (DEM) modeling technique to study processing and handling systems will be covered.*
Sponsoring Committee: *PRS-702 Crop & Feed Processing & Storage*
Co-Sponsoring Committees: *PRS-701 Physical Properties of Ag & Biological Products, ITSC-217 Computational Methods, Simulations & Applications*

Session Title: *Physical and Chemical Properties of Ag and Biological Products: Processing Handling*
Type of Session: *Oral Technical Session*
Description of Session: *Physical and chemical properties of various biological products is fundamental for characterization and subsequent processing and handling.*
Sponsoring Committee: *PRS-701 Physical Properties of Ag & Biological Products*
Co-Sponsoring Committees: *PRS-701 Physical Properties of Ag & Biological Products*

Session Title: *Physical Properties Related to Drying and Storage of Ag/Food Products*
Type of Session: *Oral Technical Session*
Description of Session: *The characterization of physical properties related to drying calculations and designing storage structures will be covered in this session.*
Sponsoring Committee: *PRS-702 Crop & Feed Processing & Storage*
Co-Sponsoring Committees: *PRS-701 Physical Properties of Ag & Biological Products*

Session Title: *Processing Systems POSTER SESSION*
Type of Session: *Poster Technical Session*
Description of Session: *This session invites posters related to topics including bioconversion, bioprocesses, crop handling, drying, in-plant waste reduction, physical properties of biological products, and processing and storage of food and other biological products (except biofuels topics are handled by ES). Quickly communicate findings to a broad community audience with opportunities for discussion, feedback, and networking with other scientists.*
Sponsoring Committee: *PRS-01 POSTER SESSION*
Co-Sponsoring Committees: *PRS-703 Food Processing, PRS-707 Food & Organic Waste Management & Utilization*

Session Title: *Qualitative and Quantitative Measurement Techniques for Biological Materials*
Type of Session: *Oral Technical Session*
Description of Session: *The advance measurement techniques dealt in this session will be useful for rapid characterization and online processing and quality. Topics include Spectral fluorescence, Raman Spectroscopy, hyperspectral imaging.*
Sponsoring Committee: *PRS-701 Physical Properties of Ag & Biological Products*
Co-Sponsoring Committees: *PRS-702 Crop & Feed Processing & Storage*

Session Title: *Sustainable Food and Organic Wastes Management Solutions*
Type of Session: *Oral Technical Session*
Description of Session: *This session will address the critical issue of sustainable waste management*
Sponsoring Committee: *PRS-707 Food & Organic Waste Management & Utilization*
Co-Sponsoring Committees: *NONE*