



## List of AGRO Symposia by Topic Area

### 260th ACS National Meeting and Exposition

August 16 – 20, 2019, San Francisco, California, USA

### *Moving Chemistry from Bench to Market*

*Each year, in addition to our traditional award/tribute symposia, the AGRO Division programs specific symposia in most, but not all, of our standing programming areas. Presentations for those standing program areas not included in listed symposia will be grouped in AGRO's general poster session.*

#### **Advances in Agrochemical Residue, Analytical and Metabolism Chemistry, and Metabolomics**

- 2020 ACS International Award for Research in Agrochemicals: From Pest Control to Environmental and Human Health
- Analytical Challenges Facing Developing Cannabis Industries
- Analytical Technologies Supporting Agrochemical R&D
- Impact of Evolving Instrumentation on Agricultural Science Regulation and R&D
- Non-Extractable Residues of Pesticides and Other Chemicals in Soil: Challenges, Strategy, and Regulation
- Residue Analytical Method Development for Global Use: Advances in Robust, Cost Effective, and Innovative techniques
- Stereoisomers: Regulatory Strategies and Technical Advances
- Technologies and Predictive Tools for Metabolite Generation, Identification and Assessment

#### **Agricultural Biotechnology**

- Everything You Ever Wanted to Know about Glyphosate: A Transparent Look at the Science
- Gene Editing in Agriculture – Leveraging new breeding tools to improve crops and their production

#### **Agrochemical Toxicology and Mode of Action**

- INsecticides and TARgets (INSTAR) Summit
- Strategies for Insecticide Mode of Action Discovery

#### **Air Quality and Agriculture**

- Contemporary Use of Fumigants

#### **Biorationale Pesticides, Natural Products, Pheromones, and Chemical Signaling in Agriculture**

- Biostimulants in Agriculture: Chemistry and Regulatory Aspects
- Natural Products as Agrochemicals
- Semiochemical Communications in Agricultural Ecology: *Early Career Symposium*

#### **Communication**

- Communicating Science to the General Public-How to Effectively Engage

#### **Discovery and Synthesis of Bioactive Compounds**

- Computational Strategies in Modern Agrochemical Discovery and De-risking
- Synthesis and Chemistry of Agrochemicals

#### **Ecosystem Exposure and Ecological Risk Assessment**

- Evaluation of Mixtures Through the Lens of Risk Assessment
- Exposure and Effects of Chemicals and their Degradation Products in Agroecosystems
- Let's Make it Work: Balancing Both Crop and Species Protection
- Off-target Transport of Field Applied Agricultural Chemicals
- Pesticides from Bench to Market: Safeguarding Sensitive Species
- Task Force Data Generation for Risk Assessment
- Three M's of Pesticides in Surface Water: Monitoring, Modeling, and Mitigation

#### **Environmental Fate, Transport, and Modeling of Agriculturally-related Chemicals**

- Environmental Fate, Transport, and Modeling of Agriculturally-related Chemicals
- Higher Tier Environmental Fate Studies and Modeling for Regulatory Submissions
- Statistical Modelling and Analysis for Agrochemical Research Data: *Early Career Symposium*

#### **Formulations, Process Chemistry, and Application Technology**

- Formulation science an area for practical surfactant and colloid applications
- Process Research and Development in Crop Protection

#### **Human and Animal Health Protection: Vector Control, Veterinary Pharmaceutical, Antimicrobial, and Worker Protection Products**

- Vector Control Technologies Now and into the Future: *Early Career Symposium*

#### **Human Exposure, Health, and Risk Management**

#### **Non-Food/Feed Production and Uses of Ag Commodities and Byproducts**

- Addressing U.S. Growers' Drive for Hemp Agricultural Chemicals
- Challenges and Opportunities for Insecticide Development in the Cannabis and Hemp Industry
- Modernization of Inhalation Assessments

#### **Pesticides, Pollinators, and Non-target Arthropods**

- Extending the Boundaries of Pollinator Research and Risk Assessment Methodologies for Pesticides

#### **Regulations, Harmonization, and MRLs**

- Developments in Regulatory Science – It's Testing, and It's Research
- From Cellar to Market: The Impact of Losing MRLs on Long-term Stored Food Products
- Physical Chemistry Testing Guidelines: Complex Challenges during Simple Tests

#### **Technological Advances and Applications in Ag Science**

- Drones and Disruptive Application Technologies

#### **Special Topics**

- Challenges of Agriculture in Developing Countries
- Chemistry for Sustainable Agriculture and Public Health: AGRO Evolution and Future Opportunities
- Effects of Climate Change on Agriculture, Species, and Agrochemical Efficacy
- Microplastics: Environmental Fate, Potential Effects, and Stewardship
- Sustainability in Agriculture: Understanding the Environmental Footprint of Developing Crop Protection Products

#### **Awards Co-sponsored with AGFD and Others**

- USDA-ARS Sterling Hendricks Memorial Lectureship Award
- ACS Kansas City Division Kenneth A. Spencer Award
- Journal of Agriculture and Food Chemistry Article of the Year Awards



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***2020 ACS International Award for Research in Agrochemicals:  
From Pest Control to Environmental and Human Health***

**Purpose of Symposium**

This symposium is in honor of Dr. Qing X. Li, recipient of the 2020 ACS International Award for Research in Agrochemicals.

Modern agrochemicals are designed to be beneficial to agricultural production and protective of human and environmental health. This symposium will address worldwide research advances in agrochemicals from their discovery to their dissipation and remediation. The symposium will provide a platform to review and discuss the advantages and applications of techniques including immunochemistry, analytical chemistry, and proteomics to evaluate pesticidal activity as well as potential human and environmental health concerns. It will serve as an international network hub for colleagues working in pesticide discovery, action target identification, residue analysis, food safety, microbial transformation of pollutants, and remediation technologies. Besides AGRO, this symposium will be of interest to the ANYL, TOXI, and ENVR divisions.

**Suggested Topics**

- Analytical chemistry and immunoassay techniques, and their application to agrochemicals
- Pesticide residues and other potential toxins in food
- Microbial transformations of agrochemicals, including remediation technologies
- Environmental fate of agrochemicals and their transformation products
- Pesticide molecular targets of action
- Chemical proteomics in agrochemical research

**For further information, contact the organizers**

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***Addressing U.S. Growers' Drive for Hemp Agricultural Chemicals***

**Purpose of Symposium**

The unprecedented explosion of the hemp industry has started a conversation between registrants, Federal & State regulators, and growers on how crop protection tools can aid in the efficient production of this crop to meet consumer demands. The classification of the many products derived from the hemp plant is a new challenge for regulators to consider. Registrants are reticent to engage in the expansion of crop protection products on this new crop without clearly defined regulations and guidance to ensure they are compliant with all State and Federal laws.

This symposium will be an opportunity for hemp producers/processors, pesticide registrants, chemists, and other scientists to get the latest information on the current regulatory status of hemp products, registrations, tolerances, and classification by Federal and State authorities.

**Suggested Topics**

- Past, present, and future pesticide regulatory schemes with hemp
- Hemp and the 2018 Farm Bill
- Legality: Is it legal or not? Which portion of the crop is legal?
- Crop protection products available for use on hemp at the State versus Federal level
- Regulatory clarity on hemp and crop protection chemicals
- International experiences regulating pesticides on hemp
- Minor use experiences with similar situation
- Meeting international standards and regulations

**For further information, contact the organizers**

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## **Analytical Challenges Facing Developing *Cannabis* Industries**

### **Purpose of Symposium**

*Cannabis* is an extremely difficult analytical matrix. The rapid growth of the hemp and legal marihuana industries is necessitating developing robust and reliable analytical methodologies for a variety of components. Analysis of cannabinoids such as THC and CBD are needed to develop and establish proper dosing levels for medical uses. The legalization of hemp has opened the doors for the labelling and use of a wide variety of traditional agrochemicals. What safety testing is needed? What analytical methodologies are needed to support new pesticide registrations?

Analytical methodologies are needed for exogenous substances such as pesticides and growth regulators. Other contaminant testing for metals, fungal toxins, and bacteria are required at the State level and need analytical methodologies.

The many products derived from the hemp plant is a new challenge for analytical chemists to consider. Registrants are reticent to engage in the expansion of crop protection products on this new crop without clearly defined regulations and guidance to ensure they are compliant with all State and Federal laws. Acceptable methodologies are needed. In addition to AGRO, this symposium would be of interest to MEDI and AGFD.

### **Suggested Topics**

- Past, present and future pesticide analytical methodologies for hemp and marihuana
- Analysis of cannabinoids for medical uses
- Legal implications of cannabinoid results
- Crop protection product registration available for use on hemp at the State versus Federal level
- International experiences regulating pesticides on hemp
- Other contaminants such as metals, fungi, fungal toxins, bacteria
- Impact of increased pyrethroid use on inhalation/oral exposures
- THC/CBD oil impact (other cannabinoids, terpenes, etc.)
- Pesticide risk assessments for cannabis consumption
- Methods for Edibles and vaping

### **For further information, contact the organizers**

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***Analytical Technologies Supporting Agrochemical R&D***

**Purpose of Symposium**

Characterizing residue concentrations of a crop protection molecule and its metabolites in different environmental, crop, and animal matrices is essential and required during the registration process. Some newer crop protection actives are large and contain multiple functional groups and rings, while a fair number of these actives contain one or more chiral centers, which lead to increased complexity of the metabolites produced. Therefore, the qualitative and quantitative analysis of these crop protection molecules and their metabolites from various matrices becomes even more challenging. Hence, innovations in analytical tools and technologies are essential to enable researchers to accomplish these tasks efficiently.

This symposium will provide a platform to communicate and discuss cutting edge analytical technologies to enable higher throughput, more sensitive, and highly specific sample analysis from challenging matrices in E-fate, metabolism, and residue studies and early phase discovery studies. Other ACS divisions that may benefit from this symposium are ANYL, ENVR, and AGFD.

**Suggested Topics**

- Analysis of samples from challenging matrices, *e.g.*, compost, pollen, nectar, and crop/animal tissues
- Advances in extraction techniques and non-extractable residue (NER) characterization
- Advances in sample preparation, clean-up, concentration and chromatography techniques
- Application of recent advances in mass spectrometry tools for quantitative and qualitative analysis
- Cutting-edge mass spectrometry technologies for targeted and non-targeted metabolite identification
- Tools enabling faster method development
- Application of post-acquisition data mining techniques for metabolite identification
- Biochemical, especially immunochemical methods for inexpensive screening and on-site analysis
- Advances in metabolomics and applications in agrochemical research

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***Assessment of Exposure and Effects of Chemicals and  
Their Degradation Products in Agroecosystems***

**Purpose of Symposium**

Recent decades have seen increased exposure of chemicals in agricultural environments either intentionally (e.g., control for weeds and pests) or un-intentionally (e.g., from biosolid soil amendments and reuse of treated wastewater for irrigation). As a result, the modern agroecosystem may be exposed to a complex mixture of many chemicals at trace levels including pharmaceuticals, veterinary medicines, personal care products, industrial chemicals, and agrochemicals. Once in the soil, or even during their exposure pathway, these chemicals can be degraded or metabolized into degradants, increasing the complexity of the chemical exposome, and where their bioactivity and potential ecotoxicity remains largely unknown. Recent advances in analytical techniques, including non-targeted and high-resolution mass spectrometry, have helped scientists identify and quantify exposure as well as investigate potential pathways of degradation. These techniques can be combined with traditional and emerging ecotoxicology methods to evaluate the impacts these chemicals may have on soil health, plant productivity, and other potential risks. This symposium seeks to provide a platform for governmental, academic, and industry researchers investigating fate, metabolism, and effects of a wide range of chemicals and their degradants in the agroecosystem.

**Suggested Topics**

- Use of non-targeted analysis to characterize chemical exposure in agroecosystems
- Identification of chemical metabolites in agroecosystems.
- Ecotoxicity of chemicals and their degradants on non-targeted plant or microbial endpoints
- Impacts on plant-rhizosphere interactions including chemical sensing resulting from contaminant exposure
- Applications of metabolomics, and other “omics” techniques to assess effects of chemicals in agricultural settings
- Chemical uptake, metabolism and translocation in plants
- Impact of soil microbes on chemical transformations

**For further information, contact the organizers**

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***Biostimulants in Agriculture: Chemistry and Regulatory Aspects***

**Purpose of Symposium**

Plant biostimulant products such as seaweed extracts, protein hydrolysates, humic substances, and microbials represent a variety of chemistries due to the different raw material composition. The use of plant biostimulants as part of sustainability and IPM programs has steadily increased during recent years, and as a result of its growing importance in the global agrochemical market, agrochemical companies have begun to invest significantly in this sector. The growing interest has also resulted in several startup companies that are solely focusing on the production and marketing of biostimulants. With continuous growth, the value of the global biostimulant market is estimated to be around \$5 billion by 2025.

The aim of this symposium is to provide an update on the biostimulant research and regulatory aspects to the AGRO audience. It will present up-to-date information on the current research on the chemistry, mode of action, and the signaling pathways that lead to improved stress tolerance, nutrient uptake, and crop yield quantity and quality, as well as on the latest developments in the regulatory framework for biostimulants in the U.S. and other geographies. Besides AGRO, this session will be of interest to AGFD, BIOL, and ENVR members of ACS.

**Suggested Topics**

- Chemistry of plant biostimulants: seaweed, protein hydrolysates, humic substances, microbials, and small molecules
- Analytical methods for biostimulants
- Methods for Biostimulant research in the laboratory, greenhouse, and field
- Modes of action of plant biostimulants
- Plant signaling pathways and physiological processes relevant to biostimulants
- Biostimulants in abiotic stress tolerance
- Biostimulants in improved plant nutrient uptake and use efficiency
- Biostimulants in improved quantity and quality of crop yield
- Regulation of biostimulants in the U.S. and other geographies
- Future of biostimulants

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### *Challenges and Opportunities for Insecticide Development in the Cannabis and Hemp Industry*

#### **Purpose of Symposium**

With the passage of the 2014 and 2018 Farm Bills, hemp (*Cannabis sativa* L.) is now being grown within the United States over a much broader geographic area and for different uses, which has launched the cannabis and hemp industries into the forefront of the U.S. and global economic market. Within the past 3 years, a large number of arthropod pest species have been documented to feed on hemp in the United States, yet significant knowledge gaps regarding mechanisms to control these pests, insecticide-plant interactions, and plant chemistry has restricted our ability to advance pest management on the crop. This symposium will highlight some of the most prominent research at the intersections of agrochemicals and commercial hemp/cannabis production.

Contributors will discuss various aspects of the cannabis/hemp industry with a specific focus on the current state of the field and direction for future growth of the agrochemical field. The goal of this symposium is to bring together experts to discuss the latest technologies and advancements in the fields of agrochemicals, insect pest complexes, and plant chemistry in cannabis that will provide a platform for knowledge dissemination, bolster collaboration, and develop future research projects.

#### **Suggested Topics**

- Synthetic insecticides for pest control
- Biopesticides in hemp production
- Cannabis terpenes and plant chemistry
- Insecticide-plant interactions

#### **For further information, contact the organizers**

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***Challenges of Agriculture in Developing Countries***

**Purpose of Symposium**

Farming practices, pesticide use, and regulatory requirements for pesticide registration can vary from country to country. This intersection of practices, use, and regulations presents unique challenges in developing countries. Examples of challenges include applying farming technologies to small fields, inability to follow pesticide label due to language barriers, use of counterfeit products, and unclear/inaccessible regulatory requirements. As a result, in many cases, pesticides either are not used appropriately, or important pest control technologies are not available to the farmer.

Environmental scientists, academics, government officials, and regulators with interest in agriculture in developing countries would benefit from learning more from each other about country-specific practices, regulations, as well as challenges and strategies for effective use of pesticides. This symposium is open for collaboration with other divisions such as ENVR and AGFD.

**Suggested Topics**

- Unique farming practices and pesticide use patterns in developing countries
- What are the datasets, models, and tools available to evaluate cropping and pesticide use patterns?
- Applicability and transferability of studies and risk assessments conducted across developing countries
- Regulatory landscape in developing countries and opportunities to increase transparency
- Pesticide stewardship and agronomic policies in developing countries
- Balancing between economic value and environmental sustainability
- Overcoming language barriers to improve environmental safety of farming
- Different crop diseases or pests in developing countries
- Safety aspects

**For further information, contact the organizers**

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***Chemistry for Sustainable Agriculture and Public Health:  
AGRO Evolution and Future Opportunities***

**Purpose of Symposium**

This full-day symposium is being organized as part of the celebration of the 50<sup>th</sup> anniversary of the Agrochemicals Division (AGRO) planned for the San Francisco ACS meeting, and will immediately be followed by a gala reception open to all AGRO members and invited guests.

Since it achieved full ACS Division status in 1970, AGRO has served as the nexus of scientific exchange related to chemistry in the service of sustainable agriculture and public health. Through its technical programs at national meetings, special workshops and symposia, educational initiatives, awards, and publications, AGRO has had major impacts on the development of agriculture in the U.S. and worldwide.

Invited symposium speakers, including noteworthy leaders and AGRO alumni from industry, academia, and government agencies, will review historic developments and contributions as well as provide perspectives on what to expect in the future for all topics of interest to AGRO. By highlighting the rich history, accomplishments, and contributors of 50 years of AGRO success, we hope to both educate and inspire the next generation regarding Divisional activities and participation.

Please plan to come celebrate the 50th AGRO anniversary with members, retirees, and friends of the Division during the San Francisco ACS meeting.

**Important note:** *Oral presentations for this symposium will be by invitation-only, but we actively invite poster contributions.*

**Suggested Topics**

- Historic contributions of AGRO to worldwide innovation and sustainable agriculture
- Evolution of agriculture and crop protection in the past 50 years
- The biotech revolution and its impact on agriculture
- The most important challenges and opportunities for AGRO contributions and programs of the future
- Farming and crop protection in the emerging digital age
- Land grant universities and changing models of education
- The role and contribution of USDA and federal research
- Advancements and outlook for regulation of agrochemicals
- Advances in formulation and application technologies
- Agrochemical environmental assessments - from observation to prediction
- Changing consumer expectations for food safety and information
- Public health and urban pest management trends and directions
- Evolution and consolidation of the crop protection and seed industry
- Impacts of legislation and legal actions on agriculture and crop protection

**For further information, contact the organizers**

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***Communicating Science to the General Public:  
How to Effectively Engage***

**Purpose of Symposium**

To help secure much needed innovation in agriculture, scientists and farmers have new and different responsibilities today. They must be able to recognize how values, perceptions, and human behaviors affect public opinion, and consider effective ways to engage with a diverse audience in this complex environment. Traditional science communication around agriculture is no longer adequate. In this symposium we will hear from experts to discuss this paradigm, we will explore ways to establish trust and greater credibility with consumers and we will look at ways to better utilize novel science communication tools such as social media, videos, and interactive websites.

Scientists from AGRO, AGFD, ENVR, and AACT should consider participation.

**Suggested Topics**

- Why/Where/How should scientists engage
- Barriers to engaging in communication
- Understanding different communication styles
- Principles that can lead to successful and effective science communicators
- Impact of the global landscape on communication
- Novel science communication tools

**For further information, contact the organizers**

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***Computational Strategies in Modern Agrochemical  
Discovery and De-risking***

**Purpose of Symposium**

Both today's and tomorrow's agrochemical research efforts will revolve around providing innovative chemical solutions that will sustain global food security without compromising safety. Traditional agrochemical discovery pipelines have shown diminishing returns as pest species continue to evolve resistance to most marketed chemistries. Additionally, increased regulatory policy stringency, in addition to public health initiatives in academia, industry, and government laboratories have made historic discovery platforms data-rich but difficult to navigate. As the tools for laboratory biochemical / cellular / biological interrogation and research evolve, accompanying computational and "digital science" tools must be developed and integrated to enable enhanced extrapolation and insight across platforms. This evolution can enable novel and progressive discovery pipelines from molecular elucidation through product risk assessment and launch.

With a highly competitive agrochemical business landscape, being able to integrate experimental and computational tools for both discovery and de-risking is of utmost importance. The goal of this symposium is to provide a platform for scientists in agrochemical discovery (computational and experimental chemists) as well as de-risking (toxicology, regulatory) to present their latest research results.

In addition to the AGRO community, this symposium would be of interest to the MEDI, COMP, and TOXI divisions of ACS.

**Suggested topics include but are not limited to**

- Practical approaches to competitive-inspired chemistry: who does it, why do it, and how to do it?
- Novel modalities in modern agrochemistry (e.g., PROTAC, peptidomimetics)
- AI and machine learning in discovery and de-risking
- Modeling meets DNA-Encoded Libraries – Hit verification, modeling, and characterization
- Adaptive intelligent systems for molecular *de novo* design and drug discovery
- Public computational toxicology tools, models, and data resources and dashboards of the present and a glimpse to the future: where to find them and how to use them for discovery and de-risking
- Capturing and mining agrokinetic data for optimizing bioavailability and ADME in multiple targets (e.g., weed, insect, and disease control)
- Pesticide resistance: impacts on discovery/de-risking and developing solutions with resistance breaking potential
- Toward pesticide-wide metabolomics: Identifying key metabolic pathways and predicting metabolic degradation products for pesticide targets
- Experimental counter-screens and computational de-risking strategies for humans, off-targets, and/or beneficial species (e.g., bees, ladybugs)

**For further information, contact the organizers**

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***Contemporary Use of Fumigants***

**Purpose of Symposium**

Fumigants are useful chemicals for pest control in soil and in harvested foods. A leading fumigant, methyl bromide, is being phased out under international regulation of the Montreal Protocol due to stratospheric ozone depletion potential. A search is on for alternative fumigants that are effective, and which are safe for applicators, workers, and by-standers.

This symposium addresses contemporary research issues surrounding the use of fumigants across the globe, but particularly in California, where environmental and agricultural perspectives converge. As fumigation science occurs in all three phases across a multitude of environments, the intent is to welcome scientists and policy makers from a variety of disciplines, including: environmental, toxicology, entomology, food science, soil science, and analytical.

In addition to AGRO, this symposium would be of interest to ENVR and AGFD divisions.

**Suggested Topics**

- Gas measurement
- Gas dispersion and reactivity models
- Residue methods
- Target and non-target toxicology
- Registration and tolerance issues
- Novel fumigants
- Fumigant alternatives
- Crop trade barriers

**For further information, contact the organizers**

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***Developments in Regulatory Science:  
It's Testing, and It's Research***

**Purpose of Symposium**

To obtain regulatory approval for sales of a crop protection product, a large set of data characterizing the properties, environmental behavior, hazard and potential risk resulting from the potential use of the substance is required. The studies for generating this information are generally executed under well-defined testing guidelines. However, regulatory scientists performing these studies inevitably encounter scientific challenges in study design and execution when answering key questions about the attributes of the tested compound.

This symposium seeks to explore how the application of the principles of good scientific methods and practice are applied to address these challenges within a constrained testing environment. Papers are encouraged encompassing all disciplines of regulatory science, including environmental fate and metabolism, residue chemistry, ecotoxicology, analytical methods, toxicology, and product chemistry. This session will be of interest to regulatory scientists in industry and contract testing organizations, academics, and government scientists. Sharing of ideas and experiences from other ACS divisions such as ANYL, TOXI, and ENVR is encouraged.

**Suggested Topics**

- Application of hypothesis development and testing to regulatory science research
- Employing experimental design principles for optimal and efficient study execution
- Case studies describing experiments outside of typical guideline testing while still ensuring compliance with regulatory expectations
- Design of advanced studies to provide answers to non-standard regulatory questions
- Optimization of current and development of new regulatory test designs and guidance
- Development of tiered testing strategies
- Application of advanced statistical techniques to data generated in regulatory science studies

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***Drones and Disruptive Application Technologies***

**Purpose of Symposium**

This symposium is intended to facilitate dialogue among scientists to examine the opportunities and challenges associated with the use of unmanned aerial vehicles (UAVs, aka drones), ultra-low volume (ULV), and other novel application technologies to enhance efficiency and sustainability in agriculture. Presentations related to pesticide application technologies, fertility, pollination, field scouting, and other related topics are encouraged.

The symposium will provide a forum for interactions among academia, industries, and government agencies. It will enhance understanding of novel application technologies and related activities that have implications for agricultural and related industries, public interest, and the environment, as well as stimulating progress toward developing these new technologies on a sustainable path. This symposium may be of interest to other divisions such as ENVR and ANYL.

**Suggested Topics**

- Unmanned aerial vehicles (UAVs, aka drones) in agriculture – application technologies and scouting
- Unconventional uses of UAVs
- Crop input technologies with ultra-low volume (ULV) applications
- Environmental sustainability, novel formulations
- Tailored solutions to reduce crop input
- Regulatory aspects of application technologies – risk assessment and best practices
- Evaluation of in-field performance, off-target drift, operator exposure, etc.
- Model development associated with UAV application

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***Effects of Climate Change on Agriculture, Species,  
and Agrochemical Efficacy***

**Purpose of Symposium**

The ever-increasing speed of climate change demands both knowledge and discourse to prepare ourselves for the impact. This symposium explores research into that impact on crops and nutritional value, agricultural practices, species, water scarcity, and other issues.

Due to the global nature of climate change, national and international perspectives are welcome. Agrochemical scientists as well as members of AGFD and ENVR and anyone interested in this important issue may wish to attend.

**Suggested Topics**

Typical topic areas with the context of climate change may include:

- Impact on agrochemical environmental fate and behavior
- Changes in the geographic pattern of beneficial and pest species
- Influence of changing weather patterns on crops
- Modeling climate change impacts on agriculture, species, and agrochemical efficiency
- Changes in nutritional value of crops
- Water issues including both scarcity and flooding
- Relevant current U.S. and global policy issues
- Evaluation and or suggestions for future U.S. and global policy issues

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***Environmental Fate, Transport, and Modeling  
of Agriculturally Related Chemical***

**Purpose of Symposium**

Effective risk assessment of pesticides requires detailed measurement and or prediction of their environmental fate in target use regions. This symposium will improve knowledge and identify research needs on this critically important topic. Presented information is expected to improve the accuracy and confidence in pesticide exposure/risk assessments and in the process, facilitate harmonization of pesticide registration globally. Spatial and temporal variability, fate process coupling and interaction, conservation practice implementation, and changing application techniques may add also substantial variability to pesticide fate assessments. Presentations describing original research, cases studies, and literature review which address these and related topics are encouraged. Scientists and regulators engaged in all aspects of pesticide exposure assessment, modeling, and fate evaluation will benefit by active participation.

**Suggested Topics**

- Relating laboratory and field fate measurements
- Conduct and interpretation of environmental monitoring
- Regulatory relevance of modeling, monitoring, and environmental fate measurements
- Advances in modeling of the environment
- Policy implications of modeling, monitoring, or environmental fate
- Improving model accuracy
- Establishing model calibration and validation criteria
- Coupling fate processes and models
- Novel laboratory or field fate study designs
- Characterizing the fate of biopesticides

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***Evaluation of Mixtures Through the Lens of Risk Assessment***

**Purpose of Symposium**

Evaluating environmental risks of mixtures of potential stressors can be difficult and complex. Both can arise from the uncertainties in temporal and spatial aspects of environmental exposures, as well as poorly understood interactions in non-target organism effects. Therefore, an active area of research continues to be assessing the potential impacts of agrochemicals mixtures to nontarget organisms. Advancements in exposure and toxicity modeling approaches have the potential to reduce uncertainties and improve the relevance of risk estimates when assessing mixtures of agrochemicals.

During this session, research relating to environmental modeling of mixtures, additivity models, and their use in evaluation of risk to nontarget organisms will be discussed. Outcomes from this session will include recommendations to address regulatory issues in the area of mixture assessments and recommendations on the design, analysis, and interpretation of mixture studies. This session will interest environmental toxicologists, environmental modelers, risk assessors, and risk managers.

**Suggested Topics**

- Approaches to model combined environmental mixtures in aquatic and terrestrial environments
- Case studies to assess risks of agrochemical mixtures to nontarget organisms
- Environmental assessment of discrete tank mixtures to nontarget organisms
- Current regulatory issues related to mixture assessments
- Selection of non-interaction modes in environmental risk assessment
- Approaches for the design, analysis, and interpretation of environmental risks of mixtures to nontarget organisms

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***Everything You Ever Wanted to Know about Glyphosate:  
A Transparent Look at the Science***

**Purpose of Symposium**

Glyphosate has become the primary tool for weed management in the United States and much of the world. This valuable tool is at risk due to several issues such as evolved resistance and perceived environmental and health issues.

The risks and benefits of glyphosate to agriculture and the environment, as well as its risks in human health will be discussed by an array of experts. The outcome should be a better science-based understanding of the actual risks and benefits of glyphosate. This symposium should be of interest and benefit to toxicologists, agriculturalists, food scientists, and environmental scientists. Some members of AGFD and ENVR members will have an interest in the symposium.

**Suggested Topics**

- Effects of glyphosate on crops and soil
- Glyphosate resistance
- Glyphosate in soil and water
- Glyphosate's role in agriculture
- Environmental safety
- Human exposure and risk
- Glyphosate in food
- Human toxicity

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### *Extending the Boundaries of Pollinator Research and Risk Assessment Methodologies for Pesticides*

#### **Purpose of Symposium**

This symposium is focused on novel or unique test organisms, innovative research methods, and groundbreaking approaches to how the effects of pesticides on pollinators are evaluated at the individual, community, and population levels, with the common goal of speaking to how these improvements can allow us to re-think, advance, or standardize pollinator risk assessments (PRA).

While there are good reasons to focus PRA on a single surrogate species, the honey bee, there is growing concern for non-*Apis* pollinators given reported global declines in entomofauna, and there is increasing interest among regulatory authorities (EPA, PMRA, and EFSA) in accounting for potential impacts of pesticides on unrelated pollinators, such as birds and bats.

While toxicity and exposure testing underpins PRA, new approaches, including the use of models to enhance data interpretation, or application of -omics research to broaden taxa, are of interest for this session.

Other ACS Divisions that might be interested: ANYL, ENVR, AGFD.

#### **Suggested Topics**

- Advances in understanding how the science of pesticide effects on pollinators is evolving, and how it contributes to the practice of PRA
- Development of reliable laboratory protocols for non-*Apis* bees and lepidopteran pollinators
- Development of reliable field protocols for pollinator toxicology studies
- Validation or use of models to simulate the effects of pesticides and other stressors or enhance data interpretation
- Advances in epidemiological modeling of pollinator populations, communities, or plant-pollinator interactions
- Use of -omics to understand the range of effects on pollinator species and/or identify species with potential unique sensitivities not represented by honey bees

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***Formulation Science:***  
***An Area for Practical Surfactant and Colloid Applications***

**Purpose of Symposium**

This symposium covers industry, government, and academia advancements on formulation solutions through surface and colloidal chemistry as well as application technologies.

The target audience for this symposium includes scientists interested in the application of surfactant and colloid science to develop formulations and application technologies that benefit from surfactant and colloid science to deliver solutions across industries.

Participants in this symposium will have the opportunity to gain insights into the challenging formulation science of traditional chemical active ingredients (agrochemical, pharma, personal care, etc.) as well as microbial/biological solutions and even the viability of premixes between them.

The symposium will explore how sustainability could influence novel delivery systems and end user product performance as well as application technologies and their optimization methods.

This symposium may be of interest to both AGRO and COLL divisions.

**Suggested Topics**

- Formulating complex multi-active ingredient products, including biologicals
- Advances in additives and adjuvants to improve performance or mitigate adverse effects of actives, including microbial, biological, and/or sprayable RNAi
- Advances in delivery system technology (e.g., nanotechnology, controlled or triggered release)
- Formulations that compatibilize small molecule and biological mixtures
- Offsite drift reduction through management of formulation physical-chemical properties
- Formulating to optimize coating treatment processing/performance (e.g., paints, seeds treatment, powder/liquid coatings)
- Precision and customized delivery (e.g., sensor development, real time monitoring of applications, variable rate application, and drone applications)

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### *From Cellar to Market:*

## *The Impact of Losing MRLs on Long-term Stored Food Products*

#### **Purpose of Symposium**

Since the mid-1980s, there has been a growing interdependence among countries as a result of the integration of trade, finance, people, and ideas into one global marketplace. Technological advances, lowered transportation costs, and fast global communication have been some of the drivers. There has also been increasing liberalization of trade and capital markets, with the World Trade Organization (WTO) playing a role in promoting fair trade to overcome protectionism. The world population is estimated to increase to approximately 9 billion by 2050, which translates into a huge demand for food/feed. For the production and trade of agricultural commodities to meet this demand, global harmonization of MRLs is critical, and over the past several years the Agriculture and Food industry have been working on addressing this highly complex issue, with multiple stakeholders and many contributing factors.

There has been mixed success through these efforts. However, there is an important category of product which has a unique challenge. These are long shelf-life products, and in some cases the monetary value of these products goes up with time. The purpose of this symposium is to discuss challenges, opportunities, and threats associated with food and beverage products due to missing MRLs and varying Channels of Trade regulations across different markets.

#### **Suggested Topics**

- The impacts of deleting MRLs or no transition periods, especially in long shelf-life products
- Explanation of importing countries' regulatory systems or how countries use Codex. Can an ideal state of global MRL harmonization ever be reached?
- Definition of pesticide residues and the regulatory status of "dual-use" substances: Pesticide vs. Biocide
- Degradation curves and what they really mean? Impacts of degradation products that might be shared with other sources (e.g., sodium)
- Label use vs. actual use, and impacts to pesticide residues on raw agricultural commodities and finished products
- Analytical methods used for enforcement, their sensitivity and chasing zero
- Old agrochemical chemistries vs. new agrochemical chemistries – are chemistries today safer and more sustainable?
- Agrochemicals approved for "organic" – pros and cons compared to synthetic chemistries and consumer perception of "safer" agrochemicals
- Fighting pest resistance while balancing consumer perception, safety, and efficacy

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***Gene Editing in Agriculture:  
Leveraging New Breeding Tools to Improve Crops and Their Production***

**Purpose of Symposium**

CRISPR and other gene editing technologies are now powerful breeding tools that provide unique opportunities in agriculture. These technologies utilize the sequence specificity of RNA to edit specific genomic loci, regulate the expression of specific genes, or introduce allelic variations to achieve desired consumer focused benefits (e.g., taste, nutrition, and appearance), agronomical benefits (e.g., yield and disease resistance), and environmental benefits (e.g., reduction in food waste and its impact on carbon footprint). This symposium will provide a platform for communication about gene editing in agriculture – technology advancement, applications, opportunities, and challenges. Government, academic, and industry researchers are encouraged to share the unique perspectives from their sector, or to highlight outcomes of collaborations or working groups. Besides AGRO, this session will be of interest to AGFD and BIOL members of ACS.

**Suggested Topics**

- CRISPR/gene editing applications, including enhanced food nutrition and production, disease resistance and crop protection, and other applications
- Status of the local and international regulatory policies and the implications on international trade
- New opportunities and challenges
- Analytical challenges and solutions including tools and strategies for traceability and detection of commercial gene editing products in the food supply
- Communication of new technologies to the public, including managing perception and education

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***Higher Tier Environmental Fate Studies and  
Modeling for Regulatory Submissions***

**Purpose of Symposium**

Robust environmental fate (efate) studies and environmental modeling play a critical role in pesticide registration processes worldwide. Generally, a standard set of efate experiments (following OECD guidelines) and modeling routines (e.g., FOCUS models, PWC) are used for this purpose. However, higher tier studies/modeling are more frequently required for complex efate challenges or to demonstrate a safe use of a product.

Some efate/ modeling options for higher tier are as follows i) inverse modeling to derive kinetic (aged) sorption parameters in lab/field studies, ii) higher tier leaching experiments, e.g., column/lysimeter studies, (iii) using modeling approaches to address non-extractable residue issues, and (iv) predicting outcome of outdoor water sediment studies using data from aqueous photolysis and dark water sediment studies, etc.

This symposium is of interest to scientists from industry, governmental agencies, and academia, with backgrounds in efate/metabolism, modeling, risk assessment, field dissipation studies, etc. Higher tier approaches, strategies, and findings will be presented. The goal is to understand the acceptability of efate higher tier studies and modeling approaches by different regulatory agencies around the world and their impact on registration.

**Suggested Topics**

- Time dependent sorption studies
- Inverse modeling of field studies to determine non-equilibrium input parameters
- Metabolite (applied as parent) field dissipation studies
- Groundwater monitoring
- Column/Lysimeter studies
- GIS and geospatial modeling
- irradiated water sediment studies
- Modified Surface water mineralization test
- Harmonization of efate studies/modeling

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***Impact of Evolving Instrumentation on  
Agricultural Science Regulation and R&D***

**Purpose of Symposium**

Modern agricultural science research is heavily dependent on advanced instrumentation and software technologies to characterize a molecule with respect to its structure, function, mode of action, etc. Advances in all analytical technologies including NMR, chromatography (LC and GC), mass spectrometry, IR, and Raman, combined with modern software tools and computing power, have enabled researchers in academe and industry to discover and develop newer crop protection molecules with good safety profiles and high efficacies, to breed new crop varieties with improved desired characteristics (e.g., yield, nutrition), and to introduce crops with non-native traits. The advances in analytical technologies have been critical in enabling the agrosience industry to meet newer regulations that push these analytical tools to the limit of detection.

This symposium will provide a platform to provide an historical perspective on analytical instrumentation and to discuss emerging, cutting-edge analytical technologies that will serve the needs of future for agrosience R&D. Other ACS divisions that may benefit from this symposium are ANYL, ENVR, and AGFD.

**Suggested Topics**

- Trace the development of analytical technologies (MS, NMR, IR, UV, Raman, LC, GC, hyphenated techniques) over the past 50 years and their impact on agrosience R&D
- Impact of modern analytical tools on agrosience R&D
- Analytical technologies for biologicals such as biomarkers, proteins, and genes
- Impact of software; advances in computation on agrosience R&D
- Analytical tools to meet newer regulations
- How have changes in regulations been driven by advances in instrumentation
- Cutting-edge sample preparation

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*INSEcticides and TARgets (INSTAR) Summit*

**Purpose of Symposium**

The INSEcticides & TARgets (INSTAR) Summit was initiated in 2016 as a component of the AGRO division programming at the ACS National meeting as a platform for scientists to share their knowledge and expertise for the discovery of insecticide chemistries, and their development, registration, and delivery as sustainable management solutions for insect pests. This initial effort stimulated the formation of an INSTAR liaison group to organize an annual INSTAR Summit as part of the AGRO division programming at the ACS National meeting.

The purpose of the Summit is to highlight research from early-to-senior career scientists across academic, industry, and government sectors as a mechanism to stimulate focused discussions on knowledge gaps, future directions, and deliverable solutions to challenges related to insecticide science. The Summit will provide a series of special topic presentations that focus on innovative comparative toxicology and functional genomics approaches for the purpose of identifying insecticide targets, chemistries, and resistance mechanisms that will lead to the development of insect pest management strategies.

To complement these presentations, a joint poster and networking session will be provided for the Summit attendees to highlight their research activities. Following the special topic presentations, an interactive Q & A panel session will be organized for the attendees to not only ignite a debate on the future directions of insecticide targets, chemistries, and resistance, but engage these scientists in collaborative research and training opportunities for insect pest management.

**Suggested Topics**

- New and novel insecticide targets
- New and novel chemistry for insect control
- Natural products for biorational control
- Bringing new products to the market
- Current status of resistance management
- New and novel approaches for resistance management

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***Let's Make it Work:***  
***Balancing Both Crop and Species Protection***

**Purpose of Symposium**

Growers are faced with increasing and changing pest pressures requiring advanced crop protection products to maintain and increase productivity. Likewise, species listed under the Endangered Species Act (ESA) are threatened by a variety of stressors requiring novel approaches to protect and enhance habitat and lead to eventual recovery. The agricultural chemistry industry is exploring strategies and implementing projects that provide access to pest management tools while directly benefiting species and providing additional environmental benefits. Advances have provided opportunities to develop techniques to identify sensitive areas needing protection, reduce unintended pesticide exposure, and optimize land use and production. Under the FIFRA/ESA framework, opportunities exist to implement avoidance, minimization, and mitigation measures, including conservation offsets. Industry strategies for going forward should be clear and well-defined for successful implementation and measurable results.

Pesticide registrants and end-users must balance both crop and species protection. This symposium will focus on how ESA species impact assessment and consultation processes intersect with the FIFRA risk assessment process, including use and usage of pesticides, and other relevant data resources. Pesticide registrants, pesticide users, regulatory and wildlife management agency staff, and conservation-based organizations that attend the AGRO and ENVR sessions of the ACS meeting will find this session noteworthy and educational.

**Suggested Topics**

- How to avoid, minimize, and mitigate in the context of the ESA Section 7 Consultation process
- Industry-wide strategy for effective registrations, including effective Section 7 Consultations, and delivery of conservation measures
- How product labels link with species protection
- State-led certification and conservation programs
- Tools, data, and environmental models which quantify species impact assessments to inform the FIFRA/ESA registration
- Successful grower stories of balancing crop protection and species stewardship, including participation in ecosystem services markets.

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**Call for Papers**  
**260<sup>th</sup> ACS National Meeting & Exposition**  
**August 16 – 20, 2020**  
**San Francisco, California USA**

***Microplastics: Environmental Fate, Potential Effects, and Stewardship***

**Purpose of Symposium**

Plastics benefit our society and quality of life, but the occurrence of microplastic (<5mm) pollution in aquatic and terrestrial ecosystems is a growing global concern. Examples of sources of microplastic contamination to the environment include textiles, personal care and home products, plastics, and application of fertilizer, plastic mulch, and sewage sludge to agricultural fields. Adverse effects to aquatic ecosystems have been documented, but less is known regarding the impact to terrestrial ecosystems, agricultural soil, human health, and our food supply.

This symposium will discuss the current science, research, potential impact, risk assessments, stewardship, regulations, policies, and sustainable solutions for microplastic environmental contamination in aquatic and terrestrial ecosystems, considering both urban and agricultural settings. We invite researchers, scientists, regulators, policy makers, and people interested in microplastics to participate in this symposium.

**Suggested Topics**

- Occurrence of microplastics: local, national, global
- Benefits and concerns of plastics and microplastics
- Environmental fate, modeling, and risk assessments of microplastics
- Stewardship and solutions to mitigate concerns of microplastics
- Monitoring and analytical methods
- Policy and regulation of microplastics
- Bio-based plastics, polymers, and sustainable solutions
- Wastewater and stormwater management of microplastics
- Microplastics and agriculture, impact to food security?

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***Modernization of Inhalation Assessments***

**Purpose of Symposium**

Recent advances in dosimetry models for inhaled particles and gases and new approach methodologies (NAMs) based on *in vitro* tools promise to improve and modernize the inhalation risk assessment paradigm. Recently refined frameworks employ exposure alignment across different experimental platforms to support accurate evidence integration. Uncertainty is reduced through integrating hazard and exposure characterization resulting in human health risk assessments that are precise, accurate, and health-protective.

This symposium will bring together new knowledge on various components of human health and exposure assessments, including inhalation exposure modeling, aggregate exposure and adverse outcome pathways, *in vitro* to *in vivo* extrapolation (IVIVE), risk characterization, and mitigation approaches, as well as information on newly available or refined datasets. This symposium will improve knowledge and identify research needs on these critically important topics.

Presentations describing original research, novel risk assessments approaches, and cases studies which address these and related topics are encouraged. The symposium will provide a platform for interaction and discussion between academic researchers, industry professionals, and regulators involved in conducting human health and risk assessments of inhaled agents. In addition to AGRO, this session will be of interest to TOXI members of ACS.

**Suggested Topics**

- New generation advances in dosimetry models for inhalation risk assessments (e.g., hybrid physiologically Based Pharmacokinetic - Computational Fluid Dynamic (PBPK CFD), multipath particle dosimetry (MPPD) model for vapors)
- Human *in vitro* tools for human risk assessments (e.g., MucilAir™, etc.)
- Examples of modernized workflows including systematic review and AEP or AOP
- Case studies for refined inhalation assessments
- Data generation and characterization of human-relevant particle size distributions

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***Natural Products as Agrochemicals***

**Purpose of Symposium**

Natural products offer diverse classes of compounds that can be used as agrochemicals or as templates for the development of potent agrochemicals. These agrochemicals can possess antifungal, insecticidal, and phytotoxic activities, as well as plant growth stimulation activities. The sources for such compounds can be from microbes, marine organisms, and higher plants. The purpose of this symposium will be to exchange scientific ideas among scientists who are working in this field. This symposium will be limited to invited speakers nationally and internationally. The scientists who attend this symposium will be able to foster collaborations and exchange scientific ideas.

**Suggested Topics**

- Fungicides that can be used in pre- and post-harvest applications of agricultural produce
- Herbicides from plants and microbes that can replace synthetic, environmentally harmful herbicides
- Algicides that can be used in aquaculture
- Possibility of interests in industry in further development of potent compounds that can be developed as commercial products

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***Non-Extractable Residues of Pesticides and Other Chemicals in Soil:  
Challenges, Strategy, and Regulation***

**Purpose of the Symposium**

The purpose of this symposium is to provide a forum to present the latest advances in research on non-extractable residues (NER) of pesticides and other chemicals such as pharmaceuticals in soil and other media, and their impact on risk assessment in the context of regulation.

There are several challenges for NER environmental risk assessment. First of all, it is difficult to clarify the nature of NER or determine major contributing molecular entities. Second, it is a challenge to determine NER's binding mechanisms – physically entrapped, covalent bonded, or bio-fixed. Third, techniques for measuring NER's mobility, bioavailability, and ecotoxicity are still lacking. Challenges also vary from one molecule to another.

Characterization of NER is mandatory under regulation. Recently, the US EPA and the European Chemicals Agency (ECHA) have published a guidance/discussion paper on NER and its characterization. However, the guidance on environmental risk assessment is still limited.

This symposium intends to bring together scientists from academia, industry, and regulatory agencies to share their insights and formulate strategies on NER in its speciation, mobility, bioavailability, and ecotoxicity, and build up a scientific foundation for environmental risk assessment.

Submissions from other ACS divisions such as ENVR, AGFD, and ANYL are also welcome.

**Suggested Topics**

- Sequential matrix-altering or destructive extraction methods for characterization of non-extractable residues in soil
- Methods for determining the biogenic fraction of NER and their impact on risk assessment
- Speciation of major molecular entities contributing to NER via kinetics modeling
- Techniques to determine binding mechanisms of NER in soil and other environmental media
- Leaching studies to determine potential mobilities of NER
- Methods to determine bioavailability and ecotoxicity of NER
- Tiered strategy for NER environmental risk assessment
- Latest developments in NER regulation
- Practical experiences and lessons learned from the EPA guidance and ECHA discussion paper

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***Off-target Transport of Field Applied Agricultural Chemicals***

**Purpose of Symposium**

Emerging technologies and increased scrutiny of off-target transport of applied agricultural chemicals require adaptation of innovative and creative approaches to meet changing regulatory and stewardship requirements. The purpose of this symposium is to leverage our understanding of off-target transport of agricultural chemicals (including pesticides, fertilizers, veterinary medicines/nutrients), discuss study designs and best practices for existing and emerging guideline studies, and identify methods to incorporate available data and modelling approaches into risk assessment, risk management, and regulatory decision making.

The symposium should be of interest to scientists, risk assessors, modelers, and fate experts from academia, industry, and government agencies involved in designing laboratory and field studies, modelling and model development, risk assessment, stewardship, and database management. This symposium is open for collaboration with other divisions such as ENVR and ANYL.

**Suggested Topics**

- Designs to capture mass balance or movement of field applied pesticides/manure/fertilizers
- Differentiation of off-target sources and impact on receiving waterbodies, sensitive crops, or endangered species
- Leveraging available monitoring data to help inform regulatory decision making
- Reconciling model predictions with monitoring data
- Higher-tier field study designs and model development for assessing exposure
- Product stewardship and/or realistic farming practices to mitigate off-target transport (drift, runoff/erosion, volatilization)
- Leveraging digital farming technologies for targeted application and reduction of field emissions

**For further information, contact the organizers**

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### *Pesticides from Bench to Market: Safeguarding Sensitive Species*

#### **Purpose of Symposium**

By the time a pesticide registration package is submitted to the US EPA for review under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), years of work have been completed by the pesticide manufacturer. This includes chemistry discovery efforts, new product labeling development, efficacy and field trials, evaluating human health and drinking water safety, non-target toxicity testing, and market and benefit analysis. This data development process has many safeguards in place to ensure that pesticide products submitted for registration have met at least a minimum level of human health and environmental protection standards. Additional protection measures are implemented during EPA's registration process, and through subsequent consultation with the US Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS), if potential threats to species listed under the Endangered Species Act are identified. Once an end use label is registered, implementation or use may be further impacted by state and local actions responsive to local conditions and concerns

This symposium will follow pesticides from discovery to end-user application and explore various steps along the way that ensure environmental and non-target species protection. Pesticide registrants, agencies responsible for pesticide review and approval, end-users, researchers, and others attending the AGRO and ENVR sessions will find this session informative.

#### **Suggested Topics**

- Components of product discovery
- Field trials and efficacy testing
- Market research and benefits assessments
- Decisions on labeling
- Avoidance, minimization, and mitigation options
- How end user choices are made and why
- State and local actions responsive to local conditions

#### **For further information, contact the organizers**

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***Physical Chemistry Testing Guidelines:  
Complex Challenges During Simple Tests***

**Purpose of Symposium**

The physical chemistry testing guidelines are meant to define important properties that define hazard assessments, prerequisites for other relevant tests, and guidance information for optimizing other relevant tests. The studies for generating these properties are generally short duration studies with well-defined endpoints. However, the nature of some test materials makes adhering to the guidelines and/or achieving said endpoints challenging.

This symposium seeks to define the testing guidelines and explore challenges that are faced during the determination of physical chemistry properties of compounds, and especially the methods and experimental designs that are used to overcome these challenges. Papers are encouraged to address any of the regulatory product chemistry guidelines and the different types of compounds that are tested by them. This session will be of interest to regulatory scientists in industry, contract testing organizations, as well as academic and regulatory scientists. Sharing of ideas and experiences from ACS divisions such as ANYL, TOXI, and ENVR are encouraged.

**Suggested Topics**

- Test designs of different product chemistry studies to meet global registration requirements
- Defining and identifying impurities in batch analysis studies
- Testing mixtures in studies meant for test substances that are of high purity
- Designing/performing preliminary experiments to set up studies for success
- Case studies describing experiments where design changes were necessary to achieve the study endpoints
- Use of different types of analytical methods in the performance of product chemistry studies and challenges they might add

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***Process Research and Development in Crop Protection***

**Purpose of Symposium**

To address the food security needs of the growing world population, modern agriculture must continually develop technologies that increase production. Crop protection process chemists must develop processes to deliver large volumes of active ingredient, typically in the range of hundreds of metric tons per year that meet relatively low-cost targets.

This symposium will serve as a platform for crop protection process scientists to share their innovative solutions to these challenges. At this symposium, the audience will hear detailed presentations and case studies from crop protection organizations around the world. The latest issues relating to synthetic route design, development, and optimization in the crop protection industry will be discussed. Although the focus of this symposium is process research and development in crop protection, the content will be beneficial to process chemists in other industries and organic chemists in general.

**Suggested Topics**

The suggested topics for this symposium are, but not limited to, the following:

- Route scoping and selection for the synthesis of crop protection products
- Process development toward crop protection products
- Impurity identification and control in the development of crop protection products
- Application of process analytical technology (PAT) in the process development of crop protection products
- Application of continuous flow technology in the development of crop protection products
- Safety considerations, practices, and safety hazards evaluation and mitigation in process research and development
- Sustainability in process research and development
- Collaboration to drive technology innovation and process development
- Case studies of large-scale production and manufacture of crop protection related products

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***Residue Analytical Method Development for Global Use:  
Advances in Robust, Cost Effective, and Innovative Techniques***

**Purpose of Symposium**

The goal of this symposium is to share practical and novel approaches for the development of analytical methods for residue analysis of various sample types including soil, water, crop commodities, bee matrices, etc.). This symposium will initiate discussion about different approaches for developing methods, guideline requirements for global use, and new technologies to provide cost-effective and high through-put analytical methods for the analysis of field samples.

Representatives from industry, academia, and government are invited to share their perspective on analytical method development for residue analysis. Other ACS divisions which may benefit from this symposium are ANYL, ENVR, and AGFD.

**Suggested Topics**

- Analytical methods for challenging sample types (*i.e.*, unusual matrices, *e.g.*, hop, body fluids, processed food fractions or ingredients)
- Extraction efficiency of incurred residues: principles and approaches for various analyte classes and sample types
- Utilization of new technologies in residue analytical methods (*e.g.*, HRMS, Ion mobility, DART/DESI, Flow injection Analysis)
- Multi-residue methods for residue analysis, global perspective, advantages and limitations.
- Automation for routine analysis
- Challenges and best practices for analytical method transfer and implementation

**For further information, contact the organizers**

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*Semiochemical Communications in Agricultural Ecology*  
*Early Career Symposium*

**Purpose of Symposium**

Chemical signals (semiochemicals) play an important role in communication among plants, insects, pests, and microorganisms, including bacteria and fungi. Although there has been steady research on this subject over the last two decades, identification of functional components is needed for many new discoveries. Therefore, research focused on a wide range of complex chemical interactions between organisms is still critical.

This symposium will highlight the research of graduate students, post-doctoral fellows, and early career scientists from academic, industry, and government backgrounds. Participants are encouraged to share their latest research results, challenges, and novel experimental approaches for studying ecological interactions and agriculturally-related issues. The forum will also provide an opportunity to strengthen professional networks among early career scientists and serve as a platform to foster future collaborations. Ecologists, chemists, entomologists, biologists, plant physiologists, plant pathologists, and environmental engineers will benefit from the presentations. This symposium welcomes participants from other ACS divisions, such as AGFD, ANYL, BIOL, BIOT, and ENVR.

**Suggested Topics**

- Semiochemicals for insects and pests; pheromones; allomones; kairomones; synomones; olfaction; electrophysiological responses; host-plant location, mating behavior
- Plant perception and response; volatile cues for plant-plant communication; herbivore-induced volatiles; predator-prey interactions; belowground communication; social communication
- Symbiotic interactions: insect-microbe chemical ecology; belowground interactions and soil microbes
- Collection, isolation, and structural elucidation of volatile and non-volatile semiochemicals; synthesis of semiochemicals
- Ecological implications of flowering communication; impacts of volatile organic compounds (VOCs) on plant-pollinator interactions in natural and agricultural landscapes; floral volatiles and visitors; chemical signals for bumblebees
- Integrated pest management (IPM) strategies for agricultural pests: development of synthetic blends or formulations; efficacy of synthetic lures; new futuristic technologies for pest monitoring and control systems; nanotechnology for insect pest control; new products from bench to market

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***Statistical Modelling and Analysis for Agrochemical Research Data***  
***Early Career Symposium***

**Purpose of Symposium**

With the improvement of computational power and availability of statistical software, more statistical models and approaches are being developed and applied in scientific research, including the agrochemical field. The purpose of this symposium is to facilitate the communications of scientific information and cutting-edge knowledge about the statistical models and data analysis approaches for experimental design and data analysis. A secondary goal is to provide a platform for postdoctoral and early career scientists to present their latest research results and to serve as a platform to foster future collaborations.

Researchers who adapt models from other disciplines or propose new approaches for analyzing agrochemical data are welcome to present their latest work. Researchers, policy makers, consultants, and industrial manufacturers can discover more cost-efficient ways for experimental design, monitoring, data analysis, and risk assessment. Agricultural and environmental software companies might be interested in commercializing the proposed methods. Other divisions, such as ENVR and AGFD might also be interested in this symposium.

**Suggested Topics**

- Application of novel statistical approaches for agrochemical studies
- Analysis, and how to maximize the information from drone generated field data
- Bayesian approach and utilization of prior knowledge
- Statistical techniques for agrochemical experimental design
- Errors and uncertainties in model structure, parameters, and measurements
- Risk assessment and risk management
- Evaluation of current regulatory statistical approaches and its implications

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***Stereoisomers: Regulatory Strategies and Technical Advances***

**Purpose of Symposium**

Placement of safe and effective plant protection products on the market has been increasingly challenging. Recently, EFSA has issued regulatory guidance on risk assessments for plant protection product (PPP) active substances that have stereoisomers as components or impurities, or that generate transformation products that may have stereoisomers.

This symposium will provide a platform to discuss regulatory strategies for risk assessments of PPP active substances or impurities containing stereoisomers and those active substances generating transformation products that may have stereoisomers, including data generation and assessments. Also, analytical methods and technologies for the determination of actives, impurities, and transformation products in formulations and in plant, animal, and environmental samples involving separations of stereoisomers (diastereomers and optical isomers) by chromatography or other techniques will be discussed. Other ACS divisions that may benefit from this symposium are ANYL and ENVR.

**Suggested Topics**

- Regulatory strategies for risk assessments of plant protection product active substances containing stereoisomers as components or impurities or generating transformation products that may have stereoisomers, data generation, and assessments
- Chiral separation technologies for agrochemical actives, impurities, and transformation products
- Advances in analytical technologies for separation of stereoisomers (small molecules)
- High-throughput analysis of chiral compounds (small molecules) at trace levels
- Proposals or examples of how to conduct risk assessment of stereoisomeric residues
- Case studies where stereoisomers were evaluated

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***Strategies for Insecticide Mode of Action Discovery***

**Purpose of Symposium**

In the face of a changing regulatory landscape and the threat of resistance development, there is a need for the continued search for novel pest control solutions that prove at the same time efficacious and safe to non-target organisms. In this session we hope to engage public and industry scientists in an open discussion and idea exchange around advances in insecticide discovery and target deconvolution. Mode of action elucidation strategies as well as target-based screening approaches will be discussed that might support the development of new active ingredients.

This symposium would be of interest to AGRO researchers, regulators and administrators interested in insecticide mode of action and discovery, and may also be of interest to AGFD, BIOL, and MEDI members of ACS.

**Suggested Topics**

- Mode of action elucidation strategies and impacts to product advancement and/or registration strategies
- Target deconvolution methods
- Target mining
- *In silico* screening
- *In vitro* screening
- Nature-inspired approaches
- Computational approaches

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***Sustainability in Agriculture: Understanding the Environmental Footprint  
of Developing Crop Protection Products***

**Purpose of Symposium**

Sustainability in agriculture is critical due to the growing population and rising size of the food value chain. The environmental footprint of crop protection products spans from synthesis and selection of analog to customer end use of applying the crop protection product in the field. Green chemistry principles are applicable throughout this entire span.

This symposium highlights the environmental footprint of developing crop protection products and efforts in the field to improve the sustainability. Papers are encouraged from all areas within discovery and development of crop protection products that address design of molecules, characterization of molecules, analytical assessment, formulation development, regulatory guidelines, biologicals, and application of product. Sharing of ideas and experiences from ACS divisions such as ANYL, COLL, ENVR, MEDI, and ORGN are encouraged.

**Suggested Topics**

- Biologicals as sustainable products
- Digital tools for precision application and optimizing use of resources
- Design and synthesis of active ingredients
- Manufacturing of active ingredients
- Development of formulation
- Application of crop protection products
- Green approaches to nitrogen fertilizer
- Regulatory influences and sustainability guidelines

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***Synthesis and Chemistry of Agrochemicals***

**Purpose of Symposium**

The ability to develop new active ingredients for use as crop protection products will be fundamental in meeting the dietary needs of a growing population. In addition to realizing ever-increasing potency requirements against key pest species, modern agrochemicals must also clear highly stringent regulatory milestones in order to reach the market.

The symposium will highlight recent research in the synthesis and chemistry of agrochemicals. Talks which describe the design, isolation, synthesis, biology, and/or structure-activity relationships of new chemistries targeting crop protection or animal health are welcomed. Lectures focusing on regulatory-guided analog design, process route development, and/or synthesis of <sup>14</sup>C and <sup>3</sup>H-labeled agrochemicals are also invited.

**Suggested Topics**

Suggested topics for this symposium include, but are not limited to:

- The discovery and synthesis of insecticides, herbicides, fungicides, or nematicides
- The structure-activity relationships (SAR) of new agrochemicals
- Mode-of-action studies for the identification of new agrochemicals
- Process route development to new crop protection products
- Synthetic methodology development in the context of agrochemical development
- The isolation, structure determination, and biological characterization of natural products with insecticidal, herbicidal, fungicidal, or nematicidal activity
- Novel route development for the preparation of radiolabeled agrochemicals
- Utilization of synthesis and scaffold design to meet regulatory requirements

**For further information, contact the organizers**

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**January 6 – March 30, 2020**



**Call for Papers**  
**260<sup>th</sup> ACS National Meeting & Exposition**  
**August 16 – 20, 2020**  
**San Francisco, California USA**

***Task Force Data Generation for Risk Assessment***

**Purpose of Symposium**

Data generation for regulatory decision making, particularly for risk assessment purposes, has become both complicated and expensive for the regulated community. Additionally, comparing data generated by a wide variety of submitters, often using different protocols and methodology, makes regulatory decision making difficult. One approach to addressing these problems is for the regulated community to collaborate to generate a common dataset of exposure values that can then be used by regulators in their evaluation of individual products.

This symposium will highlight the formation, operation, and data submission of Task Forces formed to answer specific regulatory questions, along with the regulatory use of the submitted data.

**Suggested Topics**

- History and updates of Activity-based Task Forces
- History and updates of Compound-based Task Forces
- Regulatory use of Task Force data
- Data exclusivity and data compensation for Task Force generated data
- International use of Task Force data
- Opportunities for future Task Forces

**For further information, contact the organizers**

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***Technologies and Predictive Tools for Metabolite  
Generation, Identification, and Assessment***

**Purpose of Symposium**

During agrochemical or drug discovery stage, it is critical to elucidate metabolic soft spot and biotransformation pathways, which could impact biological efficacy and toxicity. However, metabolite identification and assessment remain an extremely challenging task due to the trace level and the complexity of the biotransformation. To overcome these challenges, especially under the more stringent regulatory environment, it becomes imperative to have innovative, efficient, and cost-effective approaches to generate and predict metabolites for further characterization and informed analog advancement decision. In addition, early understanding of the major metabolic pathway makes it more efficient in regulatory metabolism studies for new pesticide registration.

This symposium will provide a platform to communicate and discuss *in vitro* and *in vivo* technologies for generating metabolites and predictive *in silico* tools to facilitate agrochemical or drug discovery and development. Other ACS divisions that may benefit from this symposium are ANYL and ENVR.

**Suggested Topics**

- Emerging technologies for generation of metabolites including enzymatic, catalytic, and electrochemical methods
- Cost-effective and robust *in vivo* and *in vitro* technologies to generate metabolites
- *In silico* predictive tools for metabolite identification and assessment
- Innovative pilot metabolism study designs in animal, soil, and plant
- Latest techniques for isolation and purification of metabolites
- Advances in analytical technologies for identification of metabolites
- High throughput metabolite identification approaches
- Quantitative structure-activity relationships (QSAR) models for predicting metabolism

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***Three M's of Pesticides in Surface Water:  
Monitoring, Modeling, and Mitigation***

**Purpose of Symposium**

As new pesticide products enter the market for pest control in agricultural and urban landscapes, it is imperative to understand the sources, transport pathways, and associated human health and ecological risks posed by pesticide applications. Equally important is the ability to potentially mitigate the risk to surface waters, which receive direct pesticide inputs from agricultural and urban landscapes, as well as wastewater treatment plant effluent. Monitoring programs must aim to provide robust data necessary for source identification, trend analysis, and management practice evaluations to support institutional decision making. Model capabilities are continually improving in their ability to predict concentrations along the transport pathway, associated ecological risks to sensitive aquatic species, and design effective mitigation strategies. In order to effectively alleviate the risk to ecological endpoints, mitigation strategies need to be developed with a clear understanding of the extent and sources of the contamination, as well as the physico-chemical and socio-behavioral processes driving the pollutant loading. Evaluations of the effectiveness of management practices allow for further refinements to both monitoring design and model parameterizations. This symposium welcomes submissions that highlight the intersection of monitoring, modeling, or mitigation efforts related to pesticides in surface water.

**Suggested Topics**

- Interactions between monitoring and model development influencing mitigation design
- Source identification and transport mechanisms responsible for pesticide loading in surface waters
- Pesticides in wastewater treatment systems as potential source to surface waters
- Observed and modeled ecological impacts of contamination
- Data analysis to evaluate extent of contamination and success of implemented mitigation measures
- Monitoring prioritization, methodology, and statistical analysis methods
- Evaluations of mitigation strategies including physical BMPs and regulatory strategies

**For further information, contact the organizers**

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***Vector Control Technologies Now and Into the Future***  
***Early Career Symposium***

**Purpose of Symposium**

As vectors of human and plant pathogens evolve resistance to currently utilized control chemistries and technologies, it is imperative that researchers develop innovative means to mitigate the health and economic burden in the agricultural and public health sectors. This symposium will highlight early-career investigators and their research programs that aim to develop innovative techniques that reduce the impact of arthropods affecting public/veterinary health and agriculture. Research focusing on controlling rodents and their contribution to human and veterinary disease transmission are also welcome. Contributors will discuss the importance of characterizing biochemical targets and pest biology for the development of repellents, insecticides/acaricides, rodenticides, and novel technologies aimed at controlling future vector/rodent populations. The goal of this symposium is to bring together new and established investigators in the field of vector management and insecticide/acaricide or rodenticide development to bolster collaboration and future research projects. A section of this symposium will highlight the research of early career scientists who are developing novel vector control chemistries and technologies.

**Suggested Topics**

- Insect-host interactions and repellents
- Overcoming insecticide resistance
- Bringing new products to market
- Biochemical targets of future insecticides
- Agricultural disease vector control

**For further information, contact the organizers**

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