Announcing the 25th Annual

Mid-Atlantic Crop Management School

November 19-21, 2019
Princess Royale Hotel and Conference Center, Ocean City, MD

About the School
The school offers a 2 ½-day format with a variety of breakout sessions. Individuals needing training in soil and water, nutrient management, crop management and pest management can create their own schedule by choosing from 5 program options offered each hour. Emphasis is placed on new and advanced information with group discussion and interaction encouraged.

Who Should Attend
This school is designed for anyone interested in crop management issues, including:
- agronomists
- crop consultants
- extension educators
- farmers and farm managers
- pesticide dealers, distributors, and applicators
- seed and agrichemical company representatives
- soil conservationists
- state department of agriculture personnel

Continuing Education Credits
The 2019 Mid-Atlantic Crop Management School will offer CCA continuing education units (CEUs) approved by the Certified Crop Adviser Program in the following categories:
- Crop Management
- Pest Management
- Soil & Water Management
- Nutrient Management
- Professional Development

Total CEUs earned will depend on course selection. This school also provides Pesticide Recertification Credits for DE, MD, NJ, PA, WV, and VA and continuing education for Nutrient Management Consultants in DE, MD, VA, and WV.
Registration Information

The early-bird registration fee (recommended to ensure a place in the sessions of your choice) is **$285** if received by **September 15**; **$295** if received by **October 31**; **$335** if received by **November 11**. Registration will close on **November 11** at 11:59 p.m. EDT or when enrollment reaches 300 attendees. Payment of registration fee entitles you to participation in 2½ days of sessions, materials, 3 continental breakfasts, 2 lunches, and refreshment breaks.

**Enrollment is on a first-come, first-served bases. Most breakout sessions will be limited to 100 participants in each session; the Alternative session will be limited to 50 participants.**

All registrations must be completed online and be paid by credit card at the time of registration.*

Visit [https://go.umd.edu/crop19registration](https://go.umd.edu/crop19registration) to complete your registration online and make your session selections. Once you complete the online registration, you will receive a confirmation email providing verification of your session schedule and receipt of payment.

*If you are unable to provide credit card payment and wish to pay by check, complete the online registration and select the alternative payment option listed. Please note that your selected sessions can only be guaranteed once full payment has been processed.

Questions about registration or payment should be addressed to University of Maryland Conferences & Visitor Services at 301-405-9471 or [cropregistration@umd.edu](mailto:cropregistration@umd.edu).

**Cancellation Policy:**

- All cancellations must be submitted in writing via email to [cropregistration@umd.edu](mailto:cropregistration@umd.edu)
- Cancellation requests received on or before November 11, 2019 are fully refundable, less a processing fee of $25.00.
- No refunds after November 11, 2019.
- Substitutions are allowed at no additional cost provided notification is sent to [cropregistration@umd.edu](mailto:cropregistration@umd.edu) prior to the event start date.

Hotel Reservation Information

The Princess Royale Oceanfront Hotel and Conference Center is located at 91st Street in Ocean City, MD. **Contact the hotel directly to make your reservation.** Call 1-800-4-ROYALE or 410-524-7777 and identify yourself by Group ID # 4023 or as a Crop Management School participant. Reserve your room no later than **October 18** to guarantee the rates below.

- **$77 per night (plus applicable fees & taxes)** – Oceanview/Poolview Suite
- **$96 per night (plus applicable fees & taxes)** – Oceanfront Suite
I. Registration

General registration will begin 8:30 am on November 19. Registration packets and information regarding CEUs and re-certification credits will be available at the registration desk. A continental breakfast will be available. There will be no general session and all breakout sessions begin at 10:00 am on November 19.

II. Crop Management Sessions

Each Session is Worth 1 CEU in Crop Management unless noted.

Hops & Malting Barley -- With new state alcohol laws, there has been an increased interest in the production of local ingredients to make beer. This session will discuss current projects focused on the agronomics of producing barley for malting, including meeting quality standards of the industry. We will also discuss results of Barley and Hops Variety Trials performed at University of Maryland, including research aimed at evaluating the economic potential of barley and hops as alternative crops for Maryland farmers. Instructors: Mr. Bryan Butler, University of Maryland and Mr. Victor Green, University of Delaware. Tuesday 10:00 and 11:00 am.

Eyes in the Sky: Decisions in the Corn Field -- UAVs, sUAS, FAA, METARs, PIC's, VOs, VLOS, AGL, FPV, Part 107, MSL, SFC, TACs, Class Echo Airspace, ATC, R, MOA, P, W, CRAP, MTRS, TRSA, Victor Airways, TAFs, HEMs, NOTAMs, TFRs, standing lenticular clouds, CLR, FEW, SCT, BKN, OVC, density altitude, FCC...Yes, you too can learn the vernacular of grizzled drone pilots. Discover why old gray-beard agronomists begin drooling at the prospect of flying drones over corn fields throughout the season. Learn how to curse puffy cloud shadows in your aerial imagery like a seasoned veteran. All of this is included in your registration cost by simply attending my session and learning how Purdue's Airborne Aggies are using small Unmanned Aerial Systems to spot crop problems from the air and enhance agronomic decisions on the ground. Instructor: Dr. Bob Nielsen, Purdue University, Tuesday 1:00 and 2:00 pm.

Agronomic Choices for Maximizing Soybean Profitability -- Improvements to soybean genetics have played a major role in increasing yields in the last century. However, agronomic decisions and adoption of novel management practices have also contributed to increased yields. This talk will focus on agronomic decisions, providing practical advice on adoption of practices that will increase profitability of soybean production systems, including planting date and seeding rate. Instructor: Dr. Shaun Casteel, Purdue University. Tuesday 3:10 and 4:10 pm.

Agronomics of Industrial Hemp Production in Maryland -- With the passing of the 2018 Farm Bill, the cultivation of industrial hemp (Cannabis sativa L.) in the United States was again legal, after decades of a ban on its production. As growers across the country begin again to grow industrial hemp, the Land Grant Universities are lacking basic agronomic recommendations for productive cultivation of industrial hemp, including nutrient recommendations, which are a vital component of nutrient management planning in the Mid-Atlantic states. In the first year of industrial hemp cultivation, University of Maryland, College Park has partnered with 13 growers across the state to determine optimum nitrogen (N)
fertilization rate for industrial hemp grown primarily to produce cannabidiol (CBD) oil. In addition to nitrogen fertilization, we expect that our experience in the 2019 growing season will provide guidance on other facets of industrial hemp cultivation and this talk will share these such experiences along with results of our N rate trial. Instructor: Dr. Nicole Fiorellino, University of Maryland. Wednesday 8:00 and 9:00 am.

Grazing Management Strategies to Maximize Forage Quality and Yield -- A well-managed pasture is one of the most cost-effective and high value feeds that can be produced. Proper pasture management can provide significant benefits, including greater forage yields, increased stand longevity, lower feed costs, and improved livestock performance. Strategies to enhance pasture production will be discussed, including grazing management, forage selection, and the use of alternative forages to increase pasture productivity and extend the grazing season. Instructor: Dr. Amanda Grev, University of Maryland. Wednesday 10:10 and 11:10 am.

Corn Profitability: Between a Rock and a Hard Place -- Low grain prices, high cost crop inputs, and variable weather patterns all contribute to the current challenging economic situation for corn growers throughout the U.S. Many believe they have already cut their production costs to the bone, however agronomically sound choices on crop inputs, including rates, can help further decrease cost per bushel. Other agronomic choices, especially hybrid selection, can increase yield with little to no additional cost per acre, therefore also reducing cost per bushel but also giving growers more bushels to sell. Instructor: Dr. Bob Nielsen, Purdue University, Wednesday 1:00 and 2:00 pm.

Yield Monitor Data: Quality and Farm Decisions -- Farm data quality is becoming more important as digital technologies and prescriptive services are being offered to farmers and consultants. This presentation will dive into yield monitor calibration including new calibration procedures offered by agriculture technology providers. There will also be discussion about data accessibility through telematics and cloud platforms since it remains critical to access the in-cab display data. Yield maps and similar data layers created from precision agriculture technologies represent fundamental data to bring field-level value to services and new digital technologies used within crop production so not only quality but also understanding the data itself is important. Instructor: Dr. John Fulton, The Ohio State University. Wednesday 3:10 and 4:10 pm.

Update of Digital Ag Technologies -- Digital agriculture continues to rapidly evolve globally. Currently, there are over 150, commercial digital technology offerings here is the U.S. with these technologies requiring access to farmer data. Data access and control will be discussed since they are becoming more important as companies interface more through their services and digital technologies. Further, survey results will be presented on how farmers are adopting these technologies along with challenges they face on creating value back to the farm. Instructor: Dr. John Fulton, The Ohio State University. Thursday 8:00 and 9:00 am.
Understanding Statistics in Crop Science -- When reading results of any study, the words statistically significant can be confusing. When determining how to produce higher yields, projects are designed to verify results, so we can be confident in any statements made. Familiarity with statistics terms, including variability, population, and significance, will help with your own interpretation of agronomic studies. Instructor: Dr. Jarrod Miller, University of Delaware. Thursday 10:10 and 11:10 am.

III. Nutrient Management Sessions
Each Session is Worth 1 CEU in Nutrient Management

Nutrient Cycling, Storage, and Soil Microbiology: Money in the Bank from Cover Cropping – In this presentation, you will learn about the unsung microbial heroes behind the success of cover cropping. Microbes, both bacteria and fungi, play multiple roles following the transition from crop to cover crop. This will be a fun and interesting description of the current state of knowledge, hypotheses being tested, and other ideas about the ways in which cover crops support and are supported by soil microbial communities, that then lead to downstream benefits of cover cropping. Instructor: Dr. Mark Williams, Virginia Tech. Tuesday 10:00 and 11:00 am.

National Efforts to Align Soil Test P Recommendations -- Soil tests and resulting fertilizer recommendations developed over half a century ago were the product of state-level research. Soil test-based recommendations have recently come under scrutiny for various reasons, including a lack of current research, inconsistent terminology, and different soil test methods and fertilization philosophies among geographic regions and states within a region. The amount of historical correlation and calibration data to support recommendations—and resources to continue trials to refine recommendations—has varied widely among states. To bridge differences among states and provide transparency and confidence in soil testing, we have developed a multi-step project to work toward the development of a web-based soil test database and analysis tool. Initially we started by comparing nutrient recommendations for phosphorus (P) and potassium (K) in 14 southern states. Differences in recommendations will be provided to show how large these differences can be. We also developed a survey for soil fertility specialist to help understand differences in nutrient management decision making, which was initially tested among southern states but is currently expanded to the Mid-Atlantic, northeast, Midwest, and west. We are developing a tool – the Fertilizer Recommendation Support Tool (FRST), which will include acquisition of soil test P and K correlation and calibration data and development of the web-based program to access the data and algorithms to support searches and queries. The FRST will allow us to collate available data into a database, which will provide stakeholders database access, and supports data analysis to enable novel insight into crop fertilizer response and soil testing relationships; the Making Better Fertiliser Decisions for Cropping Systems (BFDC) database developed in Australia will be used as a guide. The long-term goal is to develop a national tool that provides more consistent, transparent, and science-based nutrient management recommendations for major row crops across regions and
environments. For this type of project to work, collaboration is essential. Currently this collaborative effort includes soil fertility researchers from many states, especially in the south, Mid-Atlantic, and northeast. Instructor: Dr. Deanna Osmond, North Carolina State University. Tuesday 1:00 and 2:00 pm.

**Fertigation: Calibration and Field Trials** — Fertilizer delivery through irrigation systems is an important tool to manage nutrients in semi-mature crops, however, it is not without pitfalls. Irrigation system uniformity and injection pump calibration are critical but often over looked steps to ensure success. Detailed steps to setup, calibrate, and monitor fertigation systems will be presented with a compiled list of pros and cons. A summary of University of Delaware research on rate and timing of fertigation on corn and soybean will be shared, followed by interactive discussion of when fertigation is most appropriate. Instructor: Mr. James Adkins, University of Delaware. Tuesday 3:10 and 4:10 pm.

**Sensors: The Good and Bad** — Sensor technologies can improve management through more accurate and timely assessment of crop status, soil water status, and many other facets of agronomic production. Explosive advancements in technology and network connectivity in recent years have made the use of extensive and highly advanced sensor systems possible. This session will focus on which sensor strategies are most appropriate for various types of plant, soil, and water measurement, on new and innovative sensor systems, and on the challenges of data management. Instructor: Dr. Wade Thomason, Virginia Tech. Wednesday 8:00 and 9:00 am.

**Perspective on Soil Health and Implications for Agricultural Soil Assessment** — Soil health management is targeted at developing sustainable agroecosystems that produce enough resources for humans and wildlife. Major practices recommended for sustaining agroecosystems are reduced tillage, maintaining living roots, and diversifying plant life, which all potentially lead to less disturbance and increased ecological functionality in managed systems. Soil health management has been adopted by many practitioners, and as the topic increases in popularity, researchers are investigating soil properties that best indicate changes in soil health over time. These soil health indicators (SHI) comprise a range of physical, chemical, and biological soil properties and will likely play a critical role in the future of soil assessments. Multiple soil health tests and SHI measurements are currently in development, but none have been broadly accepted as a standard for assessing changes in soil health based on management practices. Some research shows clear connections between soil management and responses from different SHI, whereas other research does not show a clear or consistent connection. Results from long-term agronomic trials in North Carolina revealed that SHI are not consistent in their ability to differentiate management effects on soil health. The discrepancy is attributed to regional differences in land resources, imprecise sampling procedures, and a lack of context for the goals of soil health management. These results will be discussed along with the implications that soil health assessments may have as soil health is integrated with recommendations for soil fertility, crop management, and resource
conservation efforts. Instructor: Mr. Wayne Roper, University of Connecticut. Wednesday 10:10 and 11:10 am.

**4Rs (or 5Rs) and Nutrient Management** -- The 4R approach to nutrient management was developed by the fertilizer industry. The approach is a collaborative effort by the International Plant Nutrition Institute, The Fertilizer Institute, The Canadian Fertilizer Institute, and the International Fertilizer Industry Association. The concept is to use the right fertilizer source, at the right rate, at the right time, with the right placement. Fertility recommendations from the universities of Delaware and Maryland incorporate the concepts of the 4Rs: for example, split applications of nitrogen between preplant and sidedress (right timing), and banding phosphorus as a 2×2 starter (right placement). Deciding on the best combination of the 4Rs for an individual field is difficult. Some agricultural consultants in the Midwest think a 5th R should be added to the 4R approach to nutrient management. The 5th R is the right data. Completing simple evaluations of different combinations of the 4Rs in field-scale trials will give you the 5th R. Attend and learn about the science behind the 4Rs and a protocol to evaluate combinations of the 4Rs. Instructor: Dr. Tom Morris, University of Connecticut. Wednesday 1:00 and 2:00 pm.

**Implementing Adaptive Nitrogen Management in New York** -- Environmental regulations in New York to protect water quality refer to Land Grant University guidelines for fertility management of field crops. For nitrogen (N), guidelines are derived using soil type specific book values for yield potential, soil N supply, crop rotation credits, and fertilizer uptake efficiency. Those who have 3(+) years of yield data, can use their own data to adjust yield potentials while remaining in compliance. Management and weather can impact N supply and N demand by crops and best decisions are often taken when farmers can experiment with N application decisions for manure or fertilizer. Thus, over the past five years, a partnership of Cornell University, Natural Resources Conservation Service (NRCS), Department of Agriculture and Markets (NYSDAM), and Department of Environmental Conservation (NYSDEC), with input from farmers and farm advisors, developed and implemented the “Adaptive Management” option to managing N for field crops. Join this session to learn more! Instructor: Dr. Quirine Ketterings, Cornell University. Wednesday 3:10 and 4:10 pm.

**Crediting Cover Crops and Soil Organic Matter in N Recommendations** -- Cover crops and soil organic matter are important sources of organic nitrogen (N) that can mineralize during the growing season and supply plant available N to corn. However, crediting these sources of N has been notoriously difficult. This presentation will review recent research in Pennsylvania testing the performance of a new N recommendation framework that explicitly credits N mineralized from cover crop residues and soil organic matter using data from soil tests and cover crop tissue analyses. Instructor: Dr. Charlie White, Penn State University. Thursday 8:00 and 9:00 am.

**Maryland Nutrient Management & Phosphorus Research Update** -- Senate Bill 546 presents several changes for farmers related to record keeping and
reporting. The Annual Implementation Report (AIR) this year will be far more extensive and will require greater cooperation where manure is transported, as names and addresses of sending and receiving operations will be required. There are several other changes to Maryland Nutrient Management that will be explained and discussed, including updated information on the Phosphorous Management Tool (PMT) and full implementation. Instructors: Mr. Dwight Dotterer, Maryland Department of Agriculture and Dr. Gurpal Toor, University of Maryland. Thursday 9:00 and 10:10 am. (Note: Only Maryland Nutrient Management Credits are offered for this session.)

**Equipment Calibration** -- This session will focus on the importance of sprayer calibration. Points of emphasis will be nozzle selection, potential calibration challenges, 1/128 acre calibration method, and cost savings associated with proper sprayer calibration. **Instructor: Ms. Kerry Richards. University of Delaware. Thursday 10:10 and 11:10 am.**

**IV. Pest Management Sessions**

Each Session is Worth 1 CEU in Pest Management unless noted.

**Interaction between Herbicides and Soils** -- Herbicides are widely used for weed control. Herbicides that provide residual control have increased recently to help combat herbicide-resistant weeds. This presentation will examine the interaction of herbicides, soil properties, and environmental factors that influence herbicide performance. **Instructor: Dr. Mark VanGessel, University of Delaware. Tuesday 10:00 and 11:00 am.**

**Earworms, Wireworms, and Weevils: Challenging Management** -- Earworms, wireworms, and two weevils - pepper and carrot, provide unique challenges for managing them. Problems of developing resistance, consistency of pesticide control and timing and finding alternative controls continue to plague management of these insects. **Instructor: Dr. Joseph Ingerson-Mahar, Rutgers University. Tuesday 1:00 and 2:00 pm.**

**Fungicide Resistance and its Management for Sustainable Small Fruit Production** -- Although general resistance management strategies such as rotation and mixture of fungicides with different modes of action have been widely implemented for many years, fungicide resistance remains to be a major concern in many cropping systems. In this session, we will use common small fruit fungal pathogens Botrytis and Colletotrichum species as examples to share our thoughts on resistance management. Specifically, we will introduce (1) fungicide resistance and its mechanisms, (2) disease monitoring systems and spray strategies, and (3) the smartphone application MyIPM, as well as highlight the importance of accurate species identification and resistance monitoring. The purpose of this session is to alert our growers to the current resistance issues and provide feasible tools to better manage resistance, for the sustainability of small fruit production. **Instructor: Dr. Mengjun Hu, University of Maryland. Tuesday 3:10 and 4:10 pm.**
2019 Field Crop Disease Updates -- This session will provide an overview of the Extension Plant Pathology research and disease observations in DE and MD during the 2019 growing season. Topics covered will include wheat fungicide trials, soybean soilborne disease surveys, identification of early season corn pathogens, and fungicide efficacy trials. **Instructor: Dr. Alyssa Koehler, University of Delaware. Wednesday 8:00 and 9:00 am.**

Point-source Versus Metabolic Resistance for Herbicides: Causes and Consequences -- We will discuss the causes and consequences of point-source versus metabolic resistance for herbicides in weeds. **Instructor: Dr. Lovreet Shergill, USDA-ARS-BARC & University of Delaware. Wednesday 10:10 and 11:10 am.**

Factors Affecting Pesticide Efficiency -- This session will focus on the effects of water quality on pesticide efficiency. Points of emphasis will include pH effect on pesticide half-life, water hardness and other water quality effects on pesticide effectiveness. Most importantly how managing water quality factors can increase pesticide effectiveness and decrease pesticide application costs. **Instructor: Ms. Kerry Richards, University of Delaware. Wednesday 1:00 and 2:00 pm.**

Row Crop Insect Pest Challenges of 2019 -- This past year held some interesting pest management challenges, especially in wheat and soybeans. From soil and seedling pests to aphids and earworms, findings from research trials in Delaware and neighboring regions will be discussed. **Instructor: Dr. David Owens, University of Delaware. Wednesday 3:10 and 4:10 pm.**

V. Soil and Water Sessions

Each Session is Worth 1 CEU in Soil and Water Management

Industrial Hemp Performance in Varying Soil Types Across Maryland -- Despite being cultivated during the infancy of the U.S., a ban on cultivation of industrial hemp (*Cannabis sativa* L.) since the mid-Twentieth century has left growers and farm managers in the United States with a multitude of questions related to production of this potentially lucrative crop in Maryland, namely, which soil types across the state will optimize industrial hemp performance. In the first year of industrial hemp cultivation in Maryland, University of Maryland, College Park researchers have partnered with 13 growers across the state on a range of soil types who are producing industrial hemp for cannabidiol (CBD) or fiber products. At the culmination of the 2019 growing season, the researchers will have gained insight to the effect of soil type on industrial hemp yield, delta-9 tetra-hydra-cannabinol (THC), and CBD content and will generate recommendations for management of industrial hemp across diverse soil conditions. **Instructor: Dr. Andrew Ristvey, University of Maryland. Tuesday 10:00 and 11:00 am.**

Using Remote Sensing for a Cost-Effective, Consistent, and Scalable Measurement of Soil Health Practices -- An increasing interest in soil health over the past few years, especially from consumer-facing companies, has revealed the need for a consistent, systematic, and low-cost approach to tracking progress on practice adoption and outcomes. Remote sensing can fill this gap, and augment
the information gathered by operator surveys and existing application of remote sensing (e.g., NASS). The Operational Tillage information system (OpTIS) was developed by Applied GeoSolutions (AGS) and piloted with the Conservation Technology Information Center (CTIC) in Indiana. In 2018, AGS, CTIC, and The Nature Conservancy partnered to create a publicly available baseline of soil health practice adoption and their resulting environmental outcomes in the corn belt (Land Resource Region M). Data on adoption of conservation tillage, cover crops, and crop rotation from 2005 through 2018 were made available at the watershed (HUC-8) and crop reporting district for the corn belt. The Denitrification and Decomposition (DNDC) model was used to calculate the societal benefits of practice adoption, including water quality and soil carbon sequestration outcomes. All practice adoption and outcome data are aggregated to protect grower privacy. This dataset allows stakeholders across the agricultural supply chain to track progress on soil health practice adoption, identify areas where more focused investment is needed to increase adoption, and demonstrate the societal benefits growers are conveying through improved practices. The next phase of this project will continue monitoring in the corn belt and expand the geographic scope of analysis. Instructor: Ms. Pipa Elias, The Nature Conservancy. Tuesday 1:00 and 2:00 pm.

An Introduction to Soil Water Holding, Storage, and Movement -- As one of the most limiting crop production factors, water comes by crossing our fingers or adding irrigation. Once moisture hits the soil though, soil properties and management become important as to storage and movement within the profile. While you can not change your soil texture, you can understand how soil characteristics and management can improve your understanding of soil moisture potential. Instructor: Dr. Jarrod Miller, University of Delaware. Tuesday 3:10 and 4:10 pm.

It's your Career: Invest in it with Certification! -- We tend to have a vested interest in our careers, after all, our job pays the bills and hopefully includes elements that we enjoy on a day-to-day basis. But are we invested in our careers? Many professionals in agronomy and soil science have invested in their careers through education and experience. However, not all have gone the extra step of examination to attain a credential as a Certified Crop Adviser (CCA), Certified Professional Agronomist (CPAg), or Certified Professional Soil Scientist (CPSS). Making the decision to study for and take another exam in an already busy life is not always easy decision to make. Many might ask themselves why they would spend the time to prepare for an exam, or even wonder how much it might matter if they have a certification or not. This presentation will try to answer those questions and provide information on why it is important to your career (and employer), how it is important to your clients and the public, and what it may mean to you in career development and subsequent success in your career. This talk will cover all things exams, from how the exams are written to taking the exam and what happens afterwards. Topics will include an overview of the exam process, how to approach studying, the structure of the exams and the move to internet-based testing, and opportunities after passing the exams and becoming
Recognizing Ethical Misconduct in Agronomy and Soil Science -- Crop advisers and soil scientists are pulled in many directions in their daily work. Many times, those items on the day's "To Do" list don't get completed because other issues popped up that needed to be taken care of or were more of a priority. The life of many professionals is fast paced, has long hours, and can tend to be a little over-whelming at times. Between the demands of clients, staff, marketing, proposals, contracts, field work, and billing it is sometimes difficult to have time for lunch. Sound familiar? With this type of schedule, one might ask where thinking about ethics and appropriate conduct fits in. But...if you are certified (or licensed) you signed a Code of Ethics when you obtained the credential. Have you looked at it since? Do you remember what it says? Do you follow it? Are you sure? Ethics tends to be, at times, a grey area in our professional lives and a review of professional ethics is useful from time to time. Some ethical decisions are easy, others are extremely difficult. This talk will review the general contents common to our ethics codes and will provide some examples when situations dictate where professionals need to be cognizant of their Code of Ethics, as well as the ramifications should that code be violated. This presentation is meant to be an interactive conversation and a sharing of ideas and experiences to help us all be more aware of situations we can face as professionals and how we might be more conscious of where the boundaries are in ethical conduct and misconduct. Instructor: Ms. Dawn Gibas, ASA-CSSA-SSSA. Wednesday 10:10 and 11:10 am. (Note: This presentation will fulfill the requirement for 1 CEU as part of the continuing education program for certification as a CCA and the national certification as a CPSS/CPSC as well as many soils licensing states, however, licensed individuals should check with the appropriate state statute/rule to determine the requirements in specific states.)

Adapting to Saltwater Intrusion on Coastal Farmland -- Saltwater intrusion causes thousands of acres of low elevation farmland along the mid-Atlantic seaboard to be lost every year as fields become too wet and salty to grow crops. At the same time, salt tolerant marsh plants that border farm fields are moving inland and onto the fields in a process called “marsh migration.” In this session, we will explore tradeoffs of different options that farmers have for addressing saltwater intrusion and marsh migration on their land. These include: protecting land through practices that improve soil health in the short-term, adapting by growing salt tolerant crops, and maximizing the benefits of creating wetland restoration easements on land that cannot be reclaimed for farming. We will present the results of the first year of a five-year USDA-funded field study that assesses the viability of different salt tolerant crops. We will also share projections for coastal agricultural land loss by 2025 and 2050. Finally, we will discuss different options for harnessing marsh migration on degraded farmland to create salt marsh habitat, which provides billions of dollars of recreational value to coastal states every year. Instructor: Ms. Dani Weissman, University of Maryland. Wednesday 1:00 and 2:00 pm.
Strategies to Minimize the Impacts of Coastal Flooding and Salt Water Inundation on Agriculture -- This presentation will expose participants to short-term mitigation techniques and viable long-term adaptation strategies and methods to deal with this problem. Managing the impact of saltwater inundation will require producers to use more adaptive agricultural practices. With better site assessment tools and implementation of appropriate conservation practices with updated planting recommendations, producers in these impacted areas may not need to completely abandon their affected fields. In addition, potential income opportunities may be possible by growing value-added, alternative niche conservation plants that also provide valuable ecosystem services. Instructor: Dr. Chris Miller, USDA-NRCS. Wednesday 3:10 and 4:10 pm.

The State of Cover Crop Regional and National Cover Crop Research, Education, Extension, and Decision Support Tools -- Cover crops are nonmarket crops that are used as multi-functional tools to provide agro-ecosystem services (e.g., erosion control, soil fertility, pest suppression, water infiltration and retention, increased soil carbon sequestration and reduced surface water pollution). Furthermore, cover crops can play an important role in the design of cropping systems that adapt to and mitigate against climate change. However, the extent to which cover crops function within an agro-ecosystem largely depends on how we manage them, what a given farmer’s objectives are, and what additional external inputs are utilized. This seminar will briefly review the services cover crops provide and on how management influences crop yields, water, nitrogen, and weeds. Emphasis will be on regional and national efforts regarding research, education, extension, and decision support tools. Instructor: Dr. Steven Mirsky, USDA-ARS Beltsville. Wednesday 8:00 and 9:00 am.

Practical Experiences in Farm Drainage Design and Installation -- From spinner ditches and swales to land forming and pattern tiling, the options to improve agricultural drainage can be overwhelming and costly. Many factors come into play when determining the best method to solve complex drainage issues with minimal environmental impact. Modern precision ag systems provide valuable information for drainage planning without the additional expense associated with elevation surveys. This session will discuss the practical side of drainage design and installation and how to take advantage of modern technology and existing data. Instructor: Mr. James Adkins, University of Delaware. Thursday 10:10 and 11:10 am.

VI. Alternative Session: Specialty, Vegetable, and Fruit Crops
CEUs for each session are provided after the abstract

Sulfur on Soybeans: Learning the When and the Why -- In recent years, sulfur deficiency has been diagnosed in crops across the country, due to several management and policy-related factors. This talk will present current research results on timing of sulfur (S) applications in soybeans to prevent or correct a S deficiency, as well as discuss foliar versus soil application of sulfur. Growers should consider managing S prior to planting to avoid diagnosis of a yellowing
Strawberry Cultivars and Production Options -- The strawberry is an amazing plant! Vegetative and reproductive growth is influenced primarily by light (photoperiod) and temperature, but other factors such as chilling, nitrogen availability, and water availability also influence the growth of strawberry. Because of the above factors, the cultivated strawberry is a diverse and adaptive fruit crop. Through the combination of appropriate cultivars and production systems such as protective culture, perennial or annual production and nursery production techniques, fruit production is possible outside the traditional Spring season. This session will cover varieties for the Mid-Atlantic produced in-field and under protective structures. *Instructors: Dr. Mike Newell, University of Maryland and Dr. Kim Lewers, USDA-ARS – Beltsville. Tuesday 1:00 and 2:00 pm. (1 CEU in Crop Management)*

Vegetable Crops IPM -- We will look at insect and mite management in field and high tunnel vegetables, as well as nutrient concerns of tomato and watermelon and a few other vegetable problems that need management. *Instructor: Dr. Jerry Brust, University of Maryland. Tuesday 3:10 and 4:10 pm. (1 CEU in Pest Management)*

Using the Mid Atlantic Vegetable Recommendations -- The Mid-Atlantic Vegetable Recommendations Guide (MAVRG) is a collaboration among horticulturalists, entomologists, pathologists, weed scientists, and others. These professionals have different approaches to information in the MAVRG. This session will include information on how to use the information presented in the MAVRG to best manage your crop. *Instructors: Dr. Kate Everts, University of Maryland; Dr. Gordon Johnson, University of Delaware; Dr. David Owens, University of Delaware; and Dr. Mark VanGessel, University of Delaware. Wednesday 8:00 and 9:00 am. (1 CEU in Pest Management)*

Deficiencies and Disorders of Vegetable and Fruit Crops -- In this session information on deficiencies and disorders of vegetable and fruit crops will be detailed including symptoms for different crops and management of vegetable and fruit crops to address these issues. Included will be common mineral nutrient deficiencies; toxicities; environmental, physiological, and genetic disorders; injuries; and other common problems in the field and greenhouse. Participants will participate in identifying these crop problems in this interactive session. *Instructor: Dr. Gordon Johnson, University of Delaware. Wednesday 10:10 and 11:10 am. (1 CEU in Nutrient Management)*

Disease Management in Vegetable Crops in a Wetter Climate -- Many plant diseases are favored by wet weather and frequent rainfall. Wet conditions enhance pathogen dispersal and increase initial infections of the leaf or stem. For example, some pathogens like *Colletotrichum* (Anthracnose) are splash dispersed while other pathogens like *Phytophthora capsici* (Phytophthora blight) produce sporangia, which release zoospores in wet weather. These zoospores are also spread by splashing rain. Frequent rains also increase diseases because spore
Germination and infections are favored by an increase in the length of time the leaves or stems are wet. Cultural strategies can minimize some of the effects of wet weather and make necessary fungicide applications more efficacious. **Instructor: Dr. Kate Everts, University of Maryland. Wednesday 1:00 and 2:00 pm. (1 CEU in Pest Management)**

**Vine Crop Production** -- Vine crops (or Cucurbits) are a major vegetable group that includes cucumbers, cantaloupes and mixed melons, watermelons, summer squash, winter squash, pumpkins, gourds, and several other specialty cucurbits. In this session, the characteristics of vine crops and production recommendations will be discussed. Mid-Atlantic research on these crops will be presented including variety trials, mineral nutrition research, research on cultural practices, and pest management research. Recent advances in cultivar development will also be detailed as well as future crop improvements to expect. **Dr. Gordon Johnson, University of Delaware. Wednesday 3:10 and 4:10 pm. (1 CEU in Crop Management)**

**Blueberry Production** -- Wondering how to successfully establish a blueberry planting? Results from blueberry management and variety trial experiments in Sussex County, Delaware provide helpful insight into how to get blueberries on Delmarva to peak production quickly. Mulch materials, managing soil pH, irrigation systems, bird issues, variety selection, soil amendments, and pruning will be discussed. **Instructor: Ms. Emmalea Ernest, University of Delaware. Thursday 8:00 and 9:00am. (1 CEU in Crop Management)**

**Produce Food Safety** -- This session will focus on science-based issues of produce safety, including but not limited to issues relevant to the Food Safety Modernization Act (FSMA) Produce Safety Rule. Discussions will include findings from the large outbreaks associated with leafy greens in 2018; including outcomes of recent research studies and FDA-traceback associated with these outbreaks. Produce growers may be wondering how these outbreaks may impact them? Discussions of commodity-specific outbreaks and details related to individual grower practices. Produce safety basics like the roles of water, wildlife, workers, and waste (manure/soil amendments) and the importance of proper sanitation will also be highlighted. **Instructor: Dr. Kali Kniel, University of Delaware. Thursday 10:10 and 11:10 am. (1 CEU in Professional Development)**
## 2019 Crop Management School Workshop Schedule

**Tuesday, November 19, 2019**

|------------|------------------------------------------|---------------------------------------------|----------------------------------------------|---------------------------------------------------|----------------------------------------|
| 10:00 - 10:50 | Hops & Malting Barley  
Mr. Bryan Butler  
and Mr. Victor Green | Money in the Bank from Cover Cropping  
Dr. Mark Williams | Industrial Hemp Performance in Varying Soil Types Across Maryland  
Dr. Andrew Ristvey | Interaction Between Herbicides and Soils  
Dr. Mark VanGessel | Sulfur on Soybeans: Learning the When’s and the Why’s  
Dr. Shaun Casteel |
| 11:00 - 11:50 | Hops & Malting Barley  
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Dr. Shaun Casteel |
| 11:50 - 1:00 | LUNCH BREAK | | | | |


## Tuesday, November 19, 2019 (Continued)

|----------|------------------------------------------|---------------------------------------------|-----------------------------------------------|--------------------------------------------------|------------------------------------------|
| 1:00 - 1:50 | Eyes in the Sky: Decisions in the Corn Field  
*Dr. Bob Nielsen* | National Efforts to Align Soil Test P Recommendations  
*Dr. Deanna Osmond* | Remote Sensing to Measure Soil Health  
*Ms. Pipa Elias* | Earworns, Wireworms, and Weevils  
*Dr. Joseph Ingerson-Mahar* | Strawberry Cultivars Production Options  
*Dr. Mike Newell, Dr. Kim Lewers* |
| 2:00 - 2:50 | Eyes in the Sky: Decisions in the Corn Field  
*Dr. Bob Nielsen* | National Efforts to Align Soil Test P Recommendations  
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*Ms. Pipa Elias* | Earworns, Wireworms, and Weevils  
*Dr. Joseph Ingerson-Mahar* | Strawberry Cultivars Production Options  
*Dr. Mike Newell, Dr. Kim Lewers* |
| 2:50 - 3:10 | **BREAK** | | | | |
| 3:10 - 4:00 | Agronomic Choices for Maximizing Soybean Profitability  
*Dr. Shaun Casteel* | Fertigation: Calibration and Field Trials  
*Mr. James Adkins* | An Introduction to Soil Water Holding, Storage, and Movement  
*Dr. Jarrod Miller* | Fungicide Resistance and its Management for Sustainable Small Fruit Production  
*Dr. Mengjun Hu* | Vegetable Crops IPM  
*Dr. Jerry Brust* |
| 4:10 - 5:00 | Agronomic Choices for Maximizing Soybean Profitability  
*Dr. Shaun Casteel* | Fertigation: Calibration and Field Trials  
*Mr. James Adkins* | An Introduction to Soil Water Holding, Storage, and Movement  
*Dr. Jarrod Miller* | Fungicide Resistance and its Management for Sustainable Small Fruit Production  
*Dr. Mengjun Hu* | Vegetable Crops IPM  
*Dr. Jerry Brust* |
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| 8:00 - 8:50| Agronomics of Industrial Hemp Production in MD  
Dr. Nicole Fiorellino | Sensors: The Good and Bad  
Dr. Wade Thomason | It's your Career: Invest in it with Certification!  
Ms. Dawn Gibas | 2019 Field Crop Disease Updates  
Dr. Alyssa Koehler | Using the Mid-Atlantic Vegetable Recommendations  
Drs. Everts, Johnson, Owens & VanGessel |
| 9:00 - 9:50| Agronomics of Industrial Hemp Production in MD  
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Ms. Dawn Gibas | 2019 Field Crop Disease Updates  
Dr. Alyssa Koehler | Using the Mid-Atlantic Vegetable Recommendations  
Drs. Everts, Johnson, Owens & VanGessel |
| 9:50 - 10:10| **BREAK** | | | | |
| 10:10 - 11:00 | Grazing Mgmt. Strategies to Maximize Forage Quality and Yield  
Dr. Amanda Grev | Perspective on Soil Health and Implications for Ag. Soil Science  
Mr. Wayne Roper | Recognizing Ethical Misconduct in Agronomy and Soil Science  
Ms. Dawn Gibas | Point-Source Versus Metabolic Resistance for Herbicides  
Dr. Lovreet Shergill | Deficiencies/Disorders of Vegetable and Fruit Crops  
Dr. Gordon Johnson |
| 11:10 - 12:00 | Grazing Mgmt. Strategies to Maximize Forage Quality and Yield  
Dr. Amanda Grev | Perspective on Soil Health and Implications for Ag. Soil Science  
Mr. Wayne Roper | Recognizing Ethical Misconduct in Agronomy and Soil Science  
Ms. Dawn Gibas | Point-Source Versus Metabolic Resistance for Herbicides  
Dr. Lovreet Shergill | Deficiencies/Disorders of Vegetable and Fruit Crops  
Dr. Gordon Johnson |
| 12:00 - 1:00 | **LUNCH BREAK** | | | | |

**Wednesday, November 20, 2019**
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<td>4Rs (or 5Rs) and Nutrient Management Dr. Tom Morris</td>
<td>Adapting to Saltwater Intrusion on Coastal Farmland Dr. Dani Weissman</td>
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<td>Implementing Adaptive Nitrogen Management in NY Dr. Quirine Ketterings</td>
<td>Minimize the Impacts of Coastal Flooding and Salt Water Inundation Dr. Chris Miller</td>
<td>Row Crop Insect Pest Challenges of 2019 Dr. David Owens</td>
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<td>8:00 - 8:50</td>
<td>Update of Digital Ag Technologies</td>
<td>Crediting Cover Crops and SOM in N Recommendations</td>
<td>Regional/National Cover Crop Research, Education, Extension</td>
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<td>Understanding Statistics in Crop Science</td>
<td>Equipment Calibration Ms. Kerry Richards</td>
<td>Practical Experiences in Farm Drainage Design and Installation Mr. James Adkins</td>
<td>MD Nutrient Mgmt &amp; P Research Update Dr. Gurpal Toor and Mr. Dwight Dotterer (MD Credits Only)</td>
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Mid-Atlantic Crop Management School
2019 Planning Committee

Executive Committee
Dr. Nicole Fiorellino – University of Maryland
Dr. Jarrod Miller – University of Delaware
Dr. Amy Shober – University of Delaware

CEU Coordinator
Ms. Sydney Riggi – University of Delaware

Evaluation Coordinator
Ms. Jennifer Volk – University of Delaware

Facilities Coordinator
Mr. Joe Hatton – West Virginia Department of Agriculture

Recording Coordinator
Mr. Craig Yohn – University of Maryland

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Dr. Sarah Hirsh – University of Maryland
Dr. Jarrod Miller – University of Delaware
Dr. Cory Whaley – University of Delaware

Nutrient Management
Dr. Mark Reiter (Leader)– Virginia Tech
Dr. Amy Shober – University of Delaware
Dr. Gurpal Toor – University of Maryland

Pest Management
Dr. David Owens (Leader) – University of Delaware
Dr. Alyssa Koehler – University of Delaware
Dr. Alan Leslie – University of Maryland
Dr. Mark VanGessel – University of Delaware
Ms. Emily Zobel – University of Maryland

Soil and Water Management
Ms. Jennifer Volk (Leader) – University of Delaware
Ms. Christy Brown – USDA NRCS
Mr. Chris Gross – USDA NRCS
Mr. Isaac Wolford – USDA NRCS

Alternative Session
Mr. Andrew Kness – University of Maryland
Dr. Gordon Johnson – University of Delaware
Mid-Atlantic Crop Management School
November 19-21, 2019
Princess Royale Hotel and Conference Center, Ocean City, MD

The Mid-Atlantic Crop Management School is sponsored by the University of Delaware Cooperative Extension and University of Maryland Extension, Mid-Atlantic Certified Crop Advisor (CCA) Board, and the United States Department of Agriculture-Natural Resource Conservation Service (USDA-NRCS).

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