



## **WORKSHOP ABSTRACTS**

May 10-13, 2022 - Newport News, VA

### **WORKSHOP OPEN TO ALL SECTIONS**

#### **(W1) Becoming Trace Evidence Aware**

*Presented by: Robyn Weimer and Joshua Kruger, Virginia Department of Forensic Science*  
Half Day Workshop - Morning - Wednesday, May 11 - (Member \$100/Non-Member \$150)

This half-day workshop is aimed towards non-trace evidence examiners, new or experienced. Trace evidence is often invisible to the naked eye, and sometimes what cannot be seen is easily forgotten or overlooked. Standard processing techniques in other sections of the forensic laboratory can affect subsequent trace evidence examinations. After attending the workshop, attendees will become more aware of Trace Evidence, its meaning, and how to ensure it is not lost when examining evidence outside of the Trace Evidence section. The course will include hands-on exercises to spark interest, discussion of casework scenarios, and a better understanding of the role trace evidence can take in a forensic inquiry.

### **CRIMINALISTICS SECTION WORKSHOPS**

#### **(W2) GCMS Fundamentals of Troubleshooting and Maintenance**

*Presented by: Kirk Lokits and Rachael Ciotti, Agilent Technologies (MAAFS Vendor)*  
Full Day Workshop - Tuesday, May 10 - (Member \$150/Non-Member \$200)

The GCMS workshop will focus on the fundamental aspects of operational theory, troubleshooting, and maintenance of GC (Split/Splitless) inlets, FID detectors, and MS EI sources. Column selection and inlet and flow path troubleshooting, and maintenance will be discussed. The workshop format will be PowerPoint based but will have hands-on labs involving split/splitless inlet modules, FID modules, and MS EI sources. The amount of individual hands-on participation will depend on the size of the class. (Optimal class size ~25 students)

**(W3) Practical Identification of Environmental Particles Similar to Gunshot Residue and Unusual Elemental Profiles Found in Test Fired Ammunition**

*Presented by: Mary Keehan and Doug Degaetano, Virginia Department of Forensic Science*  
Half Day Workshop - Morning - Tuesday, May 10 - (Member \$100/Non-Member \$150)

The recognition and identification of environmental particles similar to gunshot residue (GSR) has long been the goal of every GSR examiner. In this workshop we will give a brief overview of GSR analysis and identification by SEM/EDS, an overview of environmental sources of particles similar to GSR, and provide tools and practical exercises to assist GSR examiners in distinguishing environmental particles from gunshot residue. We will also go over various types of ammunition and the elemental profiles they produce, including some non toxic or “green ammunition, as well as, ammunition produced in Europe and Eastern block countries. The workshop will consist of short lecture portions followed by practical exercises involving data interpretation. The goal of the workshop is to provide both new and seasoned GSR examiners with practical tools to assist them in casework.

**(W4) Is Gasoline Present? - Using a statistically based method to graphically display the support for gasoline in an unknown sample**

*Presented by: Brenda Christy and Kelsey Winters, Virginia Department of Forensic Science*  
Full Day Workshop - Wednesday, May 11 - (Member \$150/Non-Member \$200)

The analytical process for identifying ignitable liquids is based on fundamental chemical properties; however, the current interpretation of these properties as chromatographic data relies on subjective pattern recognition techniques. The subjectivity of these pattern recognition techniques increases with the presence of complex matrix contribution. To make the fire debris interpretation process more standardized and objective, a novel method is proposed for analyzing fire debris Gas Chromatography-Mass Spectrometry (GC-MS) data using quantitative measures of chromatographic features of interest. These features are represented by peak height ratios observed in the Total Ion Chromatograph and Extracted Ion Profiles.

This workshop focuses on applying the results of a study which included the chromatographic features of interest in 150 gasoline samples and 64 chromatographic peak height ratios. Statistical analysis was conducted to determine the variation observed for each of these ratios in the gasoline samples and to determine the frequency of these features in negative matrix samples. This information was evaluated to determine relative significance, as represented by the assigned points for each of these features. When summed and used as plot values, these cumulative scores graphically display the totality of data supporting a potential gasoline identification. The graphical display, referred to as a sufficiency graph, also identifies the “gray” area where analysts are more likely to form differing opinions.

The methodologies introduced are a step toward a documentation process that ensures greater transparency in fire debris examinations and comparisons. The methods generate a quantitative sufficiency graph for consistent data interpretation and documentation.

Attendees at this workshop will gain an understanding of the study conducted to establish these statistical features and will be introduced to the processes of applying these to case samples. Each attendee should bring a laptop computer with Microsoft Excel, Agilent Chemstation or other GC-MS data processing software, hardcopies and electronic datafiles from known gasoline samples acquired using existing laboratory methodologies, and electronic datafiles from samples containing gasoline and matrix mixtures.

### **(W5) Demonstration of THC Isomer Production Methods**

*Presented by: Jessica Belton, Virginia Department of Forensic Science*

Half Day Workshop - Afternoon - Wednesday, May 11 - (Member \$100/Non-Member \$150)

As states begin to decriminalize marijuana use, electronic vape cartridges filled with delta-9-Tetrahydrocannabinol (THC) distillate are one of the most dominant forms of marijuana consumption available to the public. To meet state regulations regarding marijuana distillates, concentrates must be free of pesticides, hazardous substances such as residual butane or ethanol, and possess a Certificate of Analysis from an approved testing laboratory. Manufacturing companies have turned to techniques used in other industries in order to further refine the concentrate. One such technique is the use of activated clays to remove pesticides. However, an unintentional consequence of activated clay use is the production of THC isomers such as delta-8-THC, delta-10-THC, and delta-6a(10a)-THC. Upon realization of this phenomenon, manufacturers are now purposely altering the THC isomer compositions of the distillates in attempts to revolutionize the cannabis industry. Using simple path distillation and two widely used activated clays (T-5 and T-41), delta-9-THC isomerization to the other THC isomers is demonstrated. In addition, a simple reaction of Cannabidiol with sulfuric and acetic acids to produce delta-8-THC is also demonstrated. Lastly, using THC and acetic anhydride, THC-O-acetate, one of the most recent "newcomers", will be produced. To end, various analytical techniques will be discussed regarding the challenges associated with isomer identification. With more states following in the footsteps of marijuana decriminalization, the marijuana distillate market will continually alter the profile of concentrates as a form of competition.

## **BIOLOGY SECTION WORKSHOPS**

### **(W6A\*) Work Smarter: Utilizing New Light Source Innovations to Help Reduce Your Backlog**

*Presented by Saad Khan, Foster + Freeman (MAAFS Vendor)*

Half Day Workshop - Morning - Tuesday, May 10 - (Member \$100/Non-Member \$150)

Finding, collecting, and processing serology evidence at the crime scene and in the laboratory can be time consuming, especially on difficult patterned backgrounds. Advances in new technology pave the way for smarter, more efficient processing techniques. Attendees of this workshop will be given an overview of light theory and refresher on traditional methods for evidence locating and collection. Attendees will then be introduced to new methodologies and techniques that involve beyond visible photography, bandpass filtering, and oblique lighting options to increase their collection and processing efficiency and cut down on agency backlogs. Applying these new methodologies and techniques, attendees will participate in an interactive, hands-on investigation to find evidence to help catch the world's worst serial killer. Attendees are encouraged to bring their own full spectrum DSLR camera and thumb drive if available.

*\* Note: This workshop is limited to 10 attendees. If registration exceeds 10, an additional section of this workshop will open for Tuesday afternoon. If an afternoon session is added, it will be listed on the registration form as W6B.*

### **(W7) Solve More Crime with New DNA Technology**

*Presented by Rachel Oefelein, DNA Labs International*

Half Day Workshop - Morning - Tuesday, May 10 - (Member \$100/Non-Member \$150)

Forensic science has had major developments in recent years with advances of new technology and new applications of existing technology. Specialized vacuum cleaners are locating DNA on long-forgotten pieces of evidence that previously yielded no results. Spent shell casings, often thought of as items with no evidential value, are now the key pieces of evidence in drive-by shootings and sniper cases. No nuclear DNA can be obtained from hair shafts? Turns out it can! Previously untested evidence and evidence that beforehand produced an inconclusive result needs to be reevaluated by cold-case experts to bring closure to the thousands of unsolved cases across our country. This presentation will highlight how new technology at DNA Labs International has been utilized to solve current and cold cases.

### **(W8) Recovery of DNA from fired cartridge cases**

*Presented by Glenn Fahrig and Greg Peiffer, Ph.D, Bureau of Alcohol, Tobacco, Firearms and Explosives*

Half Day Workshop - Afternoon- Tuesday, May 10 - (Member \$100/Non-Member \$150)

Fired cartridge cases (FCCs) can be a critical piece of evidence and possibly the only evidence left at a crime scene. In this workshop, we will discuss the history of DNA analysis on FCCs, some of the obstacles, different methods of successfully analyzing FCCs, and have a hands-on demonstration.

**(W9) Emerging cell separation techniques for analysis of sexual assault evidence**

*Presented by: Tracey Dawson Green, PhD, and Sarah Seashols-Williams, PhD, Virginia Commonwealth University, Department of Forensic Science*

Full Day Workshop - Wednesday, May 11 - (Member \$150/Non-Member \$200)

Separation of individual contributions of mixed forensic samples is readily acknowledged as critical for analysis of biological evidence, and is of particular interest with the sexual assault samples frequently encountered in forensic casework. Interpretation of mixed samples is significantly simplified when those mixed cell populations are separated prior to DNA isolation. This workshop will provide an overview of a range of methods that separate cells prior to DNA isolation, and will introduce both methods currently in use for casework as well as those still under development. These methods range from simple size and filtration methods to laser-capture microdissection, optical trapping, DEP Array, flow cytometry and microchip-based automated methods. Upon completion of this workshop, participants will have attained a higher understanding of the morphological, structural and biochemical differences between the cells of interest to the forensic scientist, as well as an understanding of the methods that could soon be implemented for differential cell separation.

**(W10) Operationalizing Next-Generation Sequencing for Missing Persons Investigations**

*Presented by: Melissa Kotkin, Verogen (MAAFS Vendor)*

Half Day Workshop - Afternoon - Wednesday, May 11 - (Member \$100/Non-Member \$150)

Every year, 4,400 unidentified bodies are recovered in the US, according to the National Missing and Unidentified Persons System (NamUs). National databases like CODIS can provide a powerful framework for tracking repeat crime and confirming identity and yet their utility is limited in missing persons investigations, identifying only approximately one percent of unidentified recovered remains. In the last few years, next-generation sequencing (NGS) has demonstrated that it can extract additional information from DNA samples when current technology fails. When a CE-based STR profile does not produce a hit in CODIS, NGS capabilities such as higher-plex marker panels, more discriminatory SNP data, and forensic genetic genealogy can provide insights that lead to case resolutions and identifications. The forensic community recognizes that this technology is a viable option for DNA analysis and is exploring how it can be integrated into standard operations. This workshop will explore the utility and implementation of next-generation sequencing in missing persons investigations, including the business case for using NGS, privacy and database considerations, markers and techniques including STRs, SNPs, and FGG, and case studies.

## **QUESTIONED DOCUMENTS SECTION WORKSHOPS**

### **(W11) Forensic Examination of Handwritten Electronic Signatures**

*Kathleen Annunziata Nicolaidis, Associated Forensic Laboratory, LLC*

Full Day Workshop - Wednesday, May 11 (Member \$150/Non-Member \$200)

Attendees will learn what to do when a handwritten electronic signature case lands on their desk. Attendees will also learn how to forensically examine handwritten electronic signatures. This workshop will include plotting and comparing handwritten electronic signatures to other handwritten electronic signatures as well as copies of wet-ink signatures. Advanced plotting techniques will be taught. This is a hands-on workshop with multiple practical problems. The purpose of this workshop is to familiarize document examiners with this type of signature examination.

**Additional QD Workshop(s) To Be Determined - Will be held Tuesday, May 10**