WORKSHOP ABSTRACTS

May 6-9, 2025 - Richmond, VA

TUESDAY, MAY 6th

(W1) Uncovering the Evidence: A Hands-On Approach to Teaching Forensic Science – Chemistry Focus

Presented by: Cristy Kissel - Fort Mill School District

Full-Day Workshop - 8:00am - 5:00pm (Member $250/Non-member $300)

Bring the intrigue of forensic science into your classroom with this dynamic, hands-on workshop designed for high school educators. Participants will immerse themselves in the exciting intersection of science and criminal investigation, exploring topics such as arson, drug chemistry, forensic toxicology, trace analysis, glass, impressions, and fingerprint development.

Through guided lab activities, educators will learn how to create engaging, inquiry-driven lessons that develop students' critical thinking, problem-solving, and teamwork skills. This workshop emphasizes practical implementation, providing participants with classroom-ready activities and tips for using cost-effective materials.

By the end of the session, participants will have a thorough understanding of how to teach core forensic science concepts while integrating science and math into an engaging and interdisciplinary curriculum. Leave inspired to cultivate curiosity and empower students with the skills of a forensic scientist!

(W2) Advanced Ignitable Liquid Data Interpretation

Presented by: Brenda Christy - Virginia Department of Forensic Science and Kimberly Kunkler - Marshall University

Full-Day Workshop - 8:00am - 5:00pm (Member $250/Non-member $300)

The analysis of fire debris samples is complicated by several factors, including complex matrices and the analysis scheme used for sample preparation and data collection. Complex matrices can mimic some aspects of petroleum-based ignitable liquids. The standardized sample extraction techniques each have their own strengths and limitations, and analysis using instrumental methods that are not adequately optimized can impact the data. These factors, coupled with the subjective nature of pattern recognition in fire debris analysis, can give rise to varying opinions about the presence of ignitable liquids in complex samples. In this workshop, the presenters will provide the most recent information on data interpretation, ASTM standardization and logic workflows for evaluating complex GC-MS data. The bulk of the workshop will consist of group interpretation and discussion of complex, "real world" samples.

(W3) The Basics of Agilent ChemStation Macros

Presented by: Eugene Zegocki - Monroe County Crime Laboratory

Full-Day Workshop - 8:00am - 5:00pm (Member $250/Non-member $300)

Agilent GC/MS instruments are the core instrumentation for the majority of laboratories performing fire debris and controlled substances analyses. Many analysts use the simple and reliable Agilent ChemStation software for data analysis. Agilent's newer software, MassHunter instrument control, uses ChemStation macros as well.

Macros are blocks of code that make ChemStation software work. Therefore, even basic knowledge about ChemStation macros is beneficial. It allows one to customize existing macros, design and modify reports, automate tasks, and search for data, ultimately saving time and reducing manual repetitive routine tasks.

The full day workshop covers the following topics:

- General ChemStation software info
- ChemStation variables
- ChemStation commands and functions
- Control statements
- Working with files
- Working with windows
- Printing
- Integration and library searches
- Some other often used commands
- Explanation of three commonly used macros

It is expected that as a result of the workshop attendees will understand the basics of Agilent ChemStation software programming.

Attendees are encouraged to bring their own laptop with installed Agilent ChemStation for hands-on exercises, however, this is not required.

(W4) STRmix Testimony 101: When The Going Gets Tough – Using STRmix and Testifying at Court

Presented By: Dr. Michael Coble - Center for Human Identification & College of Biomedical and Translational Science, Dr. Tim Kalafut - Sam Houston State University, Amber Rasmussen - Wisconsin State Crime Laboratory

Half Day Workshop - 8:00am - 12:00pm - (Member $200/Non-Member $250)

What is the most effective way to describe a STRmix likelihood ratio to a jury? How should the DNA analyst prepare for trial? What should an analyst do when standard testimony unexpectedly veers into details typically reserved for admissibility hearings? How can one explain the model STRmix uses? What is an HPD? Who are Gelman and Rubin? This workshop will combine lectures and group discussion to provide attendees with the tools to excel in their first, second, or 100th STRmix testimony.

(W5) UV/VIS/IR Imaging: Triage, Results, and Efficiency (Latent Prints)
Presented by: Derek Hardy - Arrowhead Forensics [MAAFS Vendor]
Half Day Workshop - 8:00am - 12:00pm - (Member $150/Non-Member $200)

The use of UV/VIS/IR Imaging is becoming widespread through the forensics industry. Forensic Scientists, Latent Examiners, Photographers, and Forensic Investigators are utilizing this technology to further their ability to locate, capture, and analyze items of evidence that were once considered far less likely to yield positive results. The ability to "triage" items of evidence resulting in the visualization of latent fingerprints and other forms of evidence prior to processing has positively impacted the workflow and mindset of forensic professionals domestically and internationally. In this workshop we will discuss the ways UV/VIS/IR imaging technology can be used to improve results and efficiency within the forensic industry. Discussion, presentation, and real-life practical exercises and examples will aid in this workshop.

(W6) STRmix Admissibility Challenges: The Tough Get Going – Preparing for Admissibility Hearings
Presented By: Dr. Michael Coble - Center for Human Identification & College of Biomedical and Translational Science, Dr. Tim Kalafut - Sam Houston State University, Amber Rasmussen - Wisconsin State Crime Laboratory, Graham M. Stolle - Eastern District of Virginia United States Attorney & City of Norfolk Commonwealth's Attorney, Gray Collins - City of Colonial Heights Commonwealth's Attorney
Half Day Workshop - 1:00pm - 5:00pm - (Member $200/Non-Member $250)

Admissibility hearings for STRmix seem to be a thing of the past. Or are they? Recent hearings related to STRmix have focused on the suitability of the code, "bugs", and the availability of the software for examination of the code itself. Additional challenges have been raised related to validation studies, especially those related to numbers of contributors and mixture with related persons. This workshop will cover recent events related to STRmix admissibility challenges, lessons that can be learned from prior inadmissible decisions, and methods to prepare both the analyst and calling attorney for an admissibility hearing.

(W7) Instrument Troubleshooting and Maintenance
Presented by: Delisa Dalgleish, Chad Schennum, Jason Bishop, and Chad Harris - Virginia Department of Forensic Science
Half Day Workshop - 1:00pm - 5:00pm - (Member $150/Non-Member $200)

Virginia Department of Forensic Science presents an interdisciplinary workshop on Instrument Troubleshooting and Maintenance. This workshop is geared towards providing an overview of the troubleshooting process, common in-house preventative maintenance activities that can decrease the potential for instrument problems, and real-life examples where troubleshooting was necessary. The primary focus is on Gas Chromatography instruments used in Toxicology, Trace, [and Controlled Substances] disciplines, and Liquid Chromatography instruments used in Toxicology. Speakers will also provide tips depending on which detector is incorporated into the instrument (e.g. NPD, FID, MS).

(W8) Incorporating 3D Scanning and Modeling in Shooting Incident Documentation and Other Forensic Applications

Presented By: Dr. Rhys Williams, Marion Davidson, and Jon Fried - Loyola University Maryland [MAAFS Vendor]

Half Day Workshop - 1:00pm - 5:00pm - (Member $150/Non-Member $200)

Attendees of this workshop will learn the basic approach to documenting bullet impacts and the use of trajectory rods to document and measure angles of impact. They will then practice the technique on drywall samples with existing bullet holes in them. Next, attendees will use digital imaging tools including 3D scanner, iPad and mobile devices to record 3D scans of the trajectory rods in place and learn how to best capture and process the scans into a final virtual model. These will then be digitally measured following the physical analysis stages. Finally, attendees will learn about additional uses for 3D modelling, including research, training, and evidence presentation in court, as well as practical applications within forensic pathology, forensic anthropology, and forensic odontology.

Please note - attendance is limited to 16 attendees. Attendees must have a laptop with MeshLab and Autodesk Meshmixer (both free) to process the scans. They are also welcome to bring their own scanner for additional practice.

WEDNESDAY, MAY 7th

(W9) Uncovering the Evidence: A Hands-On Approach to Teaching Forensic Science – Biology Focus

Presented by: Cristy Kissel - Fort Mill School District
Full Day Workshop - 8:00am - 5:00pm - (Member $250/Non-member $300)

Bring the intrigue of forensic science into your classroom with this dynamic, hands-on workshop designed for high school educators. Participants will immerse themselves in the exciting intersection of science and criminal investigation, exploring topics such as death investigation, forensic biology/DNA, blood spatter, anthropology and entomology.

Through guided lab activities, educators will learn how to create engaging, inquiry-driven lessons that develop students' critical thinking, problem-solving, and teamwork skills. This workshop emphasizes practical implementation, providing participants with classroom-ready activities and tips for using cost-effective materials.

By the end of the session, participants will have a thorough understanding of how to teach core forensic science concepts while integrating science and math into an engaging and interdisciplinary curriculum. Leave inspired to cultivate curiosity and empower students with the skills of a forensic scientist!

(W10) Questioned Documents: Various Writing Instruments and Their Impact of Signature Examinations

Presented by: Nancy Cox - NMCox Consulting, Inc. and Jeffrey Payne - Applied Forensics
Full Day Workshop - 8:00am - 5:00pm - (Member $250/Non-member $300)

This workshop will provide an overview of both traditional and modern writing instruments and their impact on signature examinations. After a brief review of traditional writing instruments and their characteristics, the workshop will provide hands-on examinations of questioned signatures produced using a ballpoint pen, finger, stylus (digital pad), crayon, sharpie and weighted pen.

(W11) Detect More Evidence: Extend Your Search Beyond the Visible (Biological Fuids and Trace Evidence)

Presented by: Nathan Carey - Foster + Freeman [MAAFS Vendor]

Half Day Workshop - 8:00am - 12:00pm - (Member $150/Non-Member $200)

Various types of evidence are often overlooked because they are not visible to the naked eye. When using an alternate light source with the proper corresponding filter, it is still possible to miss items of evidence such as biological fluids and trace evidence due to background interference or improper angle of illumination. The purpose of this lecture will be to introduce attendees to various methods utilized in detecting evidence beyond the visible range. An introduction to light theory and techniques utilizing wavelengths of light beyond the visible range on notoriously difficult surfaces will be discussed. This will include ultra-violet and infrared examination to detect the presence of biological fluids and gunshot residue. Novel oblique lighting techniques will be explored to detect footwear impressions. Bandpass filtering techniques will also be explored to aid in the detection of evidence at crime scenes.

(W12) Justice v. Ethics: How Forensic Scientists Can Navigate Ethical Dilemmas in the Courtroom

Presented By: Theresa DeAngelo - Maryland State Police Forensic Sciences Division and Dr. Kelly Elkins - Towson University

Half Day Workshop - 8:00am - 12:00pm - (Member $150/Non-Member $200)

Ethics as it applies to Forensic Science is recognized as the rules of conduct in respect to the application of scientific principles and practices to the adversarial process where guilt or innocence is determined in court. But what occurs when the results of the science presented in court conflict with the goals of those of the prosecuting attorney? What if the questions asked to a scientific witness from an attorney is misleading or does not allow the evidence results to be fully introduced in court? Where does the ethical obligation lie for the scientific witness? How do you adequately prepare an expert witness to testify? How does one prepare for such ethical challenges? What training is available for forensic scientists regarding courtroom ethics? During this workshop, these questions will be explored and guidance will be provided for several ethical challenges that forensic scientists may face in the courtroom.

(W13) General Chemistry: A Review for the Forensic Scientist

Presented by: Neil K. Vowels - Virginia Department of Forensic Science

Half Day Workshop - 8:00am - 12:00pm - (Member $150/Non-Member $200)

This half-day workshop is intended as a refresher for general Chemistry principles as they apply to analyses that we forensic scientists perform daily. It may have been anywhere from 4 - 30+ years since you have taken a General Chemistry course, so there is a chance that fundamental chemical knowledge that is inherent in your analysis may have been forgotten. A foundational knowledge base is needed to shore up our understanding of how our analysis produces its results. Throughout this workshop we will explore concepts including but not limited to molarity versus normality, acid-base chemistry, solutions, extractions, fluorescence, and nomenclature.

(W14) Trace Evidence: Understanding and Implementing OSAC IGSR Standards
Presented by: Mary Keehan, Virginia Department of Forensic Science and Thomas (Rusty) White, Texas Department of Public Safety
Half Day Workshop - 8:00am - 12:00pm - (Member $150/Non-Member $200)

With the growth of the OSAC registry and introduction of new standards comes the need for adaptation at the laboratory level. Join us for an overview of the science behind current and proposed OSAC IGSR standards and work items along with practical tips on how these can be implemented at the laboratory level. The following standards and work items will be discussed including the update of E-1588 from a Standard Practice to a Test Method.

OSAC Registry Standards:

- ANSI/ASTM E1588-20 Standard Practice for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry (added September 7, 2021)
- ANSI/ASTM E3284-23 Standard Practice for Training in the Forensic Examination of Primer Gunshot Residue (pGSR) Using Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry (SEM/EDS) (added September 3, 2024)
- ANSI/ASTM E3309-21 Standard Guide for Reporting of Forensic Primer Gunshot Residue (pGSR) Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry (SEM/EDS) (added September 6, 2022)
- ANSI/ASTM E3391-24 Standard Terminology Relating to Gunshot Residue Analysis (added October 1, 2024)
- OSAC 2023-N-0010 Standard Practice for the Collection of Primer Gunshot Residue (pGSR) Particles from Clothing Vehicles and Other Inanimate Objects using Scanning Electron Microscopy (SEM) Stubs (added November 7, 2023)

Work Items:

- ASTM E1588-2x Standard Test Method for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry
- ASTM WK72526 Guide for Opinions on the Interpretation of Primer Gunshot Residue (pGSR) Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry (SEM/EDS)

(W15) QIAGEN NGS Workflow: The Portfolio, The Science, and Utilizing Forenseq Kintelligence for FIGG
Presented by: Amber McManus and Lisbeth Colon - QIAGEN [MAAFS Vendor]
Half Day Workshop - 1:00pm - 5:00pm - (Member $150/Non-Member $200)

By attending this half-day workshop, registrants will gain insight into the QIAGEN NGS portfolio and the basic scientific principles of sequencing on the MiSeq FGx instrument. We will address how to implement NGS in your laboratory and introduce attendees to the QIAGEN missing persons workflow. We will discuss how our Kintelligence kit was designed and why it is truly a fit for purpose kit for Forensic Investigative Genetic Genealogy (FIGG). We will also demo our Universal Analysis Software (UAS) and give an overview of GEDmatch/GEDmatch Pro.

(W16) Forensic Toxicology: From Testing to Testimony and Beyond
Presented by: Robyn Amos-Kroohs, Jesse Patterson, Rebecca Wagner, Heather Ciallella, and Luke Garcia - Virginia Department of Forensic Science, Aracelis Velez - Maryland Office of the Chief Medical Examiner, Carl Wolf - Department of Pathology at VCU Health, Edward Zumaeta - Palm Beach County Sheriff's Office
Half Day Workshop - 1:00pm - 5:00pm - (Member $150/Non-Member $200)

This half-day workshop will provide a broad overview of forensic toxicology covering method development, analytical testing of evidence, testimony in court settings, and possible future directions within the field. The workshop will start with a presentation related to human performance and postmortem testing schemes, including the types of evidence tested as well as common types of instrumentation used within the field. Further presentations will highlight some specific technical aspects of forensic toxicology including optimizing testing for carbon monoxide in postmortem samples, how novel THC derivatives impacted accurate screening in urine samples, and current work on method validation for hallucinogens. An additional presentation will offer information on how toxicology results are translated into a court setting, with emphasis on preparing for court and being an effective expert witness using fun case studies. Finally, the workshop will conclude with a forward-looking presentation discussing leveraging artificial intelligence strategies to predict toxicity and enhance case interpretation.

(W17) Introduction to IR Spectral Interpretation
Presented by: Ronald Rubinovitz - Thermo Fisher Scientific [MAAFS Vendor]
Half Day Workshop - 1:00pm - 5:00pm - (Member $150/Non-Member $200)

FTIR is a well-established technique used to identify unknown materials typically by comparisons between a measured spectrum and a database of stored reference spectra. Often these search results are quite successful, however, situations arise when an unknown spectrum’s material is not part of the existing database, or additional unexpected peaks are observed. When this occurs, the ability to assign spectral peaks to functional groups becomes an invaluable aid in characterizing the sample. The emphasis of this workshop will be an overview of the techniques used in the spectral interpretation of FTIR spectra. Starting with a review of how the positions and intensities of IR peaks relate to the molecular bonds of the sample of interest, this workshop will cover basic strategies for interpreting spectra by detecting commonly found functional groups (alkenes, aromatics, carbonyls, alcohols, etc.) appearing in spectra. This will include a review of IR correlation chart information for each specific functional group, followed by the step-by-step interpretation of example spectra.

(W18) Codebreaking in Forensics: Unveiling Secrets for Law Enforcement

Presented by: Melissa Adams and Kirsten Knapp - FBI Laboratory

Half Day Workshop - 1:00pm - 5:00pm - (Member $150/Non-Member $200)

In an era where digital communication predominates, the ability to decipher encrypted messages is crucial for law enforcement agencies seeking to solve crimes and uphold justice. This workshop, hosted by two forensic examiners in the FBI Laboratory's Cryptanalysis and Racketeering Records Unit, is designed to equip participants with the essential tools and techniques for recognizing ciphers and codes. Participants will engage in hands-on activities to crack common encryption methods and gain insights into the latest trends. By examining case studies, attendees will learn how effective cryptanalysis can uncover vital evidence, enhance investigations, and ultimately support the prosecution of criminal activities. Join us to enhance your investigative toolkit and collaborate with experts dedicated to deciphering the hidden messages that can change the course of justice.

(W19) Translating GSR Research to Practice: An Interactive and Collaborative Workshop About Implementation Plans and Overcoming Potential Challenges

Presented by: Tatiana Trejos & Leah Thomas - West Virginia University and Monica Joshi - West Chester University

Half Day Workshop - 12:30pm - 5:30pm - (Member $150/Non-Member $200)

Over the past decade, the forensic community has experienced a significant increase in turnaround times, backlogs, and the costs associated with analyzing gunshot residue (GSR). [1–8] Properly communicating GSR evidence's scope, capabilities, and limitations to end-users can prevent mistaken expectations, but it's not always strategically channeled. Consequently, some forensic laboratories are facing difficulties in maintaining GSR services despite the crucial role it can play in firearm-related crimes. The scientific community and groups such as the Organization of Scientific Areas Committee (OSAC) have identified research needs to overcome these gaps. The needs primarily focus on developing consensus-based methods to analyze organic gunshot residue (OGSR) to complement current practices, alongside studies on the persistence and transfer of GSR. [9,10]

This workshop aims to provide an update on the current research base and standards being developed at the OSAC GSR group to address the feasibility of adopting OGSR in forensic agencies. Awareness of best implementation practices will be raised following the RTI International Forensic Science Translation and Implementation Program. [11]

This workshop will serve as a central hub for disseminating recent findings in this field, fostering collaboration, and gathering insights from practitioners, managers, policymakers, and researchers. Several key aspects of modernizing GSR services will be covered. First, we will discuss the peculiarities of OGSR and IGSR deposition, transfer, and persistence mechanisms and how these can be used for interpreting combined inorganic and organic data. Second, recommendations for methods for OGSR analysis using casework-like samples and realistic circumstances. These

include preserving organic constituents without compromising the pGSR during the stages of recovery in the scene, transportation, and laboratory analytical processes. Finally, we will discuss the potential impact on the criminal justice system from a cost-benefit perspective.

A recent survey of law enforcement and forensic laboratory personnel gathered information about current collection protocols, analysis, and interpretation of GSR evidence. Of 48 forensic laboratory participants, 20% indicated that their agencies consider incorporating organic gunshot residue (OGSR) analysis into their workflows. However, due to the volatile nature of OGSR, many professionals question its viability and compatibility with existing methods. Furthermore, forensic laboratories often face significant backlogs, during which evidence is frequently stored under conditions that may not be optimal for the later analysis of volatile compounds. In this workshop, we will look at these concerns from the optic of research evidence and discuss the implications of the findings for laboratory adoption.

The workshop will be structured to promote engagement and interactive discussions between the participants. It will introduce GSR's needs, values, challenges, and standard development. Then, research findings will be exposed through “data walk” sessions. Participants will rotate through stations where data is displayed, and they can post their thoughts to discuss and reflect on the data in group sessions. A guided discussion will follow to assess adoption strategies and effective communication of expectations to end users.