



WORKSHOP ABSTRACTS

May 16-19, 2023 - Pikesville, MD

WORKSHOPS OPEN TO ALL SECTIONS

(W1) Courtroom Communication for Forensic Scientists - an Alda Method Workshop

Presented by: Julie Burrill and Josh Rice - Alan Alda Center for Communicating Science, Stoney Brook University

Full Day Workshop - Tuesday, May 16 - (Member \$200/Non-Member \$250) - Space limited

Communicating science in the courtroom is an essential aspect of the criminal justice process for any case involving forensic evidence. There are some substantial challenges for forensic scientists within the courtroom environment including the interrogative structure of testimony, as well as the varied audiences, specialized language and adversarial narratives. This workshop will address those challenges using research-driven communication principles to help scientists convey nuanced interpretation while preserving accuracy and expressing scientific limitations. The Alda Method is a unique communication training technique that blends improvisational theater exercises with audience-focused method-design strategies. Driven by the adaptability and active listening at the core of improvisation and the empathy and connection prescribed by social science research, the Alda Method provides strategic approaches for communicating science to non-expert audiences by prioritizing their engagement and comprehension experience. These principles have been applied to the new Courtroom Communication for Forensic Scientists workshop. Like many Alda Center workshops, ideas of centering your audience and being empathic and flexible as a communicator are fundamental to this training. Within the formal structure of courtroom testimony, many of the opportunities for genuine connection, non-verbal communication cues, and relaxed scientific storytelling are removed, so our training focuses in part on ways to reestablish that essential connection. Participants should expect to be actively involved in the exercises, ideally including video recording and interactive feedback from peers. Participants will learn valuable skills like analogy building, active listening, language adjustment, and engaging with challenging questions, as well as iterative mock testimony practice to enhance their science communication toolbox.

(W2) Triageing Forensics- Streamlining the Workflow to Reduce the Backlog

Presented by: Dana Y. Keiter, MS., Jennifer D. Moran, and Monia E. Vincent - Baltimore Police Department

Half Day Workshop - Afternoon - Tuesday, May 16 - (Member \$100/Non-Member \$150)

A four-hour workshop that includes the merging of two high throughput laboratory units from the Baltimore Police Department to not only streamline the workflow to reduce backlog but also introduce new and improved methods such as the Vacuum Metal Deposition for latent print processing and DNA analysis. This workshop will discuss the transformation and implementation of the new Forensic Processing Unit, a unit in which analysts preserve biological material in addition to processing for latent prints.

Initially, the Screening section of the Forensic Biology Unit was created to combine serological testing and latent print processing methods. This model was based on the basic triage system to reduce turnaround time, thus reducing a unit's backlog. New methods of latent print processing were also validated in order to yield a higher number of suitable prints.

Many laboratories employ separate Biology and Latent Print Units, however, resulting in multiple units having to process and transfer evidence. By merging serology and latent print processing, the evidence was screened by one analyst and suitable results were forwarded to the DNA Unit and the Latent Print Unit for further analysis.

The first part of the workshop will provide a historical overview of both Biology and Latent Print units prior to the implementation of the Screening section to include backlog and turnaround times for both sections. The main priorities for merging the two sections included training, protocol and SOP changes, documentation changes based on currently used reports and worksheets, and validating new methods. Success depended on reconstructing the current workspace, creating awareness throughout the department and State's Attorney Office of the new policies and procedures, purchasing new equipment, and training new analysts as the general workflow direction was changed. New techniques included Lumicyano, 1, 2- Indanedione, Vacuum Metal Deposition processing, Crystal Violet, Rhodamine 6G, and Sticky Side Powder Kit.

The final portion of the workshop will cover the current state of the Forensic Processing Unit (what was previously known as the Screening Section), its goals and collaborations between the Forensic Biology, Firearms, Crime Scene, and Latent Print Units. Topics to be discussed include DNA contamination and inhibition, DNA analysis after latent print processing methods, and latent print processing after crime scene processing. Case examples from the Forensic Processing Unit will be discussed and also include question and answer time.

Learning objectives, participant goals, and desired outcomes:

This course will introduce a new approach to processing evidence for both biological evidence and latent prints. Participants will develop an understanding of new processing methods that can be used in conjunction with serological screening tests. Throughout the workshop, both advantages and disadvantages will be discussed regarding the merging of two formerly independent units.

(W3) The Science of Forensic Science for High School Educators

Presented by: Cristy Kissel - Fort Mill High School

Full Day Workshop - Wednesday, May 17 - (Member \$150/Non-Member \$200)

Forensic Science is a growing science field for high school courses as new standards directed toward next generation and STEAM science curricula focuses on real world applications of science based skills and cross curriculum with mathematics and technology . This workshop will introduce forensic science educators to the science behind forensic science and how to incorporate these into your curriculum from a forensic scientist perspective. This hands-on class may (schedule will be determined later) include such topics as:

- Crime Scene Processing for Large Groups of Students
- Basic Fingerprinting Techniques and/or Chemical Processing of Fingerprints
- Basic Blood Detection and Analysis and/or Advanced Bloodstain Pattern Analysis
- Hair & Fiber Analysis
- Forensic Anthropology and Entomology
- Arson Investigations
- DNA Analysis in the Forensic Science Classroom
- Forensic Analysis of Glass

(W4) The Impact of Ethics in Forensic Sciences- learning how education, training, standards and law shape ethics in forensic science

Presented by: Theresa DeAngelo - Maryland State Police and Kelly Elkins - Towson University

Half Day Workshop - Morning - Wednesday, May 17 - (Member \$100/Non-Member \$150)

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. As forensic scientists, it is important to continue crucial ethical discussions from the past and ensure we incorporate new material focused on ethics for the future. In this workshop attendees will explore and learn techniques and exercises for forensic ethics education and training. Attendees will also gain a better understanding of how current standards (accreditation, etc.) and new legislation (introduction of new laws) raise new ethical concerns for forensic scientists.

CRIMINALISTICS SECTION WORKSHOPS

(W5) Statistical Sampling for Seized-Drug Forensic Analysis

Presented by: Jack Prothero and Will Guthrie - NIST and Sandra E. Rodriguez-Cruz - DEA
Full Day Workshop - Tuesday, May 16 - (Member \$150/Non-Member \$200)

This full-day workshop will present tools and techniques for both conceptualizing and deploying statistical sampling plans in seized-drug forensic laboratories. Topics covered will include sample size selection, uncertainty quantification, generation of appropriate population inferences for net weight and identification purposes, and appropriate reporting language for net weight, unit count, and extrapolation scenarios. The workshop will culminate in working through hands-on examples derived from casework and from scenarios suggested by the jurisdiction practices of the attendees. Attendees should bring examples of real casework situations and a device compatible with web-based and Excel-based applets, if able. We can also provide laptop computers for the duration of the workshop to attendees as necessary by advance request.

(W6) Pressure Sensitive Tape Basics: Forensic Techniques, Data Analysis, and Interpretation

Presented by: Andria Mehlretter - FBI Laboratory
Full Day Workshop - Tuesday, May 16 - (Member \$150/Non-Member \$200)

Forensic analysis of pressure sensitive tapes, specifically duct tape, electrical tape, and packaging tape, will be the subject of this introductory-to-intermediate level workshop.

The primary aim of this workshop is to familiarize attendees with the basics of forensic tape analysis, including tape fundamentals, sample preparation, data analysis, and interpretation and report writing. Manual techniques will be demonstrated for the analysis of pressure sensitive tapes, including separation of wadded tape pieces, evaluation of physical characteristics (e.g., backing layer structure of duct tapes, optical properties of packaging tapes), and sample preparation for various analytical techniques. Attendees will be provided opportunities to practice these techniques and evaluate the physical characteristics of multiple types of tape.

Subsequently, data will be provided to demonstrate typical spectral results and allow attendees opportunities to practice interpreting data from commonly used analytical techniques. Group discussions will ensue regarding identification of tape components and comparisons of tape samples via spectral analysis. Not only will data from various analytical techniques be interpreted, but attendees will also assess and discuss the combined significance of the results from a comprehensive analytical scheme, and report writing examples will be shared.

Attendees are encouraged to bring interesting samples to share, small tools/equipment to demonstrate some of their own tricks-of-the-trade, or copies of their own data for group discussion.

(W7) Forensic Applications of DART/time-of-flight mass spectrometry

Presented by: Robert (Chip) Cody - JEOL USA, Inc (MAAFS Vendor)

Half Day Workshop - Morning - Wednesday, May 17 - (Member \$100/Non-Member \$150)

The AccuTOF-DART Direct Analysis in Real Time time-of-flight (DART-TOF) mass spectrometer was introduced in 2005 and rapidly found applications to forensic science. The application of DART-TOF to drug screening was initially developed and validated at the Virginia Department of Forensic Science, with the creation of a searchable database of DART-TOF mass spectra of drugs measured at four collision energies. In recent years, NIST has taken over the management and distribution of the DART Forensic Databases, including the original Virginia DFS database and a newly created NIST DART drug database which is expanding to include new psychoactive substances. DART-TOF analysis is a SWGDRUG Category A method that rapidly provides elemental composition information and searchable fragment-ion mass spectra.

While the AccuTOF-DART system has been widely applied to drug screening, the system has also found use in other forensic fields including questioned documents, trace evidence, and the detection of illegally traded timber from endangered species. The workshop will include lecture on the basic principles and forensic applications of the AccuTOF-DART system, followed by demonstrations in the laboratory with a focus on drug chemistry.

*This workshop will be held off-site at the Maryland State Police Forensic Sciences Division Pikesville Facility. Transportation will be provided.

(W8) Benchtop NMR for Identification and Purity Measurement in Drug Analysis

Presented by: Hector Robert and Robert Espina - Magritek (MAAFS Vendor)

Half Day Workshop - Morning - Wednesday, May 17 - (Member \$100/Non-Member \$150)

Forensic Scientists require a quick and reliable method that will give specific identification and accurate purity quantitation for drug analysis. Magritek's Benchtop NMR is an ideal NMR solution for forensics labs due to its small footprint, simple sample preparation and quick analysis time. NMR Spectroscopy is an invaluable technique to determine identity and purity in one measurement. In this workshop we will describe and demonstrate the use of benchtop NMR and software tools for quick and easy drug identification using a customized database, and automated purity analysis

(W9) Basics of Drug Extraction from a Biological Matrix

Presented by: Ellen Hondrogiannis and Taylor Shafirovich - Towson University

Half Day Workshop - Afternoon - Wednesday, May 17 - (Member \$100/Non-Member \$150)

This workshop will cover all the steps needed to carry out the solid phase and liquid-liquid extraction of a drug from a biological matrix. It will also cover the GC/MS analysis of the drug to include the use of ion ratios to identify the drug.

Attendees will learn 1) solution preparation (with internal standard); 2) buffer preparation; 3) identifying acidic and basic functional groups; 3) choice of pH; 4) choice of SPE column and steps for extraction; 5) derivatization; 6) making calibration curves with internal standards; 6) GC-MS basic overview, choosing the right ions, and data analysis.

(W10) Mass Spec Acquisition Parameter Optimization, Source Cleaning Tips, and What Really Happens When You Tune

Presented by: Kirk Lokits and Alexis Willey - Agilent (MAAFS Vendor)

Half Day Workshop - Afternoon - Wednesday, May 17 - (Member \$100/Non-Member \$150)

The MS workshop will focus on the fundamental aspects of operational theory, optimizing acquisition parameters for spectral fidelity and method stability. Attendees will have the opportunity to perform hands-on dis-assembly and reassembly of an EI source, discuss best practices for cleaning the source, and logical troubleshooting and maintenance of MS and vacuum system. An in-depth discussion of the tuning process and what's occurring during the tuning process will be presented. Initial plans are to have a standalone MS system in the room for discussion and troubleshooting tips. The amount of individual hands-on participation will depend on the size of the class. (Optimal class size ~25-30 students)

BIOLOGY SECTION WORKSHOPS

(W11) Science Behind ALS (Alternate Light Source) Imaging

Presented by Logan Eickhoff and Neal Schrode, Leeds Forensic Systems, Inc. (MAAFS Vendor)
Half Day Workshop - Morning - Tuesday, May 16 - (Member \$100/Non-Member \$150)

ALS imaging is used in forensics to screen for physical evidence such as bodily fluids, gunshot residue, and trace evidence. This workshop will give a brief explanation of how various ALS techniques work. It will cover fluorescent, absorption, and near-infrared contrast methods, giving examples of each and explaining the science behind each method. The LSV2 (Leeds' Alternate Light Source Imaging Tool) will be available for hands-on application of these methods.

(W12) Using Next-Generation Sequencing to Improve Casework Outcomes

Presented by Melissa Kotkin, Verogen (MAAFS Vendor)

Half Day Workshop - Morning - Tuesday, May 16 - (Member \$100/Non-Member \$150)

Description: In the last few years, next-generation sequencing (NGS) has demonstrated that it can extract additional information from DNA samples for investigations when current technology fails. When a CE-based STR profile does not produce a hit in traditional databases, NGS capabilities such as higher-plex marker panels, more discriminatory SNP data, and forensic genetic genealogy can provide insights that lead to identifications. The forensic community is recognizing this technology as a viable option for missing persons and unidentified human remains investigations, sexual assault cases, and other violent crimes and are exploring how it can be integrated as more than just a specialty tool. The questions being asked are now focused on the practical aspects of implementation, such as whether this technology is a good financial investment, whether NGS can benefit everyday investigations, and how do you validate. This workshop seeks to share the journey of adopting NGS into their operational casework, and will provide useful information, arguments, case studies, and soft skills as you prepare for your own.

The benefits of next-generation sequencing (NGS) for human identification analysis are increasingly understood but perceived barriers to implementation for general operations still exist. NGS can not only add power to existing processes but also provide unique capabilities for the increasing number of investigations which are beyond the capacity of traditional methods to solve. We will highlight how a range of NGS- based investigative tools can be used to support both mainstream and more advanced analyses for missing persons investigations. This workshop will cover traditional direct comparison DNA analysis with STRs, how to access and use phenotypic and biogeographical information, the different available technologies for forensic investigative genetic genealogy and when to use them, practical workflows that can be implemented into routine laboratory operations, and funding opportunities for NGS.

(W13) Advancements in DNA Technology

Presented by Rachel H Oefelein, DNA Labs International (MAAFS Vendor)

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

This workshop will provide attendees with an overview of new DNA technology already available and becoming available in 2023, starting with Next Generation Sequencing (NGS). Topics will cover the choice between manual and automated processing, validation studies specific to NGS that will need to be employed, the process of modifying your scope of accreditation, staff selection for training, and necessary implementation steps while keeping our eyes forward on the goal of courtroom admissibility. A sneak peek at how the analysis software functions and successful forensic genetic genealogy cases will also be highlighted! Second, improvements to automation for sexual assault kit (SAK) processing to handle the higher volume of SAKs being processed throughout the country will be addressed. The choice to maintain or cease serology testing of SAKs will be explored along with options to increase the throughput of serology testing. Next, an overview of other technologies, such as MVac, SpentShell, Hair Shaft testing, Phenotyping, and advanced kinship will be addressed. Finally, research developments on secondary transfer, activity-level propositions, and evaluative reporting will be addressed. A framework for how to conduct evaluative reporting from research collection to testimony will be reviewed.

(W14) Presenting Probabilistic Genotyping Accurately and Effectively to a Judge and Jury

Presented by: Christina Hurley - Baltimore Police Department and Lauren Lu - Michigan State Police

Full Day Workshop - Wednesday, May 17 - (Member \$150/Non-Member \$200)

The goal of this workshop is to prepare DNA Analysts/Technical Leaders for testimony involving probabilistic genotyping, from the viewpoint of an Analyst and DNA Technical Leader. The workshop will cover testimony preparation for both Daubert hearings and trial testimony, specifically in regard to both TrueAllele and STRmix. Discussions will include: what to do when you are notified of a Daubert hearing for your case, how to prepare, how to effectively and correctly explain probabilistic genotyping to a judge/jury, Daubert questions & testimony, questions and testimony at trial with probabilistic genotyping results, and other related issues that are likely to be brought up during testimony (e.g. questioning the use of likelihood ratios). The workshop will also include breakout sessions: small groups will formulate responses to a list of recommended questions analysts can provide to attorneys in cases involving probabilistic genotyping. The groups will come back together for discussing their responses with the panelists, feedback, and exchange of ideas.

QUESTIONED DOCUMENTS SECTION WORKSHOP

(W15) Challenging Signature Workshop

Presented By: Nancy Cox - NMCox Consulting, Inc and Jeffrey A. Payne - Applied Forensics

Full Day Workshop - Wednesday, May 17 (Member \$150/Non-Member \$200)

Attendees will conduct examinations of challenging signatures to include both simulated and genuine signatures. This hands-on workshop will include reviewing the fundamentals of signature examination as well as multiple practical problems. The purpose of this workshop is to review the challenges associated with signatures, identify the examiners limitations, and determine when a qualified conclusion is required.