



WORKSHOP ABSTRACTS

May 6-10, 2024 - Pittsburgh, PA

WORKSHOPS OPEN TO ALL SECTIONS

ANAB Forensic Technical Assessor Training - ISO/IEC 17025

Monday through Thursday*, May 6-9

Special Discounted Offering! MAAFS Member \$1100/Non-Member \$1250 (Full price is \$1400)

Forensic technical assessor training is meant for anyone interested in serving as an ANAB technical assessor for the ISO/IEC 17025 accreditation program and learning the mechanics of the assessment process.

This course provides a review of ISO/IEC 17025:2017, the relevant ANAB forensic accreditation requirements, and the assessment process. In addition, through various practical exercises, classroom discussions, and a final examination, attendees will gain knowledge about the ANAB assessment process, learn numerous assessment methods, and acquire skills for performing an assessment and collecting, verifying, and recording objective evidence.

Please note: The information presented during this course assumes a basic understanding of the structure and content of ISO/IEC 17025:2017. A thorough review of the requirements is provided in the online training portion of this course but requirements will not be reviewed in detail while on site.

For more information on the course, including prerequisites, please visit

<https://anab.ansi.org/training/forensic-technical-assessor-training/>

*This course is a three day course held Monday-Wednesday, with a two-hour exam on Thursday morning. Lunch will be included for all participants on Monday-Wednesday. Breakfast will be provided Tuesday-Thursday. Participants are also welcome to attend the Welcoming and Vendor Appreciation cocktail reception on Wednesday evening.

(W1) Detect More Evidence: Extend Your Search Beyond the Visible

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

Half Day Workshop - Tuesday Afternoon, May 7 - (Member \$100/Non-Member \$150)

Various types of evidence are often overlooked at a crime scene 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 due to background interference or improper angle of illumination. The purpose of this workshop 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 evidence on raised surfaces and footwear impressions. Bandpass filtering techniques will also be explored to aid in the detection of evidence at crime scenes.

(W2) Understanding and Implementation of the Standard for Interpreting, Comparing and Reporting DNA Test Results Associated with Failed Controls and Contamination Events

Presented by: Tabitha Brandy - Bode Technology and Charlotte Word

Half Day Workshop - Morning - Wednesday, May 8 - (Member \$100/Non-Member \$150)

Each DNA testing laboratory, regardless of the type of testing being conducted, will likely be faced with situations where the required positive or negative controls have failed and/or a contamination event has occurred. While re-testing may be possible in some circumstances, this is not an option when the evidence and DNA extract have been consumed, nor is it always the prudent path to take. The Standard for Interpreting, Comparing and Reporting DNA Test Results Associated with Failed Controls and Contamination Events provides requirements for the interpretation, comparison, and reporting of DNA data associated with control failures or contamination where re-testing is not performed. Currently listed as a Proposed Standard on the OSAC Registry (OSAC 2020-S-00040) and under development for publication as an ANSI/ASB Standard (Standard 175), this standard is available for implementation in DNA testing laboratories. Implementation of this standard may be vital in situations where exculpatory/exclusionary conclusions can be made in order to avoid legal issues associated with Brady violations.

Attendees of this workshop will learn about the specific requirements for: 1) the laboratory protocols for evaluating, interpreting and comparing data associated with these events; 2) assessment of the risks of re-testing vs. not re-testing; 3) documentation; and 4) the reporting of the event and the associated data and conclusions. Guidance for using and implementing this standard along with other relevant standards will be addressed [e.g., ANSI/ASB Standard 020, Standard for Validation Studies of DNA Mixtures, and Development and Verification of a Laboratory's Mixture Interpretation Protocol, First Edition, 2018; ANSI/ASB Standard 040, Standard for Forensic DNA Interpretation and Comparison Protocols, First Edition, 2019; ANSI/ASB

Standard 018, Standard for Validation of Probabilistic Genotyping Systems, First Edition, 2020; and OSAC2020-N-0007, Best Practice Recommendations for the Management and Use of Quality Assurance DNA Elimination Databases in Forensic DNA Analysis (Best Practice Recommendation 171 with ASB)]. Various scenarios that occur in laboratories with approaches to consider for evaluating, decision-making and reporting data without re-testing will be presented along with hands-on problems and through interactive discussions. Effective communication of the data, conclusions and events to individuals in the criminal justice system through conversations, trainings and testimony will also be discussed.

At the end of the workshop, the attendees should have a solid understanding of the individual requirements in the Standard with insights on how to develop appropriate protocols and policies for addressing failed control and contamination events when re-testing of an evidence item and DNA extract is not possible or not feasible for various reasons.

This workshop may be beneficial to DNA analysts and DNA technical leaders, as well as supervisors, QA/QC managers, trainers and laboratory directors overseeing any type of testing where controls may fail or contamination can occur.

https://www.nist.gov/system/files/documents/2021/06/01/OSAC%202020-S-0004_Standard_for_Interpreting_Comparing_and_Reporting_DNA_Test_Results_with_Failed_Controls_and_Contamination%20FINAL%20OSAC%20PROPOSED.pdf

CHEMISTRY SECTION WORKSHOPS

(W3) The When, Where, Why, and How of "Magic Mushrooms"

Presented by: Jennifer Paris - New Hampshire State Police Forensic Laboratory

Half Day Workshop - Tuesday, May 7 - (Member \$100/Non-Member \$150)

This half-day workshop explores how psilocybin mushroom spores are acquired and cultivated into the fruiting bodies. Attention is paid to the growing conditions and harvesting methods of mushrooms with insight from a clandestine laboratory investigator. Time is devoted to when during development and where in the fruit that psilocin and psilocybin are detectable. The focus then shifts to analysis of the finished product, both neat and in preparations such as chocolate confections. Attendees are introduced to extraction methods and analytical schemes utilizing conventional techniques, including thin layer chromatography and mass spectrometry, as well as contemporary approaches featuring liquid chromatography and time-of-flight mass spectrometry.

(W4) MassHunter Unknowns and Qualitative Workflows for Forensic Data Analysis

Presented by: Kirk Lokits, Ph.D. and Erinn O'Neil - Agilent Technologies [MAAFS Vendor]

Full Day Workshop - Tuesday, May 7 - (Member \$150/Non-Member \$200)

The full day workshop is designed to introduce the audience to the workflows involved when using Unknowns Analysis in the MassHunter software. The workshop begins with an ~20-minute explanation of the deconvolution process, differences between deconvolution and peak integration, and some of the variables involved when using this powerful data analysis tool. Running through workflows, utilizing forensic data, the session will illustrate how to translate established workflows within MSD ChemStation Data Analysis to MassHunter Unknowns Analysis. The workshop will include how to generate an in-house library in Unknowns Analysis, how to link retention time and or retention indices to each library entry and apply these entries to increase your Library Match Score (LMS) confidence level. Examples of Unknowns Analysis reporting templates will be demonstrated from the workshop exercises. Qualitative Analysis software will also be introduced. Laptops with MassHunter software and forensic data will be provided through this full day of hands-on learning. The course is limited to the first 16 registrants due to the number of laptops available. However, additional students (~10) may join the course if they can provide their own laptop with MassHunter Quantitative and Qualitative Analysis software pre-loaded (rev 12.0 is preferred but not required) on the laptop. The forensic data files can be loaded in the morning prior to the start of the course. Please contact the course instructor if you have additional questions. Kirk.Lokits@Agilent.com

(W5) Implementation of Liquid Chromatography-Quadrupole/Time of Flight Mass Spectrometry (LC-QTOF-MS) in Forensic Toxicology Workflows and Academic Settings

Presented by: Stephen Raso and J. Hunter Fleming - DC OCME and Laerissa Reveil - VCU
Half Day Workshop - Morning - Wednesday, May 8 - (Member \$100/Non-Member \$150)

Liquid Chromatography-Quadrupole/Time of Flight Mass Spectrometry (LC-QTOF-MS) is a novel analytical technique that has been used to detect trace levels of compounds. Relevant forensic applications include the analysis of biological fluids for the detection of drugs for toxicology and the analysis of seized drugs for controlled substances. Both quadrupole and time of flight mass analyzers are used in conjunction to sort, count, and identify ions based on their mass to charge ratio (m/z). High resolution mass spectrometry (HRMS) techniques, such as QTOF, are able to elucidate exact masses of parent compounds and daughter fragments. Current techniques typically used, such as gas chromatography-mass spectrometry (GC-MS), provide only nominal masses, which contain no decimal masses, and thus less sensitivity and accuracy. Exact masses, which contain up to five decimal places, give the forensic scientist a higher level of confidence when reporting and testifying about their results. LC-QTOF-MS provides a more sensitive limit of detection compared to traditional techniques that are used for forensic casework. Additionally, due to its orthogonal separation of ions, isomers that have the same m/z can be identified.

In the current landscape of the drug epidemic, modern instrumentation such as LC-QTOF-MS is imperative in providing untargeted analyses in order to identify drugs. This workshop will cover theory, method development and validation, research applications in academia, and case studies. The objective of this workshop is to give forensic chemists and toxicologists the skillset to be able to purchase, validate, and run routine casework with a LC-QTOF-MS. A basic knowledge of liquid chromatography and mass spectrometry is recommended.

(W6) Introduction to IR Spectral Interpretation and Mini-Workshop on the Comparison of FTIR and Raman Spectroscopy Including Live Sample Spectral Collection

Presented by: Ronald Rubinovitz - Thermo Fisher Scientific [MAAFS Vendor]
Full Day Workshop - Wednesday, May 8 - (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. A short session introducing Raman spectroscopy and comparing it to FTIR in terms of sampling benefits and the complimentary nature of its spectra including live collection of sample spectra by both techniques will also be featured in the workshop at the start of the afternoon session.

BIOLOGY SECTION WORKSHOPS

(W7) Understanding FIGG: A deep dive into how FIGG works, how you can implement FIGG into your workflows.

Presented by Bobby L LaRue, PhD - QIAGEN [MAAFS Vendor]

Half Day Workshop - Morning- Tuesday, May 7 - (Member \$100/Non-Member \$150)

Over the past few years advancements in Forensic Investigative Genetic Genealogy (FIGG) have made headlines with successes associated with cases where traditional STR workflows have provided little insight. Examples are instances where perpetrators are not entered into the CODIS database system and missing persons cases. In the majority of those cases GEDmatch and its law enforcement only side GEDmatch Pro are often used as the database for FIGG kinship analysis. The parent company of GEDmatch and GEDmatch Pro, QIAGEN, would like to invite you to a workshop in order to answer your questions and leave you with a better understanding of the mechanisms by which long-range FIGG kinship analysis is done in our databases. This workshop will include everything from the basics of how FIGG profiles are generated, to more advanced topics such as how kinship analysis is calculated. At the end of this workshop you should not only have a better understanding of how current FIGG workflows operate, but also the ease in which it could be implemented in your laboratory.

(W8) Rapid DNA Validation - Pennsylvania State Police DNA Division

Presented by Jeffrey M. Zachetti - Pennsylvania State Police

Half Day Workshop - Afternoon - Tuesday, May 7 - (Member \$100/Non-Member \$150)

The Applied Biosystems™ RapidHIT™ ID System conducts extraction, amplification, and capillary electrophoresis in approximately 90-minutes. The RapidHIT™ ID System consists of the Applied Biosystems™ RapidHIT™ ID Instrument using Applied Biosystems™ RapidHIT™ ID System Software v1.3.2.2. This adjunct RapidLINK™ Software v1.1.5 allows for DNA profile analysis through the embedded GeneMarker™ HID STR Human Identity Software V2.95. The single-use ACE GFE and INTEL GFE cartridges are used for sample introduction, extraction, and polymerase chain reaction (PCR). The GlobalFiler™ Express chemistry amplifies 24 short tandem repeat (STR) loci on human DNA using a six-dye system. The loci included in the kit are: D3S1358, vWA, D16S539, CSF1PO, TPOX, Y indel, Amelogenin, D8S1179, D21S11, D18S51, DYS391, D2S441, D19S433, TH01, FGA, D22S1045, D5S818, D13S317, D7S820, SE33, D10S1248, D1S1656, D12S391 and D2S1338. The internal lane standard contained within the sample cartridge is DY632PLUS.

This workshop will provide an overview of the reagents and consumables associated with the Applied Biosystems™ RapidHIT™ ID System. It will also provide a live demonstration of the instrument using both the ACE and INTEL sample cartridges and discuss the sample results. Results from the Pennsylvania State Police Forensic DNA Division internal validation studies for the Applied Biosystems™ RapidHIT™ ID System as well as the ACE and INTEL samples cartridges will be presented via PowerPoint.

The Applied Biosystems™ RapidLINK™ Software v1.1.5 provides a real-time connection to a RapidHIT™ ID Instrument. Run data from the instrument is automatically sent to the RapidLINK™ Software. The RapidLINK™ Software is used to assist in review and analysis of RapidHIT™ ID instrument results as well as to monitor the network of RapidHIT™ instruments. The workshop will provide live demonstration of the Applied Biosystems™ RapidLINK™ Software. It will also include information on the available applications within the software. The applications are the RapidLINK™ Software Match, Familial Match, Staff Elimination, and Kinship Search Applications.

The workshop will also explore the various databasing software programs available to be incorporated with RapidHIT™ ID System. SOP's and Quality control procedures implemented by the Pennsylvania State Police Forensic DNA Division will also be covered.

(W9) Current Practices and Developing Methods in Forensic Serology

Presented by Sarah Seashols-Williams - Virginia Commonwealth University

Half Day Workshop - Morning - Wednesday, May 8 - (Member \$100/Non-Member \$150)

Forensic body fluid identification, while previously stagnant for many years, has undergone an explosion of research over the past 15 years; however, much of that research has not made it into practice in forensic casework. Many laboratories are still using catalytic tests for presumptive detection of body fluids, while others have either abandoned serology or moved to molecular techniques. In this workshop, we review the state of body fluid detection and identification. We will dive into the cellular biology fundamentals for the commonly encountered forensically relevant biological fluids and secretions and discuss the current methods in practice and those with potential for future applications in working forensic laboratories.

(W10) New Technologies and Relevant Testimony Preparation

Presented by: Marybeth Sciarretta and Tarah Nieroda - DNA Labs International [MAAFS Vendor]

Half Day Workshop - Afternoon - Wednesday, May 8 - (Member \$100/Non-Member \$150)

This workshop will provide attendees with an overview of new DNA methods and technologies, such as MVac, SpentShell, Hair Shaft testing, Probabilistic Genotyping, Next Generation Sequencing (NGS), and Phenotyping. Examples of successful cases that utilized these methods/technologies will be discussed. Furthermore, a look into modifying one's scope of accreditation for new technologies, such as NGS, will be reviewed. Appropriate training and proficiency testing are key to this implementation. Additionally, as courtroom admissibility is the end goal for every new technology implemented, direct and cross-examination questions from actual cases will be showcased for these new technologies. Challenges with courtroom testimony surrounding complex mixtures and probabilistic genotyping will be talked about in detail. Open discussions with the participants will be held to share courtroom experiences and exchange ideas for continuous testimony improvement. From a Quality Assurance perspective, a discussion about

testimony training and testimony review will be held. This discussion will review QAS requirements and the training that is required for questions surrounding evolving technology. Lastly, a case review of a successful genealogy case will be highlighted and challenges with future testimony involving genetic genealogy will be discussed.

(W11) The Evaluation of Biological Findings Given Activity Level Propositions

Presented by: Dr. Tim Kalafut - Sam Houston State University and Dr. Simone Gittelsohn - DC Department of Forensic Sciences, The George Washington University
Full Day Workshop - Wednesday, May 8 - (Member \$200/Non-Member \$250)

There are many misconceptions and misunderstandings regarding the evaluation of DNA results given activity level propositions. Questions at court often ask about hypothetical DNA transfers (e.g., “Is it possible that DNA transferred during such-and-such activity?”), though many people don’t realize that by answering, they are testifying on activity level propositions. This workshop will demonstrate how to evaluate biological findings and share expert knowledge using a scientifically sound framework and published practices when the questions of interest to the court relate to what may have happened. Participants will learn how to formulate activity level propositions in accordance with the ISFG 2020 recommendations (Gill et al., 2020), do a case pre-assessment using the Case Assessment and Interpretation (CAI) framework (Cook et al., 1998; Jackson et al., 2015), assign likelihood ratios for forensic biology results given activity level propositions, use a Bayesian network for assigning the probabilities in the numerator and the denominator of a likelihood ratio, and handle hypothetical questions that are commonly asked during court testimony. After these lectures, they will understand the difference between Transfer-Persistence-Prevalence-Recovery (TRPR) and an activity level proposition, be able to evaluate their results with regard to activity level propositions, understand what Bayesian networks are and how they work, recognize poorly worded questions asked in court, and know how to answer such questions in a scientifically correct manner. A hands-on exercise will allow participants to apply this newly acquired knowledge and skill set on a mock case.

References:

Gill P., Hicks T., Butler JM., Connolly E., Gusmão L., Kokshoorn B., Morling N., Van Oorschot R.A.H., Parson W., Prinz M., Schneider PM., Sijen T., T. D., DNA commission of the International Society for Forensic Genetics: Assessing the value of forensic biological evidence - Guidelines highlighting the importance of propositions: Part II: Evaluation of biological traces considering activity level propositions, *Forensic Science International: Genetics* 44 (2020) 102186.

R. Cook, I.W. Evett, G. Jackson, P.J. Jones, J.A. Lambert, A model for case assessment and interpretation, *Science & Justice* 38(3) (1998) 151-156.

G. Jackson, C.G.G. Aitken, P. Roberts. *Case Assessment and Interpretation of Expert Evidence in Criminal Proceedings: Guidance for Judges, Lawyers, Forensic Scientists and Expert Witnesses*, Practitioner Guide No. 4. Royal Statistical Society, 2015.

PHYSICAL EVIDENCE SECTION WORKSHOPS

(W12) Exploration in Variation and its Impact on Forensic Handwriting Examination

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

Full Day Workshop - Tuesday, May 7 (Member \$150/Non-Member \$200)

While variation in handwriting is natural and expected, this workshop examines the impact of various limitations in the examination of signatures. Designed to be an open discussion in determining the criteria necessary to reach a conclusion, attendees will conduct examinations of signatures with varying degrees of range of variation, limited quantity, and extended time frames. The workshop will demonstrate how conclusions are case dependent and provide reinforcement in recognizing the examiner's limitations.

(W13) Security Printing Processes Workshop

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

Full Day Workshop - Wednesday, May 8 (Member \$150/Non-Member \$200)

This workshop will provide an overview of traditional printing processes utilized for security documents as well as popular digital printing techniques. Workshop attendees will gain an in-depth and hands-on understanding of the advantages and disadvantages of various security printing processes. Training will be provided on how to analyze the different printing processes and serve to reinforce examination skills. Counterfeiting techniques and trends used to simulate genuine security printing will also be discussed.