**2015 SAFS/ASTEE Workshop Descriptions (Please check back on the SAFS website,** [**www.southernforensic.org**](http://www.southernforensic.org)**) for workshop description updates) – Updated 8/31/15**

**MONDAY**

**Structural Elucidation (Monday, all day)**

Structural Elucidation and Spectral Interpretation

Instructor: Bob Ollis (Defense Forensic Science Center, USACIL)

**MSP (Monday, all day)**

Topics in Microspectrophotometry

This workshop will provide examiners with a unique opportunity to review several different sample spectra that present challenges for interpretation. The first half of the workshop will feature discussions on theory, basic instrument design and the types of evidence analyzed by microspectroscopy. Attendees will then be split into groups and will have the opportunity to discuss these challenges and be tasked with specific questions regarding sampling considerations, interpretation, and reporting. Attendees are strongly encouraged to bring difficult casework examples and share their own laboratory procedures relating to Microspectrophotometry.

Instructors: Dr. Paul Martin (CRAIC Technologies) and Sarah Walbridge-Jones

**Building Material Workshop (Monday, all day)**

Particle Analysis of Building Materials

This one-day workshop will consist of a systematic analysis of building materials commonly encountered in microanalysis casework. The course consists of a combination of PowerPoint lectures including case studies and laboratory exercises and demonstrations of building material types. The composition of cement and concrete, fibrous and non-fibrous insulation products, paper, wood and wood composite materials, architectural paint extenders, and plastics will be covered. The particle characterization approach will be employed with emphasis in stereo-binocular microscopy and polarized light microscopy. Detailed instruction and practical exercise in particle characterization of building materials will make the course profitable for both the experienced and novice forensic scientist working in trace evidence, crime scene response and firearms examination.

Instructor: Williams Schneck (Microvision Northwest-Forensic Consulting, Inc.)

**DNA CE Troubleshooting Workshop (Monday, morning)**

Troubleshooting the DNA casework workflow: Quantitation, Amplification, and Capillary Electrophoresis

The workshop will be divided into two sections. One will focus on the quantification process (using the Applied Biosystems™ 7500 Instrument and Quantifiler™ kits in examples) and the second will focus on STR amplification and CE analysis (using Applied Biosystems 3500 instruments and STR kits). We will review troubleshooting tools available to the customer, the Field Application Specialist (FAS), and the Field Service Engineer (FSE) and explain the significance of each tool and when to use them.

For the Quantification portion we will review the basic terminology of real-time PCR and the parameters used to evaluate quant data including standard curve, slope, and Y-intercept. We will also discuss the impact of single copy compared to multi-copy targets used in such kits. Lastly, we will highlight some of the common causes of poor data quality and how to avoid them.

For the Amplification and CE portion we will highlight how raw data, analyzed data, EPT data, capillary view and instrument logs are used to troubleshoot as well as the service tools and software used by the FSE. In these discussions we will also highlight the causes of some common issues and how to avoid them. We will then open the floor to audience questions and offer question and answer session to discuss common issues and how to investigate them. The goal of this workshop is to arm DNA analysts with information needed to identify simple issues that they can resolve themselves and when it is necessary to work with their FAS and FSE team to resolve more complex issues. For Research, Forensic or Paternity Use Only. Not for use in diagnostic procedures.

Instructor: Shelly Guerrero (Thermo Fisher – Applied Biosystems)

**Grant Writing (Monday, afternoon)**

A guide through the requirements and tips for successful grant writing.

Instructor: Henry Maynard (Defense Forensic Science Center, USACIL)

**PST (Monday, afternoon)**

Analysis of Pressure Sensitive Tape

Breakdown of the types of pressure sensitive tape evidence encountered, manufacturing processes, and methodology for analysis and interpretation.

Instructor: Thom Hopen (ATF)

**TUESDAY**

**DNA/Trace Working Together (Tuesday, all day)**

Advanced Trace/DNA Symposium-Style Workshop

The Trace Evidence Branch of a forensic laboratory has historically always gotten along with the once named Serology Branch. Technology took hold and Serology grew up, maturing into today’s DNA Branch of the forensic laboratory. With increasing limits of detection of DNA on the picogram level and Locard’s Exchange Principle as a basis for Trace, examiners from both branches need to be aware of what the other branch in capable of for analysis and how each other’s work can impact the subsequent analysis in the other section. This symposium-style workshop is meant to bring together experienced analysts from Trace and DNA in an attempt to share information so that both sections can work towards to common goal of “Justice Thru Science.” We each need to understand how the other section works so that we do not hinder the work of the other section and so we can recognize when the other section’s analysis may be important to the case if not previously requested by the submitting agency.

Instructors: Matney Wyatt and Donna Ioannidis (Defense Forensic Science Center, USACIL)

**Ethics in Forensic Science (Tuesday, morning)**

This is not your run of the mill ethics presentation. Dr. Paul Voss of Georgia State University will be highlighted in a dynamic presentation of a wide application of ethics related topics. Today, more than ever, aspects of culture, leadership, and ethical decision- making play a crucial role in the forensic community. Forensic labs must strive to create a culture of scientific excellence, to be sure, but this cannot happen without an equal commitment to high ethical standards and practices. Ethikos seminars, specifically designed for the forensic community, provide thought-provoking, edifying, and entertaining content in order to support and enhance any organizational culture. Each 3.5-hour seminar will address issues vital to achieving high standards, excellent science, and a healthy culture. The seminars, led by Dr. Paul J. Voss, earn among the highest evaluations in the industry.

Instructor: Dr. Paul J. Voss (Ethikos)

**Introduction to GC-MS Instrumental Analysis (Tuesday, morning)**

Introduction to Mass Spectral Interpretation with specific applications to the novel psychoactive substances (NPSs) part 1 of 2

The GC/MS is typically the “work horse” of forensic drug analysis with the vast majority of drug samples being analyzed on this instrument; as such it is prudent to have a deeper level of understanding of the ionization concepts behind it. This workshop is broken up into two parts each designed to help forensic chemists become more proficient at understanding what the mass spectrometer can tell you (basic interpretation skills of EI spectra) and what the mass spectrometer can’t tell you (limitations of the data). Part 1 of this workshop introduces the basic concepts of mass spectral interpretation skills. We will discuss how a mass spectrometer works, how a sample is ionized, and what happens to that sample once ionized. This includes things such as a review of basic chemistry concepts, fragmentation mechanisms, the nitrogen rule, isotopic clusters, and logical/illogical losses. With these introductory facts the attendee will be prepared to glean certain compound characteristics simply by glancing at a mass spectrum.

Instructor: Jason Nawyn (Defense Forensic Science Center)

**ALS Techniques for Serology and Trace Evidence (Tuesday, morning 2 hours)**

Light: Theory and Applications in Forensic Science

Think you know all about how to use your Alternate Light Source? A representative from Foster + Freeman will instruct you on tips, tricks, and techniques you may not know about when using this method for serology and trace evidence screening. This is not a marketing session.

We will discuss the basics of light and how light can be used to help find evidence. We will discuss ultraviolet, visible and infrared theory and applications.

Instructor: Foster and Freeman

**DART (Tuesday, morning)**

Inquiring Minds Want to Know! A decade of DART and Forensics

The Direct Analysis in Real Time (DART) ion source was first publicly introduced at the ASMS Sanibel Conference on “MS in Forensic Science and Counterterrorism” in January 2005, followed by the introduction of the first commercial ambient ionization source at PittCon two months later. The past ten years have seen rapid development in the technology and applications of DART and other ambient ionization methods.

Forensic applications of DART have been diverse, including the identification of illicit substances, toxicology, white powders, clandestine laboratories, questioned documents, trace evidence, explosives and smokeless powders, arson, airplane and automobile crash and sexual assault investigations.

Drug identification is perhaps the most widespread forensic application of DART. Analytical procedures have been thoroughly explored, developed, and validated in several Federal, State, private and academic forensic laboratories. A Forensic DART Database comprised of mass spectra measured in the Virginia Department of Forensic Science is now publicly available on the NIST website. Efforts are underway in other laboratories to expand the database to include new and emerging threats. A method for the confirmation of pharmaceuticals that combines DART data with tablet markings has been approved in the Commonwealth of Virginia. DART has also been applied to the analysis of new designer drugs and clandestine laboratory investigations.

New forensic applications of DART are continuing to appear rapidly. The US Fish and Wildlife Forensic Lab has developed methods for identifying illegally imported materials from endangered species based on their chemical profiles as measured by DART and chemometric techniques. This approach has been extended by other researchers to species identification for other materials of forensic interest such as psychotropic seeds, and blowfly puparial casings.

Of course, no single analytical method is universal! Examples will be presented of several ambient ionization methods that are complementary to DART and can be carried out on the same mass spectrometer system without changing hardware.

Instructor: Robert B (Chip) Cody (JOEL)

**Courtroom Testimony (Tuesday, afternoon)**

Instructor(s): TBD

**GC-MS App to Novel Psychoactive Drugs (Tuesday, afternoon)**

Introduction to Mass Spectral Interpretation with specific application to the novel psychoactive substances (NPSs) part 2 of 2

The GC/MS is typically the “work horse” of forensic drug analysis with the vast majority of drug samples being analyzed on this instrument; as such it is prudent to have a deeper level of understanding of the ionization concepts behind it. This workshop is broken up into two parts each designed to help forensic chemists become more proficient at understanding what the mass spectrometer can tell you (basic interpretation skills of EI spectra) and what the mass spectrometer can’t tell you (limitations of the data). Part 2 compares the spectra of NPS compounds (primarily cannabinoids and cathinones) and compares their fragmentation patterns keying in on certain fragmentation characteristics that are similar among the varying classes of compounds. Combining these similarities with the concepts learned in part 1, we will apply these skills to help interpret several unknown compounds. This will include practical exercises (both individual and group) of unknown compounds that will help apply these principles to real world situations. If time permits, we will conclude with a discussion on helpful aids and resources that are readily available in determining unknown compounds.

Instructor: Jason Nawyn (Defense Forensic Science Center)

**Physical Fit (Tuesday, morning)**

After attending the workshop, attendees will have learned basic theory of fracture match and gained a better understanding of the applications of this examination in forensic casework. Attendees will have the opportunity to apply their skills by working on practical exercises utilizing case scenarios designed to challenge them and refine their ability to apply this technique. This presentation will impact the forensic community by providing attendees knowledge of fracture match examinations and its uses in the forensic science/law enforcement community.

Instructor: Michael Villarreal (Defense Forensic Science Center, USACIL)

**Wednesday**

**Emerging Drugs and Databases for Chemists (Wednesday, all day)**

This all-day workshop will focus on the analytical, legal, and theoretical aspects of “Novel Psychoactive Substances” including synthetic cannabinoids and cathinones.

Instructors:

Josh Yoahnnan — Formerly with the Emerging Trends Program at the DEA Special Testing and Research Laboratory, currently a manager with the Allegheny County Office of the Medical Examiner

Dr. Randall Clark – Professor in the Department of Drug Discovery and Development at Auburn University and the author of many peer-reviewed articles dealing with the differentiation of regioisomeric and isobaric compounds related to controlled substances

Dr. Greg Endres - Vice President of Chemistry at Cayman Chemical Company

Dana Harris – Forensic Scientist and Computational Chemist at the Virginia Department of Forensic Science

Lee Fadness – Drug Chemist at the Defense Forensic Science Center, USACIL

**DNA Mixture Interpretation (Wednesday, all day)**

Moving to Probabilistic Genotyping Software for DNA Interpretation

DNA interpretation continues to be a challenge in forensic laboratories, both with interpreting difficult sample types and with providing consistency between analysts. This is especially true with complex DNA mixtures (i.e., mixtures of more than two individuals, where allelic dropout or drop-in is possible, and/or where a minor contributor is either masked in stutter or under a major contributor. With all this uncertainty, interpretation and evaluating appropriate statistical weight for a person of interest can be problematic with conventional binary models. Recently, probabilistic genotyping methods using a likelihood ratio approach have been proposed and recommended to better account for this uncertainty. These new approaches rely on sophisticated software tools to calculate the results. These software tools require validation and sufficient training on the model in order for the laboratory to adequately implement the tool and effectively testify to the reported results. The Defense Forensic Science Center has been utilizing probabilistic genotyping software in their casework since November 2014. In this one day workshop, DFSC will introduce probabilistic genotyping within a likelihood ratio framework, provide insight and strategies for validating and implementing the tool in casework, as well as discuss practical considerations for developing a training program for analysts. Actual Casework examples using probabilistic genotyping will be discussed as well.  
  
Agenda topics:

*Overview of probabilistic genotyping (PG) models for DNA interpretation  
“Explanation of the various binary models, how they differ from PG models, and discuss the different PG models (semi and fully continuous, Drop vs. MCMC, biological model)”*

*Introduction to likelihood ratio (LR) models  
“Explanation of the different LR models and the math compared to binary models”*

*What exactly are you proposing with your LR?  
“LR proposition setting and reporting”*

*Cases worked  
“Analysts will discuss cases- 2 casework analysts in attendance”*

*Validating PG systems*

*Implementing PG systems*

Instructors: Sara Green and David Diekema (Defense Forensic Science Center, USACIL)

**Cognitive Bias (Wednesday, morning)**

Cognitive Bias in Forensic Laboratories -or- What Your Brain is Doing, Whether You Know It or Not

With recent high-profile crime lab scandals, bias in crime laboratories is a topic for media as well as for researchers. Additionally, the creation of a Human Factors Committee will focus more attention on topics of bias, cognition, and error. Formal training in cognitive bias may not be provided within the scope of traditional discipline-specific training programs, but does impact the day-to-day work and functioning of a crime lab. Future recommendations and changes will require an understanding of both theoretical concepts related to bias in forensic science and practical applications of research in bias and cognition. This lecture will deliver a basic framework for understanding cognitive bias in forensic science through the following topics:

* + -   Cognitive Bias – definitions and major concepts related to forensic science
    -   A review of forensic science-related research on cognitive bias
    -   What can we learn about bias from cognitive psychology and behavioral economics
    -   Expertise and cognitive bias
    -   The bias blind spot
    -   Practical solutions for minimizing cognitive bias

Instructor: Melissa Hehir (Georgia Bureau of Investigation)

**FTIR/Raman (Wednesday, afternoon)**

Raman and FTIR Instrumental Analysis

The FTIR/FT-Raman workshop will include both theoretical and practical components. Basic FTIR and Raman theory will be presented. The use of FTIR and Raman spectroscopy in drug chemistry and trace evidence will be discussed including the hyphenated techniques of GC-IR and FTIR Microscopy. Two FTIR systems will be available for use by attendees. One system will be configured for basic drug identification and a second research level system configured for FTIR and FT-Raman analysis. Practical demonstrations of the FTIR and FT-Raman techniques will be provided. Course attendees are encouraged to bring their own samples for FTIR and/or FT-Raman analysis.

Instructor: Will Wihlborg (Thermo Fisher)

**Off-Site Tours**

**Fiberglass Manufacturing Tour (Monday, morning)**

A walking tour of an Owens-Corning plant manufacturing fiberglass to be followed by discussions with plant personnel discussing distribution and characteristics which can serve as a basis for differentiation. **NOTE: Must wear closed toe shoes and no dresses**

**3SI Security Device Plant Tour (Monday, afternoon)**

A walking tour of the 3SI plant manufacturing bank security devices designed to deter robberies. The dye/inks and other components of these devices used in banks and ATMs will be discussed. **NOTE: Must wear closed toe shoes and no dresses.**

**GBI Lab Tour (Tuesday, morning)**

This will be a guided tour of the Headquarters lab of the GBI which is a full service modern lab including medical examiners’ facilities.

**Glass Fabrication Plant Tour (Tuesday, afternoon)**

A walking tour of the Trulite glass fabrication facility that processes large volumes of glass to include tempering and laminating. A site presentation by a representative from the Guardian company will be included. Guardian is a float glass manufacturer that also coats glass. **NOTE: Must wear closed toe shoes and no dresses.**

**Textile Plant Tours (Wednesday, all day)**

Two Plant Tour – Textile fiber and Carpet Manufacturing Plants

A walking tour of the Shaw carpet manufacturing plant in Dalton, GA to be followed by a walking tour of the Aquafil plant in Cartersville, GA producing solution dyed nylon 6 fibers. **NOTE: Must wear closed toe shoes and no dresses.**

**Paint Manufacturing Plant Tour (Wednesday, morning)**

A walking tour of a paint manufacturing plant to be followed by discussions with plant personnel discussing distribution and characteristics which serve as a basis for differentiation. **NOTE: Must wear closed toe shoes and no dresses**

**Plastic Bag Manufacturing Plant Tour (Wednesday, afternoon)**

A walking tour of the Heritage manufacturing plant. The tour will be followed by discussions with plant personnel discussing distribution and characteristics which can serve as a basis for differentiation. **NOTE: Must wear closed toe shoes and no dresses.**