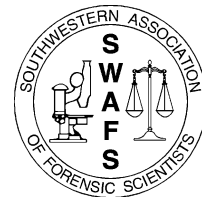




SWAFS 2008 Training Conference

Sep. 22-26, 2008

Little Rock, AR



Workshop Abstracts

Monday, Sep. 22:

Color Tests (9am-noon)-

Chris Youngkin

Texas Department of Public Safety

As forensic science continues to increase in sophistication, do “old school” tests such as spot/color tests still have a place in the analytical scheme? The continued application of spot/color tests will be presented as well as other related topics.

Fundamentals of Y-STR and Mini-STR Analysis (1-4:30pm)-

Gina Pineda

Orchid Cellmark, Inc.

The goal of this workshop is to provide attendees with knowledge of the application, implementation, and interpretation of Y-STR and Mini-STR DNA analysis in forensic cases. This workshop is targeted for individuals with a basic understanding of standard autosomal STR analysis who want to learn how to apply more targeted types of STR analysis to samples that have failed to provide meaningful results with standard STR testing.

The workshop will expose attendees to the fundamental theoretical background and history of Y chromosome analysis and Mini-STR analysis in forensic applications. It will also provide information on the implementation of Y-Filer and MiniFiler in a forensic lab. Sample selection for Y-STR and Mini-STR analysis is crucial. The workshop will focus on the types of samples that should be selected for each type of analysis and what information can and cannot be gained from the results of each type of test. Finally, it will expose attendees to routine cases encountered with Y-STR and Mini-STR analysis and the intricacies involved when processing degraded or difficult samples. It will provide attendees with real data for active discussion and interpretation.

STR is followed by:

Advancements in Automated Extraction: QIAGEN's QIASymphony (4:30-5pm)

Dennis Grigassy

Qiagen

Automation needs in forensics reach beyond typical high-throughput batch size protocols. Casework in particular has diverse batch sizes for any and every case. The need to standardize methods and avoid limiting access to automation with traditional, lengthy run times inspired the development of QIAGEN's newest innovation. QIASymphony is an automated platform that allows perpetual loading of samples. Any number of sample tubes and sizes can be used simultaneously. Additional sample tubes can be loaded while the QIASymphony is in process. Plate formatted samples can be loaded as well. An overview of system development, composition, performance and developmental data will be discussed along with a visualization of this new design in automation.

Advanced Elemental and Gunshot Residue Analysis by SEM/EDS (all day)-

James Garcia

U. S. Army Criminal Investigation Laboratory

Primer gunshot residue (P-GSR) analysis by scanning electron microscopy equipped with energy dispersive x-ray spectroscopy (SEM/EDS) has become more prevalent than bulk techniques due to automation, multi-component analysis, and ability to identify environmental contaminants. This workshop will cover advanced SEM/EDS techniques for imaging and elemental analysis followed by hands-on demonstrations of gunshot residue analysis using the ASPEX, LLC Personal SEM. P-GSR topics will include elemental thresholds, quality control, contamination, false positive, interpretation, report writing and testimony. **(Course is limited to 30.)**

**Bode Pen (9am-10am)-
Dr. Hays Young
Arkansas State Crime Laboratory**

Importing handwritten forms or notes into the computer is a major obstacle in trying to establish paperless cases. The BodePen system digitally collects the information as you write, and then allows you to upload the information in the form of a PDF. The PDF can be integrated into your LIMS and case management system. It also allows for quick corrections without the need of rescanning the entire document. The aim of this course is to give you an understanding of how the BodePen works, how it is used at the Arkansas State Crime Laboratory, and how it could be implemented in your Agency. (Course is limited to 30.)

Bode Pen is followed by:

**Enhanced Trace Analysis: 4-6 fold RFU Increase by Using MinElute Reaction Cleanup Kit
Post-Amp (10:15am-noon)-
Dennis Grigassy
Qiagen**

Theory, Methods and Analytical Results will be discussed. Participants will receive background including fit for purpose and fit for need detail, an analytical review of performance comparison of various Post-Amp cleanup methods, reference to published journal articles as confirmation of internal validation, review standardized protocol for the application and discuss manual and automated procedures for implementation.

**At the Legal Limit \pm Uncertainty (1-5pm)-
Mark Ruefenacht
Heusser Neweigh**

The forensic laboratory makes numerous critical measurements each day...potentially affecting a victim or a suspect for life. In practice, measurements are always imperfect and include some "doubt." This tutorial presents the basic skills needed for the preparation and calculation of uncertainty estimates for typical measurements in the forensic laboratory. An eight-step process will be introduced to facilitate the attendee in estimating uncertainties of uncomplicated measurements while meeting NIST-traceability and ISO 17025 requirements. Complicated mathematical equations and statistics will be minimized in favor of understanding the factors that affect measurements and the impact of associated uncertainties. Examples will be presented and discussion is encouraged.

**Forensic Pathology subjects (9am-noon):
Nervous System Pathology in Forensic Setting-
Dr. Murat Gokden**

Dept. of Pathology, University of Arkansas for Medical Sciences

Central nervous system (CNS) trauma is one of the most common causes of disability and death, and is frequently encountered in forensic pathology. Traumatic injury is readily identified by the characteristic pattern of hemorrhage and tissue damage, while laboratory tests elicit the cause of toxic injuries. On the other hand, there are many pathological processes that involve the nervous system and that can be encountered in the forensic setting. These processes may be the medical cause of death, or their presence is coincidental and they need to be recognized as such. The purpose of this talk is to review the gross and histopathological features of these disease processes, some of which may be obvious on gross examination, while others require meticulous microscopic examination. Pathological changes caused by toxic agents and traumatic injury will also be reviewed briefly.

**Interesting Cases in Forensic Pathology-
Dr. Adam Craig**

Arkansas State Crime Laboratory

The presentation will consist of several interesting forensic pathology cases from Alabama, Ohio, and Arkansas. Each case will begin with presentation of a short description of the scene and/or the circumstances surrounding the death. Next will be key photos of findings at autopsy. This will be followed by the conclusions reached and the assignment of the cause and manner of death. Interspersed between case presentations will be photos of other types of injuries or diseases of interest from other cases.

**Digital Forensics: Taking a “Byte” out of Crime (1-5pm)-
Dr. Mark R. McCoy**

University of Central Oklahoma Forensic Science Institute

This workshop will discuss the relatively new forensic discipline of digital evidence and explore its various applications in criminal investigations and civil cases. The workshop will also include an overview of the University of Central Oklahoma Forensic Science Institute and the AT & T Digital Evidence and Cyber Security Laboratory.

Tuesday, Sep. 23:

Introduction to Microscopes (all day)-

Brad Rogers

Oklahoma State Bureau of Investigation

This one day course is designed to meet the needs of a beginning microscopist, whether you're a trace evidence analyst, biologist or drug chemist. You will learn the basics of aligning microscopes, manipulating small samples, discerning information from samples (such as is it synthetic or natural fiber or hair). Some introduction into polarized light microscopy will be provided. This course is not for advanced users. (Course is limited to 12.)

Steroids (8am-noon)-

Tamara Keller and Dr. Darrell Eubank

DEA

This workshop will cover the basic terminology and fundamentals relating to anabolic steroids. Analysis techniques and ester salt form identification will be included as well as how to approach the analysis when faced with unknown compounds. Overall, the workshop will cover this class of substance which is widely abused yet not discussed on the same level as other controlled substances.

Weapons of Mass Destruction (WMD) subjects (1-5pm):

FBI WMD Program

James Schanandore

FBI-Little Rock office

Law enforcement response to a WMD incident including responsibilities and resources of the FBI.

Weapons of Mass Destruction Precursors

Dr. Charles Luman

FBI Hazardous Materials Response Unit

This presentation defines and describes weapons of mass destruction (WMD). Indicators for the preparation and use of WMD are discussed with relevant case examples.

Clandestine Drug and WMD Laboratory Commonalities

David Berezansky

Policy Program Specialist, FBI WMD Countermeasures Unit

This presentation will discuss some of the commonalities between clandestine drug laboratories and weapons of mass destruction (WMDs) laboratories. Many of the same chemicals and equipment can be utilized to produce both drugs and WMDs and it is sometimes difficult to distinguish between the two. It is essential for crime scene processors to be able to recognize the indicators for each and to avoid rushing to label the crime scene as only one type. On many occasions clandestine laboratories have been discovered to be producing multiple products, and sometimes those products have crossed over into two separate categories, drugs and WMDs.

A Case of Mistaken Identity

Dr. Charles Luman

FBI Hazardous Materials Response Unit

This presentation discusses the use of field identification equipment in the context of criminal investigations involving unknown materials. Common demands and pitfalls are discussed, as well as implications for investigative strategy.

Successful and Effective Courtroom Testimony

Keith Pridgen, Karen Shumate, and Eloisa "Bones" Esparaza

This lecture is geared toward forensic scientists with limited to no courtroom experience or as a refresher course for seasoned forensic scientists. Topics will include: visual aids, developing successful "tape loops" for stock questions, explaining science to the jury, interacting with the attorneys, courtroom etiquette, terminology, and overcoming stressful circumstances among others.

Implementation of Lubricant Analysis in Sexual Assault Casework (all day)-

Jeffrey Dake and James Adams

US Army Criminal Investigation Laboratory

Lubricants have been encountered in sexual assault crimes in many facets. Lubricants may be used to facilitate an act, be present in the background of samples, or be transferred due to the use of lubricated condoms. This workshop will provide a basis for the incorporation of lubricant analysis into current laboratory systems with a minimal investment on the part of the laboratory. Students will be provided background information on the types of samples that are typically encountered in lubricant analyses, including commercial sexual lubricants, improvised lubricants, and condoms. The course will include such topics as the recognition and collection of lubricant materials as evidence - including strategies to account for background materials, techniques for the extraction of lubricant materials, and analytical schema. Students will also be introduced to methods of data interpretation, analytical conclusions and the limitations of these exams. The workshop will conclude with a roundtable discussion of future needs in this area of analysis and potential areas for research and development. It is recommended that students have a background in FT-IR and GC/MS analyses and data interpretation.

Wednesday, Sep. 24:

Utilization of LCMS in Forensic Toxicology (1-5pm, time is approximate)

**Crystal Holt, Clinical/Forensic Specialist; Larry Meeker, Southwest Area Regional Chemist
Waters**

This workshop will cover the following:

- Introduction to LC/MS/MS technology
- MS/MS Inlet: HPLC vs UPLC
- Confirmation of Opiates utilizing UPLC/MS/MS
- Confirmation of Benzodiazepine Panel
- A simple robust method for the detection of Ethyl-Glucuronide and Ethyl Sulfate
- Unknown screening in Forensic Toxicology cases

Thursday, Sep. 25:

Forensic Examinations of Tapes (all day + 8am-noon Friday)-

Jenny M. Smith

Missouri State Highway Patrol Crime lab

This one and one-half day workshop is an introduction to the construction and analysis of tapes commonly received as evidence. These include: duct, electrical, clear packing, masking and strapping tapes. The different instrumental methods for analysis will be discussed with an emphasis on those exams that are most discriminating. Variability of the given tape product will also be discussed. PLM techniques with an overhead camera will be included to demonstrate examinations of adhesive fillers, reinforcement fibers and oriented polymers. A short refresher course in polymer chemistry will be included plus hands-on lab exercises and a mock duct tape comparison. It is assumed that participants will have a working knowledge of the FTIR, pyro-GC/MS, EDX and Microscopy.

A workbook and collection of reference material will be provided for each participant. Continuing education credits are approved for this class. **An additional \$75 fee is required for taking this class. (Course is limited to 15.)**

Forensic Biology Training Course (8am-noon)-

Dr. Karl Reich, Anne Hunter, and Jack Keehma

Independent Forensics

Forensic Biology is filled with antiquated procedures and testing technology that is 35-40 years old. Our goal is to demonstrate how state of the art forensic biology testing technology can be used to identify the best samples for DNA analysis, reducing the wasted time and expense associated with failed DNA profiling.

Section 1: Body Fluid Identification of Saliva, Semen, Blood, Urine and Feces.

Section 2: Microscopic Methods of Sperm Detection including Bright field (X-mas Tree), Phase Contrast (Interference Filters) and Fluorescence (SPERM HY-LITER™).

Section 3: Low Copy Number Detection with analysis down to as little as 50 sperm and Isolation Techniques including Laser Capture Microdissection (Zeis, Palm LCM).

Processing Drug Evidence with Dye Stains (1-5pm)-

Joel R. Stephenson

DEA

This course will give you the options available to get the best possible results when fingerprinting small plastic bags, foils, tapes, and other drug-related items of evidence. **(Course is limited to 15.)**

Ethics (8am-noon)-

Tamara Keller and Jerry A. Walker

DEA

This workshop will cover the overall concept of ethics relating to our field of forensic science. Many of the discussions will be geared toward drug analysis/chemistry. The format will include group discussions which cover topics ranging from court testimony to overall reporting of results.

Quantitative Method Validation (1-5pm)-

Victor A. Bravenec

DEA

This course will go through the procedures and processes of validating a quantitative method. The key topics covered will be instrument qualifications, method development, selectivity, linearity, precision, accuracy, recovery, uncertainty of the method, method ruggedness, limits of quantitation, and method transfer and re-validation. Instrument qualifications will cover getting the instrument ready for validation. The course will cover the general concepts of method development. The selectivity, linearity, precision, accuracy, and recovery sections will cover the theory, the testing procedure, and the evaluation criteria. The uncertainty section will cover the concepts of method

uncertainty and ideas on how to determine the uncertainty for your method. Method ruggedness will discuss ways to make your method easier to transfer and troubleshoot. Method transfer and re-validation will discuss what testing needs to be done when transferring a method to another instrument. Also, when does a method need to be re-validated. At the end of the course, the student will be provided an excel workbook that has many of the calculations and testing parameters. Course will focus mainly on Gas Chromatograph type methods, but High Pressure Liquid Chromatography parameters will also be covered.

**Incident Response to Terrorist Bombings (8am-noon)-
Jennifer Perry**

Arkansas State Crime Laboratory

The four hour performance level IRTB course provides basic information on explosive and incendiary devices that could be used as terrorist weapons. Classroom topics include:

- Understanding the terrorist threat
- Improvised explosive devices (IEDs)
- Safety issues
- Departmental or agency policies to ensure compliance with local requirements

**Clandestine Labs Update (1-5pm)-
Norman Kemper and Angie Walker**

Arkansas State Crime Laboratory and DEA

This workshop will cover current trends in the manufacturing of methamphetamine involving clandestine laboratories. An update on Federal and State laws will be discussed as it relates to the purchase of precursors and reagents used in the manufacture of methamphetamine. This workshop will include other drugs that are currently being mixed with methamphetamine for purchase at street level. A brief over view of the manufacturing process will be discussed also.

Friday, Sep. 26 (8am-noon):

Forensic Examination of Tapes (cont. from Thursday)

**THC Extraction Labs – Taking Hemp To A New High
Jackie Long**

California Department of Justice – Bureau of Narcotic Enforcement

The concentration of cannabis resins has taken on a new twist. With the high THC content of today's "Bud", THC extraction labs have evolved to utilizing various household solvents. Today's cannabinoid not only uses "shake" to make keif and oil, but now uses the Bud material as well.

This course will cover the mindset of the cannabinoid, current trends involving the hemp plant, address the various keif and solvent extraction processes, and show the new street versions of honey oil.

Note: If you saw this presentation in Sep. 2007, it has been updated and expanded.

Disaster Mortuary Operation Response Team

Bobby Humphries

Arkansas State Crime Laboratory

Bobby will discuss what DMORT is. He is a member of DMORT Team VI with deployments assisting in the morgue operations under various assignments including Oklahoma City Tornado 1999, New York City WTC 2001, and Hurricane Katrina and Rita 2006. **(This presentation is only about 2 hours long.)**

The Basics of Forensic DNA

Jennifer Beaty (information by Mary Simonson)

Arkansas State Crime Laboratory

If you're curious about the DNA side of Forensics but don't have a lot of background on the subject, this is the talk for you. We will discuss what a DNA profile is and how it is obtained from various types of samples. Topics will include DNA extraction techniques, Quantification of DNA using real-time PCR, DNA Amplification by PCR (Polymerase Chain Reaction), Capillary electrophoresis, use of the CODIS (Combined DNA Index System) database, DNA data interpretation in terms of "inclusion", "exclusion" and identification and future trends and advancements in Forensic DNA. We'll discuss some case studies as examples and have the opportunity for an open forum discussion to accommodate an audience with a range of scientific or biological backgrounds. **(This presentation is only about 1.5 hours long.)**

Wed., Sep. 24, Short Presentations/Technical Papers/Etc. (8am-noon):

Statistical Sampling for the Crime Laboratory

Christopher G. Krug

Johnson County Sheriff's Office Criminalistics Laboratory

This presentation will cover the three main statistical sampling methods in use in crime labs today; binomial, hypergeometric and Bayesian. Information presented on each method will include the basic statistics behind it, and how (and when) to best implement the method. Other topics include general information on sampling, current guidelines in the field, and some legal considerations of statistical sampling. (Approximately 1 hour long.)

Searching for a "fix" to methamphetamine addiction

Dr. Howard P. Hendrickson

University of Arkansas for Medical Sciences

Methamphetamine use, dependence, and withdrawal result in a myriad of central nervous system effects, ranging from euphoria, increased libido and improved cognition to addiction, depression, paranoia, and anxiety. Unfortunately, no pharmacotherapy has been approved for the treatment of METH dependence or addiction, in part because of the diverse sites of action and clinical effects of METH. This talk will highlight our work in the development of monoclonal antibody-based therapies to treat drug abuse. These protein-based medications act by keeping abused drugs, like methamphetamine and phencyclidine out of the brain where they produce the "high" sought by the addicted person. This talk will focus on the growing problem of methamphetamine abuse and discuss how we hope to improve the health of individuals addicted to this drug.

Desorption Electrospray Ionization

Jay Hoppenwaser

DEA

Desorption electrospray ionization (DESI) is a new technique that provides rapid confirmatory analysis of samples with no sample preparation in most cases. Sample components of a mixture are ionized at ambient conditions by a DESI source and are individually identified using the MS^n power of an ion-trap mass spectrometer. This presentation will demonstrate how DESI was used in the detection of a wide variety of controlled substances. Samples were analyzed by a Prosolia Omni Spray DESI source coupled to a ThermoFisher LCQ Advantage ion-trap mass spectrometer. A comparison will be made with other ionization techniques. This will be followed by a discussion on the theory and mechanisms of DESI. A review of sample spectra will demonstrate the advantages of DESI over other techniques. DESI would be an ideal confirmatory test for forensic laboratories looking to reduce sample analysis and preparation times. (30 to 60 minutes)

NMR

Ted Chapman

DEA

This lecture covers several capabilities of NMR use in the South Central Laboratory. The South Central Laboratory NMR is used for two main purposes: identification and quantitation. The South Central Laboratory's NMR is a Varian Mercury *plus* 400 MHz Proton NMR with a 5 mm indirect detection probe with pulsed field gradient. The NMR is actively shielded and capable of automated operation. A demonstration of NMR for the identification of controlled substances will be done comparing the results of analysis of pure and adulterated materials. NMR quantitation provides for, in most cases, multiple purity determinations. NMR quantitations indirectly bolster the various identifications of unknowns based on the fact that NMR signal intensity is the same for all compounds per mole. Also, the presentation will demonstrate the ease of spectral prediction for simple phenethylamines and tryptamines. In cases of simple compounds, this procedure allows a chemist to collect data on unknowns or pure standards in order to make the first few steps toward determining the structure responsible for the spectra. (30 to 60 minutes)

Raman
Paul Adams
DEA

This lecture covers several applications of Raman use. In the South Central Laboratory, Raman's primary use is the confirmatory identification of controlled substances. The South Central Laboratory's Raman is a Fourier Transform Raman attached to a Thermo Nicolet 6700 Fourier Transform Infrared Spectrophotometer (FT-IR). An introduction to Raman history and theory will be given followed by a brief comparison of Raman and traditional FT-IR. The presentation will also illustrate the use of Raman in the identification of controlled substances and adulterants. Additionally, the presentation will demonstrate the use of the micro-stage to obtain spectra out of a mixed sample and the ability to obtain spectra through plastic and glass containers. (30 to 60 minutes)

Salvia Divinorum: A Legal Hallucinogenic Mint
Debbie Stephens (with Quynh Nguyen)
Austin PD

Salvia divinorum is a psychoactive plant in the Labiatae family (sometimes called the "mint family"). Salvia divinorum originated in the Oaxaca region of Mexico and has been cultivated and used for centuries by the Mazatec people for healing and religious ceremonies. It is not a controlled substance in the United States, however Australia was the first country to officially schedule Salvia divinorum and Salvinorin A (the psychoactive constituent), and it is now controlled in Belgium, Denmark, Finland, Italy, and South Korea as well. The identification and examination of this recently encountered plant material will be discussed. (About 30 minutes)

Class selective extraction of amphetamines and related drugs from urine using molecularly imprinted polymeric SPE (poster presentation)
Jim Brown (with Olga Shimelis and An Trinh)
Supelco/Sigma-Aldrich

Forensic, clinical and doping laboratories often require class-selectivity from sample extraction and analytical methods. A new sample preparation method has recently become available that uses molecularly imprinted polymeric (SupelMIP) solid phase extraction (SPE) procedure. During the extraction procedure, analytes bind to the synthetically created cavities by multiple interactions. The strong retention between the analytes and the SupelMIP SPE phase ensures that the compounds are retained on the phase during application of strong washes when elimination of matrix impurities occurs.

This method was applied towards analysis of amphetamines and methamphetamines in urine. Extraction with a SupelMIP Amphetamines SPE was performed and the samples were analyzed via LC/MS/MS method on a C18 HPLC column with and without 0.05% ion-pairing agent (trifluoroacetic acid) in the mobile phase. The recoveries, detection limits, ionization effects and sample's matrix background were evaluated and are discussed in this presentation.

Implementation of Lubricant Analysis in Sexual Assault Casework (poster presentation)
Jeffrey Dake and James Adams
US Army Criminal Investigation Laboratory

Direct Analysis of Trace Analytes and GSR from Fibers utilizing Nanomanipulation-Coupled Mass Spectrometry (poster presentation)

**Dr. Teresa Golden (with Pedro Davila, Nicole Ledbetter, Richard Ernest, and Guido Verbeck)
University of North Texas (with Alliance Forensics Laboratory, Inc.)**

We will present the novel instrumentation of nanomanipulation coupled to nanospray mass spectrometry in order to probe trace analytes and gunshot residue from fibers. Nanomanipulation is ideal for these applications due to its translational resolution of 10-100 nm, in lieu of the optical limit, making it ideal to couple to nanospray mass spectrometry, which only requires a minimum of 300 nL and 300 attograms of analyte. This technique increases analyte detection sensitivity, and lower the amount of sample required with minimal damage to the evidence. With this instrument we are able to directly probe and manipulate from a fiber using the nanospray tip, and then transfer the analyte to the mass spectrometer reducing the analyte preparation. We demonstrated this technique by probing histidine and caffeine from a single rayon fiber then analyzing the trace particles. We also demonstrated extraction of GSR from dyed fabric. The instrument is multifunctional with applications to the forensic sciences including analysis of trace elements, gunshot residue, and document ink.

**Remington Arms manufacturing plant
Tour from 8:30am to noon (times are approximate)
(Tour limit of 45.)**