MAAFS 2021 - Breakout Sessions - Schedule & Abstracts

Thursday, September 23rd

Scholarship Winners - Salon B/G

2020 Scholarship Winners

1:00 pm **Inorganic Gunshot Residue (IGSR) Micro-particle Standard with Application to Method Development and Understanding Modern Ammunition**
Korina Menking-Hoggatt, Ph.D., Edward "Chip" Pollock, Courtney Vander Pyl, M.S., Tatiana Trejos, Ph.D. - West Virginia University*

1:20 pm **Effects of dithiothreitol (DTT) on fluorescent qPCR dyes**
Brittany Hudson, M.S., Jordan O. Cox, M.S.; Sarah J. Seashols-Williams, Ph.D.; Tracey Dawson Green, Ph.D. - Virginia Commonwealth University*

2021 Scholarship Winners

1:40 pm **Volatile Organic Compounds Produced by Bacteria Associated with Decomposition**
Veronica Cappas, Dan Sykes, PhD., Megan Morris, Reena Roy, PhD. - The Pennsylvania State University

2:15 pm **Classification of Body Fluid Source using a Panel of MicroRNAs in DNA Extracts**
Ciara Rhodes, Carolyn Lewis, Anaya Valentine, Edward Boone, Tracey Dawson Green, Sarah Seashols-Williams - Virginia Commonwealth University*

2:35 pm **High Resolution Melt Curve Analysis and Support Vector Machine Modeling for Identification of Two-Person Mixtures**
Chastyn Smith, Andrea L. Williams, B.S., Hannah E. Wines, M.S., Darianne C. Cloudy, M.S., Edward L. Boone, Ph.D., Sarah J. Seashols-Williams , Ph.D., Tracey Dawson Cruz, Ph.D. - Virginia Commonwealth University*

Biology Section - Salon B/G

3:00 pm **Recovering Human DNA from the Inside of a Dog's Mouth**
Alyssa Addesso, Dr. Mitchell Holland, Dr. Sree Kanthaswamy, Dr. Jason Brooks - The Pennsylvania State University*

3:15 pm **Evaluation of virtual standard curve functionality of the hid real-time pcr analysis software by comparison to assay specific standard curves and an external standard curve generated in-house**
Angelina Mauriello, Megan M. Foley, Kelly Knight, Dr. Joseph A. DiZinno - George Mason University*

3:30 pm **Assessing the necessity of DNA quantitation on saliva from common evidentiary Items**
Kelly Reading, Nyla Ngegba, Janine Kishbaugh M.S.F.S, Dr. Lawrence Quarino, Courtney Mower. - Cedar Crest College*

4:00 pm **DNA Group Discussion -**
Kelly Knight - George Mason University and Mimi Smith - Virginia Department of Forensic Science - Moderators

MAAFS 2021 - Breakout Sessions - Schedule & Abstracts

Criminalistics Section - Salon A/H

3:00 pm **Synthesis of 4-bromomethcathinone from 4-bromopropiophenone via α-bromination and methamination**
Kevin Zencak - Virginia Department of Forensic Science*

3:15 pm **Volatile Organic Compounds Associated with Diseased Human Blood**
Megan Morris, Dan Sykes, Veronica Cappas, and Virginia Greenberger - The Pennsylvania State University*

3:30 pm **Rapid Analytical Screening Methods for the Investigation of Firearm Related Crimes**
Courtney Vander Pyl, Korina Menking-Hoggatt, PhD, Tatiana Trejos, PhD - West Virginia University*

4:00 pm **Evaluation of a New Seized Drug Substance Screening Procedure with the Waters RADIAN™ ASAP Direct Ionization Mass Spectrometer**
Erin Tracy, Kelsey DeWitt, Lauren Wiley, Melanie Peguese-Richards, Peter B. Harrsch - Raleigh/Wake City-County Bureau of Identification*

4:30 pm **Screening Anticoagulant Adulterants in Seized Materials**
Hiu Yu Lam, Tais Fiorentin, Fran Diamond, Mandi Mohr, Barry Logan - The Center of Forensic Science Research and Education*

Questioned Documents Section - Aloeswood (Virtual Presentations, schedule TBA)

Optimizing a method to digitize exemplars for use in the automated detection of trash marks
Paige Riley - Oak Ridge Institute for Science and Education / Federal Bureau of Investigation

Stabilization of Shredded IDs/Credit Cards
Lorie Cousin - FBI

An objective inter-comparison of trash mark constellations from 50 photocopiers utilizing manual and automated detection methods
Linda Eisenhart - FBI

MAAFS 2021 - Breakout Sessions - Schedule & Abstracts

Friday, September 24th

Biology Section - Salon B/G

8:00 am **WORKSHOP: What's That Stain?: Serology and Body Fluid Identification**
Sharon Polakowski, Wisconsin State Crime Lab - Milwaukee

Criminalistics Section - Salon A/H

8:30 am **Delta-9-Tetrahydrocannabinol Quantitation of Plant Material Using GC-SIM-MS**
Jessica Belton - Virginia Department of Forensic Science*

9:00 am **Age-at-Death Estimation Using Cementochronology in Thermally Altered Teeth**
Ryen Weaver, Dr. Anthony Falsetti, Dr. Timothy Gocha, Dr. Joseph DiZinno - George Mason University*

9:15 am **How common is it to find glass and paint residues in a member of the general U.S. population?: A preliminary study**
Lauryn Alexander, Oriana Ovide, Olivia Duffett, Tatiana Trejos - West Virginia University*

10:00 am **Screenshot**
Peter Diaczuk - John Jay College of Criminal Justice*

10:15 am **A Tale of Two Quants: A Comparison of Two THC Quantitation Methods**
Brady Lusk - Anne Arundel County Police Department Forensic Services*

10:45 am **Likelihood Ratios of Hair Using RGB Color Values and Diameter**
Emma Redman, Victoria Echternach, Casey Rech, Isabel Sandone, Lawrence Quarino - Cedar Crest College*

11:15 am **Investigation of Novel Chemiluminescent Detection Methods for Cannabinoids**
Catherine Stacey and Dr. Lindsey Welch - Cedar Crest College*

11:30 am **Negative Control Study to Evaluate MSP's Policy on Blanks**
Brooke Welsh and Amber Burns - Maryland State Police Forensic Science Division*

Questioned Documents Section - Aloeswood (Virtual Presenter)

8:00 am **PDF Forensics**
Leonard Rosenthol, Adobe

Biology Section Abstracts

Scholarship Winners - Thursday, September 23rd

Effects of dithiothreitol (DTT) on fluorescent qPCR dyes

Brittany Hudson, M.S., Jordan O. Cox, M.S.; Sarah J. Seashols-Williams, Ph.D.; Tracey Dawson Green, Ph.D. - Virginia Commonwealth University*

DNA extractions of semen samples commonly utilize dithiothreitol (DTT), and although DTT is traditionally removed before downstream analyses, the forensic DNA community has recently explored Y-screening, direct amplification, and direct cell lysis assays that omit purification while still employing reducing agents. Thus, this study examined the impact of residual DTT on downstream processes involving fluorescent dyes. Quantification using Investigator ® Quantiplex HYres revealed a significant increase in the male DNA yield ($p = 0.00056$) and a >150,000,000- fold increase in the male:human DNA ratio when DTT remained in extracts versus when it was filtered out using a traditional purification method, while for Quantifiler™ Trio the true mean DNA yield for the large autosomal target significantly increased ($p = 0.038$) and the average reported DNA yields increased 1.1-fold, >9.5-fold, and 1.3-fold for the small autosomal, large autosomal, and male targets, respectively. DTT-spiked DNA standards from both kits were impacted similarly to samples with residual DTT, demonstrating that observed effects were related to DTT and not the extraction method. Overall, DTT causes inaccurate quantities and, consequently, inaccurate calculated male:female ratios when used in conjunction with these kits; therefore, implementation of newer direct-to-PCR assays incorporating DTT should either be avoided or used only with carefully evaluated, compatible dyes.

High Resolution Melt Curve Analysis and Support Vector Machine Modeling for Identification of Two-Person Mixtures

Chastyn Smith, Andrea L. Williams, B.S., Hannah E. Wines, M.S., Darianne C. Cloudy, M.S., Edward L. Boone, Ph.D., Sarah J. Seashols-Williams , Ph.D., Tracey Dawson Cruz, Ph.D. - Virginia Commonwealth University*

In the conventional forensic DNA workflow, the number of contributors in a sample is unknown until the last step of STR analysis. We propose a high resolution melt curve (HRM) mixture screening assay, which uses support vector machine (SVM) modeling of melt morphologies of D5S818 and D18S51 amplicons integrated into a common qPCR-based human DNA quantitation kit, in order to determine if a sample is a mixture at an early stage of the DNA workflow (quantitation). Using data from the entire melt curve data generated, 87.5% of single-source samples and 90% of mixed samples (2 contributors) classified accurately. In conclusion, this work demonstrates that the integration of the STR-HRM assay into a commercially available quantitation kit can allow analysts the opportunity to identify the presence of a mixture earlier in the DNA workflow without altering quantification estimates and without adding additional steps to the workflow.

Biology Section Abstracts (continued)

Classification of Body Fluid Source using a Panel of MicroRNAs in DNA Extracts

Ciara Rhodes, Carolyn Lewis, Anaya Valentine, Edward Boone, Tracey Dawson Green, Sarah Seashols-Williams - Virginia Commonwealth University*

Molecular markers, such as microRNAs (miRNAs), have been the subject of forensic body fluid identification for the past few decades to improve current serological methods. Previous work in our laboratory identified a panel of six miRNAs capable of identifying seven body fluids with 93% accuracy in RNA extracts using RT-qPCR and quadratic discriminant analysis. In this project, we applied our miRNA panel analysis method to DNA extracts in a population of 50 donors of each body fluid and initially obtained an overall correct classification rate of 87%, which increased to 92% when three additional miRNA markers were incorporated. Our data suggest that miRNAs are comparatively detectable in both RNA and DNA extracts and therefore eliminates the need for an RNA extraction, which would greatly reduce evidentiary sample consumption and analyst time if miRNA analysis were to be implemented into forensic laboratories.

Thursday, September 23rd

Recovering Human DNA from the Inside of a Dog's Mouth

Alyssa Addesso, Dr. Mitchell Holland, Dr. Sree Kanthaswamy, Dr. Jason Brooks - The Pennsylvania State University*

The questions addressed in this study include: 1) can a dog owner's DNA profile be recovered from the inside of their dog's mouth, 2) can human DNA be recovered from the inside of a dog's mouth after a dog bite, and 3) does the owner's profile interfere with the interpretation of profile information from the person associated with the bite? Comparisons of profiles recovered from a dog's mouth to the profiles of individuals with whom the dog resides resulted in a baseline expectation for the presence of human DNA associated with dog owners. A dog bite was then simulated by 1) rubbing human saliva into a dog's mouth and 2) having a dog bite into a piece of meat coated in human saliva. The time between deposition and collection was altered to determine how long after deposition could human DNA be recovered. Variability in the recovery of informative DNA profiles was seen between dogs, which can help manage expectations in the forensic science community of the possibility of swabbing the inside of a dog's mouth in dog bite situations or in cases where there is a question of dog ownership.

Evaluation of virtual standard curve functionality of the hid real-time pcr analysis software by comparison to assay specific standard curves and an external standard curve generated in-house

Angelina Mauriello, Megan M. Foley, Kelly Knight, Dr. Joseph A. DiZinno - George Mason University*

Two alternative methods in determining the quantity of DNA that does not require a standard curve for each run was compared to the traditional method of running an assay specific standard curve. These two methods are the use of an external standard curve and a virtual standard curve from the HID Real-Time PCR Analysis Software v1.3, using different lot numbers, curve preparations by different analysts, and between instrument calibrations. It was determined that the external standard curve method and virtual standard curve method were identical. Results showed there was no significance between instrument calibration and no difference between kit lots when comparing the assay specific curve to the virtual/external curve methods. For the virtual standard curve, there was no significant difference to the assay specific method, however, there was significant differences between pipetting from different analysts when looking at the different standards prepared.

Biology Section Abstracts (continued)

Assessing the necessity of DNA quantitation on saliva from common evidentiary items

Kelly Reading, Nyla Ngegba, Janine Kishbaugh M.S.F.S, Dr. Lawrence Quarino, Courtney Mower. - Cedar Crest College

In forensic biology there is an ever present need to process evidentiary samples without complete consumption in a timely manner. A protocol that could be eliminated from DNA processing is qPCR, or quantitation. Quantitation aims to determine quantity of DNA in samples to identify an input volume for amplification. If a predictable amount or range of DNA input volumes could be identified, qPCR could be removed from the typical analytical scheme for DNA profiling in a crime laboratory. By assessing the quantity of DNA on the flaps of sealed envelopes, cigarette butts, chewing gum, and used drink containers, this research aims to determine if a predictable amount of DNA exists as a function of sample size for the given evidence types. Statistical analysis will be performed to validate consistent results. The project is also exploring whether direct PCR on such samples has an advantageous effect on genotyping, potentially enabling the removal of DNA extraction as well.

Friday, September 24th

What's That Stain?: Serology and Body Fluid Identification

Presented by Sharon Polakowski, Wisconsin State Crime Lab - Milwaukee

Half Day Workshop - Morning- Friday, September 24 (Included in regular meeting registration)

This half day workshop will provide a brief history of serology in the field of forensics, an in-depth discussion of the tests and techniques currently available and their use in casework, and an overview of research in serology for the future.

Criminalistics Section Abstracts

Scholarship Winners - Thursday, September 23rd

Inorganic Gunshot Residue (IGSR) Micro-particle Standard with Application to Method Development and Understanding Modern Ammunition

Korina Menking-Hoggatt, Ph.D., Edward "Chip" Pollock, Courtney Vander Pyl, M.S., Tatiana Trejos, Ph.D. - West Virginia University*

Although the field of gunshot residues relies on sound scientific foundations, there are still some difficulties associated with the speed of analysis, changing formulations of modern ammunition, and transfer and persistence of GSR. This discipline is further challenged by the deficit of standard GSR materials that limits the quality control process, the optimization of SEM-EDS for lead-free ammunition, and the optimization of new analytical techniques. Our research group at WVU, in collaboration with the Sacramento County District Attorney's Crime Laboratory, developed a novel method for the production, collection, and characterization of IGSR particles that can be used as quality control standards for leaded and non-leaded primers. The collected IGSR micro-particle samples were tested by two analytical techniques–SEM-EDS and Inductively Coupled Plasma- Mass Spectrometry (ICP-MS)–in order to characterize the number of GSR particles, their composition, and elemental concentrations, and then the standards were applied to the development of a rapid Laser Induced Breakdown Spectroscopy (LIBS) technique for the detection of IGSR. This research is anticipated to assist the forensic community by providing authentic IGSR standards that can strengthen research, expand access to new detection techniques, and enhance crime laboratories quality assurance.

Volatile Organic Compounds Produced by Bacteria Associated with Decomposition

Veronica Cappas, Dan Sykes, PhD., Megan Morris, Reena Roy, PhD. - The Pennsylvania State University*

Microorganisms play an important role in decomposition and are known to produce volatile organic compounds (VOCs) that contribute to the odor of decomposition. Although microorganisms and VOCs have been studied independently regarding decomposition, few studies have linked the two. Alcaligenes faecalis, Lysinibacillus fusiformis, and Lactobacillus gasseri were identified as significant bacteria from a decomposing swine using the v4 region of the 16s rRNA gene. After being independently cultured in headspace vials, Solid Phase Microextraction (SPME) fibers were used to sample the VOCs produced over a five-day period. Herein, we describe the bacteria-specific VOC profiles in the context of the more complex decomposition process.

Criminalistics Section Abstracts (continued)

Thursday, September 23rd

Synthesis of 4-bromomethcathinone from 4-bromopropiophenone via α-bromination and methamination

Kevin Zencak - Virginia Department of Forensic Science*

As part of the Clandestine Laboratory training module for new forensic scientists at the Virginia Department of Forensic Science, a synthesis is performed. The synthesis of 4-bromomethcathinone (4-BMC) was chosen due to the ease of obtaining the propiophenone precursor. A cathinone was chosen over a phenethylamine since there have been more new substituted cathinones on the drug market in recent times compared to phenethylamines.

Volatile Organic Compounds Associated with Diseased Human Blood

Megan Morris, Dan Sykes, Veronica Cappas, and Virginia Greenberger - The Pennsylvania State University*

Characterizing the differences between the volatile organic compounds (VOCs) produced by healthy and diseased blood may enhance our understanding of the body's health-state on decompositional processes. Headspace solid-phase microextraction (SPME) paired with gas chromatography-mass spectrometry was used for the detection of volatile emissions of nondiseased and diseased blood. Nondiseased, anemic, and diabetic blood samples were placed in open glass vials and allowed to stand uncapped for two weeks. VOCs were collected at regular intervals -0, 24, 96, 168, 336 hours via SPME fiber headspace for sample adsorption, and vials were capped thirty minutes prior to collection at each time interval. Throughout this research, diseased and nondiseased blood VOC profiles consistently differ.

Rapid Analytical Screening Methods for the Investigation of Firearm Related Crimes

Courtney Vander Pyl, Korina Menking-Hoggatt, PhD, Tatiana Trejos, PhD - West Virginia University*

Evidence from firearm-related incidents is readily submitted to crime laboratories for multiple types of analyses. These examinations often include detecting potential links between suspected individuals to a shooting incident, identifying potential bullet holes, and estimating muzzle-to-target shooting distances. Current methods used for GSR detection can be time-consuming, require the use of hazardous chemicals, and may limit further use of confirmatory methods. Therefore, this study developed rapid screening methods using Laser-Induced Breakdown Spectroscopy (LIBS) as a fast and reliable analytical tool for detecting gunshot residues from multiple types of crime scene samples. Over one thousand GSR specimens were recovered from hands, clothing, walls, and windows, with accuracy generally better than 90%. This study assessed the feasibility of incorporating a reliable screening tool in the GSR analysis workflows for faster decision-making and more streamlined processes.

Criminalistics Section Abstracts (continued)

Evaluation of a New Seized Drug Substance Screening Procedure with the Waters RADIAN™ ASAP Direct Ionization Mass Spectrometer

Erin Tracy, Kelsey DeWitt, Lauren Wiley, Melanie Peguese-Richards, Peter B. Harrsch - Raleigh/Wake City-County Bureau of Identification*

The RADIAN ASAP Mass Spectrometer system provides a new tool for the forensic drug chemist to rapidly screen seized drug substance evidence. The system employs an easy- to-use sampling interface that permits a simplified workflow for drug samples pre-dissolved in an appropriate solvent prior to being rapidly analyzed. The mass spectral data can be immediately interrogated and identified by spectral matching software with mass spectra of specific drug compounds in the seized drug database. The workflow and analysis procedure was first checked with known drug standards. The system was also valuated on authentic case samples that were analyzed previously by GC-MS. There was excellent concordance in the drug components identified by the RADIAN ASAP compared to the GC-MS data.

Screening Anticoagulant Adulterants in Seized Materials

Hiu Yu Lam, Tais Fiorentin, Fran Diamond, Mandi Mohr, Barry Logan - The Center of Forensic Science Research and Education*

Anticoagulants, compounds within warfarin and superwarfarin class, are commonly found in commercial rodenticides and have a long history of involvement in many types of forensic casework, including suicides, homicides, and accidental poisonings. In the past few years, these anticoagulants have been implicated as toxic adulterants in street drugs in the United States, causing a significant adverse events and death. Analytical evaluation for screening for the presence of anticoagulants is particularly challenging due to the small amounts present in samples and their chemical properties. Here, we characterize traditional seized drugs workflows, such as color test and gas chromatography and mass spectrometry (GCMS) and their ability to detect anticoagulants associated limitation.

Friday, September 24th

Delta-9-Tetrahydrocannabinol Quantitation of Plant Material Using GC-SIM-MS

Jessica Belton - Virginia Department of Forensic Science*

Due to the passage of the Federal Farm Bill in 2018, states became tasked with differentiating between Industrial Hemp (Cannabis) and Marijuana. A majority of delta-9-Tetrahydrocannabinol (delta-9-THC) quantitation methods of plant material has been heavily focused on high-performance liquid chromatography coupled to a diode-array detector (HPLC-DAD). However, due to the inherent nature of the plant material itself, this technique leads to various issues such as carryover and co-elution of cannabinoids. As most laboratories were not previously equipped with HPLCs, additional instrumentation needed to be procured. Gas chromatography-selective ion monitoring-mass spectrometry (GC-SIM-MS) is an excellent technique to quantitate delta-9-THC of plant material with equipment readily available in virtually all forensic laboratories.

Criminalistics Section Abstracts (continued)

Age-at-Death Estimation Using Cementochronology in Thermally Altered Teeth

Ryen Weaver, Dr. Anthony Falsetti, Dr. Timothy Gocha, Dr. Joseph DiZinno - George Mason University*

This study aims to provide an in-depth analysis of thermal alteration to human teeth by various accelerants when utilizing the cementochronology method to build a biological profile. Three accelerants with varied volumes were used to determine if the readability of cementum annulations can still remain accurate after alteration; results from this study indicated that the type of tooth had significant impact on the ability to count annulations. Annulations were able to be read and estimated after alteration with all three accelerants used in this study. A novel formula was developed to help approximate the amount of cementumannulations found within each sample. This formula was found to yield estimated toothcementum annulations that were highly correlated with the actual ages of the individuals from whom the samples were from. After thermal alteration of teeth with accelerants, it was found that cementochronology is an accurate and helpful tool for estimating age-at-death in unknown individuals.

How common is it to find glass and paint residues in a member of the general U.S. population?: A preliminary study

Lauryn Alexander, Oriana Ovide, Olivia Duffett, Tatiana Trejos - West Virginia University

There is currently limited literature on the frequency of occurrence of glass and paint, especially within the United States. Moreover, the available studies do not reflect the demographics, socioeconomical, or geographical circumstances of our region.

As a result, this survey aims to establish background data on the occurrence of glass and paint in different US regions and seasons. In this study, we present the results from a first set collected in Morgantown, WV during the winter season. A total of 100 volunteers with up to 6 separate garment areas per volunteer were sampled utilizing taping and scraping methods. A total of 511 items were sampled from the 100 participants. Out of the 511 items collected, 13 glass fragments and 118 paint fragments were identified and classified. The background information is anticipated to serve as an important basis for a more comprehensive interpretation of glass and paint evidence.

Screenshot

Peter Diaczuk, John Jay College of Criminal Justice

This research project was generated from a shooting case involving a suspected bullet hole through a window screen. When submitted for examination, the window screen contained two holes, so it became important to determine whether one, both or neither holes found in the window screen were made by a bullet(s), and if so, could an angle be approximated (or eliminated) based on the shape of the hole. The holes made by these test-fired bullets distinctly revealed that one of the two holes in the apartment screen did not result from bullet perforation. Additional test-fired bullets in the experiment showed a more elliptical shape with increasing angle away from an orthogonal impact, an increased diameter with increasing bullet caliber, and varied results with bullet velocities in different calibers.

Criminalistics Section Abstracts (continued)

A Tale of Two Quants: A Comparison of Two THC Quantitation Methods

Brady Lusk - Anne Arundel County Police Department Forensic Services

With the passing of the Farm Bill in 2018, a new challenge was presented to forensic laboratories: the quantitation of plant material to determine THC concentration. Two methods utilizing an HPLC-UV were validated: one method utilizing a series of manually prepared standards, and a method where injection volumes are varied for a single calibration standard. Quantitation of plant material samples of a known concentration was performed with and without the usage of an internal standard. It was determined that varying injection volumes of a single calibration standard was able to provide a more accurate result when compared to plant material of a known THC concentration.

Likelihood Ratios of Hair Using RGB Color Values and Diameter

Emma Redman, Victoria Echternach, Casey Rech, Isabel Sandone, Lawrence Quarino - Cedar Crest College*

The presented study hopes to establish a model whereby a likelihood ratio could be calculated to assess the probability of encountering a random hair using two objective measurable variables, diameter and color. Two hundred and fifty hairs collected from common places were mounted in DPX mounting media (nD -1.521) and examined under 200x using an Olympus BX53 polarized light microscope set up for Kohler Illumination under standardized lighting conditions. Using software measurement tools, diameters of each hair were taken in 3 locations along the hair shaft toward the middle of the hair and five RGB values were taken at different points in the cortex approximately 3 µm from the edge of the hair. The mean standard deviation of each color and diameter of all hairs was used to construct a floating bin database which was used to determine random match probabilities of additional collected hairs. A 95% upper bound confidence interval was determined from each random match probability and the reciprocal of this value was used to calculate a likelihood ratio which ranged from approximately 100 to 500 for randomly collected hairs.

Investigation of Novel Chemiluminescent Detection Methods for Cannabinoids

Catherine Stacey and Dr. Lindsey Welch - Cedar Crest College*

Several oxidizing agents such as potassium permanganate, tris(bipyridine) ruthenium (II), cerium (IV) sulfate with rhodamine B, and N-bromosuccinimide were compared in the chemiluminescent detection of pyrocatechol, orcinol, and resorcinol. Based on the results of these preliminary studies, those methods which resulted in consistent response were tested for the detection of cannabinoid compounds in solution. The combination of N-bromosuccinimide and sodium hypochlorite resulted in chemiluminescence in the presence of both D 9 -tetrahydrocannabinol (THC) and cannabidiol (CBD), with signals exhibiting a linear correlation in toxicologically relevant concentrations. From these studies, a novel method for the detection of D 9 -THC and other cannabinoid compounds was identified. This study presents the potential for a new presumptive drug test for biological fluids.

Criminalistics Section Abstracts (continued)

Negative Control Study to Evaluate MSP's Policy on Blanks

Brooke Welsh and Amber Burns - Maryland State Police Forensic Science Division*

In September 2019, the Maryland State Police-Forensic Sciences Division (MSP-FSD) participated in a Frye hearing where our policy on blanks was challenged. The defense argued that our blanks policy was insufficient and could result in MSP-FSD reporting out a controlled dangerous substance (CDS) that was not actually present in the defendant's sample, either from carryover of a CDS from the previous sample analyzed on the instrument or from background contamination. As a result of this hearing, MSP-FSD performed a negative control study to evaluate the effectiveness of our blanks policy and to assess the sensitivity of the instruments over the length of the study. When the Maryland courts transitioned to Daubert hearings, we faced the same challenge again for the same case during a Daubert hearing. This presentation will cover the negative control study, the drug background research published by Dr. Edward Sisco and Amber Burns, and the resulting research to establish that our procedures ensure data integrity when reporting a CDS in a sample. While the negative control study shows that the likelihood of reporting a false positive result is minimal with our current practices, the CDS Unit plans to update their SOPs to incorporate the use of blanks and include this data in the case files to ensure data integrity.