**CBD-IAI/PSDIAI FALL EDUCATIONAL SEMINAR**

**October 15, 2016**

**WEST VIRGINIA UNIVERSITY**

***Surviving One Day and 27 Years Later: A Heinous Crime***

This presentation will consist of crime scene explanation with a narrative story by the presenter of the complexity of this life and death investigation. How with hard work, some luck, state-of-the-art forensics and a little help from above, breaks the case to a successful courtroom conclusion. But the story still continues from the first time it was presented before the CBD-IAI 25 years ago!

**Joe Scerra** has 46 years in several official law enforcement fields, retired as a police officer, and has spent many years as a latent fingerprint examiner.

***Forensic Linguistics***

This talk explains some of the ways Forensic Linguistics can help suspect identification. After an overview of the wide diversity of topics Forensic Linguistics handles, we explore the background topics of phonetics, sociolinguistics, and variationist analysis that form the foundation of linguistic identification. Both the potential and the limits of linguistic identification are illustrated through an exploration of several cases involving both written and audio language data.

**Kirk Hazen** is a Professor of Linguistics in the Department of English at West Virginia University, where he also directs the West Virginia Dialect Project. His research program since 1993 has focused on the influence of linguistic and social factors on language variation patterns. His research has been supported by both the National Science Foundation and the National Endowment for the Humanities. In addition to 35 articles and book chapters, he has authored *An Introduction to Language* (Wiley 2015) and *Identity and Ethnicity in the Rural South* (Duke 2000), co-authored *Dialect change and maintenance on the Outer Banks* (1999) with Walt Wolfram and Natalie Schilling-Estes and co-edited *Research Methods in Sociolinguistics* (Wiiley 2014) with Janet Holmes. From the start of his career, he has promoted sociolinguistic goals by presenting dialect awareness programs to numerous communities. For the linguistic profession, he has served as an associate editor for *Language* and other journals and as an advisory panelist for the linguistics program of the NSF.

***Crime Scene Reconstruction Case Studies***

This presentation will serve as a review of cases where crime scene reconstruction was applied to the scene in preparation for trial.

**Jessica Shaffer** holds BS degrees in Forensic Science and Chemistry and a Master of Forensic Science. She has been employed with the Western Maryland Regional Crime Laboratory (housed within the Hagerstown Police Department) for over 9 years. Jessica has been a member of the IAI and CBD-IAI since 2009 and is currently serving on the CBD Board of Directors. She has been certified through the IAI as a Crime Scene Investigator since March 2009.

***Current Developments in Organic Gunshot Residue Research***

This presentation will summarize current research, development, and validation work in organic gunshot residue. Developments in the US and Europe will be addressed. Methods to be described are based on hand swabbing using cloth and swabs as well as hand dabbing using SEM stubs. The goal of these projects is to develop field sampling methods based on protocols already in use. Laboratory methods, including presumptive testing, will be described and results and status discussed. Methods used to combine data from inorganic characterization (barium, antimony, and lead) with organic characterization will be presented.

**Dr. Suzanne Bell** is a professor at West Virginia University and is on the faculty of the Chemistry and Forensic and Investigative Science Departments. She is a Commissioner on the National Commission on Forensic Sciences, a member of the OSAC on gunshot residue, and a member of the scientific working group on gunshot residue analysis (SWGGSR). Her research group has been active in GSR and organic GSR work since 2011 and she collaborates with the European working group on OGSR. Her research has been funded by the US Army, the National Institute of Justice, the Forensic Science Center of Excellence at RTI, and the National Institute of Standards and Technology.

***The Effects of Fingerprint Processing on Touch DNA***

DNA has quickly become the gold standard in forensic testing with its ability to aid investigations of criminal offenses. At the advent of DNA analysis, a large amount of sample was required to successfully obtain a DNA profile. As DNA testing has advanced, the amount of sample needed to obtain a profile has decreased significantly; to the point that a visible stain is not required for successful DNA results. This advancement has allowed the recovery of DNA from objects that have been handled by an individual. Along with this advancement comes the concern of performing multiple methods of analysis such as latent print processing and touch DNA analysis, both to increase the likelihood of investigative leads but to also provide sufficient probative evidence for juries saturated with misinformation from CSI-themed television shows. This presentation will discuss the effects of latent print processing on touch DNA in an effort to maximize the information that can be obtained from the evidence in criminal investigations.

**Ms. Ashley Platt** earned her BS in biology with a minor in Chemistry from Carlow College in 2003. She later earned a Master of Science in Criminalistics from California State University, Los Angeles, 2006. Ms. Platt started her forensic career at the Orange County Sheriff/Coroner in Santa Ana, CA as a forensic scientist in the blood alcohol section until 2006 when she transferred to the Los Angeles County Sheriff to serve as a Senior Criminalist, first the Narcotics section and then in the Forensic Biology section. In 2013, Ms. Platt moved back to her home town of Pittsburgh where she is now employed as a scientist in the Forensic Biology Section of the Allegheny County Office of the Medical Examiner, performing both serology and DNA, in addition to acting as the CODIS Administrator.

***Case Study: Recovered Human Head and the Forensic Technology That Has Been Employed to Assist in an Identification***

This is a case study of a recovered human head and the forensic technology that has been employed to assist in identification. While there has been significant investigative leads through varying forensic disciplines, no identification has yet been made. Techniques such as forensic art (sketch and sculpted likeness), forensic analysis of dental filling to date the head, facial recognition, and isotope testing have been employed. In addition, standard investigative techniques such as media coverage, suspect pool development, investigative round tables, vital records searches have been completed.

**Brian Kohlhepp** is a Detective at the Ross Township Police Department. In this capacity, he is the primary investigator in the Ross Police Forensic Investigation Unit. He investigates all major criminal incidents such as suspicious deaths, sexual assaults, and child abuse. He has over 900 hours of specialized training in various policing subjects. He has a BA from Waynesburg University in Criminal Justice and a Master of Arts in Social Sciences from California University of Pennsylvania (summa cum laude). Detective Kohlhepp is on faculty teaching at Duquesne University, graduate school at California University of PA, and Waynesburg University and undergraduate courses at John Jay College of Criminal Justice. He also serves as a program director and instructor in numerous criminal investigation and forensic continuing education classes for attorneys and law enforcement at the Center for Law and Public Policy at California University of PA held in the Pittsburgh and Philadelphia areas. Detective Kohlhepp regularly conducts continuing education seminars for John Jay at their main campus in New York City. He is the current President of the Pennsylvania State Division of the IAI.

***WVU Student Research: Determining the Number of Test Fires Needed to Represent the Variability Present within a Firearm***

Many studies have been performed in recent years in the field of firearm examination with the goal of providing an objective method for comparisons of fired cartridge cases. To date there has been no research to support the number of test fires needed to represent the variability present within a firearm. When a suspect firearm is submitted to a firearm examiner, typically two to four test fires are performed. The recovered cartridge cases are compared to each other to determine which characteristics from the firearm are reproducing, and then compared to any cartridge cases collected at a crime scene. The aim of this research was to determine the number of test fires firearm examiners should perform when a suspect firearm is submitted to the lab to balance cartridge case acquisition time with performance accuracy. Each firearm in the IBIS database at West Virginia University is represented by 100 fired cartridge case entries. Random samples of comparison scores were taken separately from the breech face match score and firing pin match score lists. This subset was compared to the total match distribution of the firearm using a hybrid equivalence test to determine if the subset of similarity scores were statistically equivalent to the larger distribution of scores. For the sampled distribution to remain above 80% equivalent to the match distribution, a minimum of 15 cartridge cases is a conservative estimate, being that it is enough to be 100% equivalent to the actual firearm match distribution of 100 fired cartridge cases.

**Eric Law** graduated from West Virginia University with an undergraduate degree in Forensic and Investigative Science in 2014. He continued at WVU where he received hhmgis Master’s Degree in Forensic and Investigative Science in 2016. He was also selected as a Ruby Fellow in 2016 to pursue a PhD in forensic science at WVU.

***WVU Student Research: Understanding the Expert Decision Making Process in Forensic Footwear Examinations: Accuracy, Decision Rules, Predictive Value and the Conditional Probability of an Outcome***

Forensic footwear examination and interpretation is a complex and distributed activity influenced by a host of competing and evolving factors that vary as a function of case attributes and examiner experience. The entire pattern recognition process and ultimate conclusion drawn by the expert decision maker with regard to source is an amalgamation of several sources of variability that are not necessarily independent, not linearly related. Although most experts can well-articulate their conclusions and justifications for a given case (even in the presence of variations between crime scene samples and known exemplars), it is much more difficult for the community to characterize and quantify intra- and inter-analyst variability in expert decisions across several cases that vary in terms of quality and complexity. Moreover, it is nearly impossible to directly state the probability of a single decision rule, let alone a dominating rule. For this reason, the idea of inferring a preference model using a data mining technique is very attractive. Therefore, the aim of this project is to use the dominance-based rough set approach (DRSA) to better discern how examiners interpret the pattern recognition process of footwear comparison from start to finish. With this model, the expert need only answer questions regarding a questioned-source comparison and then provide an exemplary decision (e.g. identification, exclusion, etc.), and through the rough set approach, all available information regarding the expert’s findings can be used to produce preferential model(s) that enable an understanding of the decision maker’s reason(s) for his or her choice(s). In accomplishing this goal using the aforementioned method, four additional objectives will also be achieved: (i) quantification of variability in expert decisions via accuracy and positive predictive value, (ii) identification of factors that affect footwear examination and conclusions via decision rule induction, (iii) evaluation of decision rule quality as a function of strength, support, certainty and lift factor and finally, (iv) an evaluation of the interaction between factors (e.g. impression quality, number of concordant randomly acquired characteristics (RACs), examiner years of experience, etc.) and expert decisions.

**Ms. Madonna Nobel** graduated from West Virginia University’s Forensic and Investigative Science Bachelor’s Degree Program in the Forensic Examiner Track in May 2014 and continued on to do her master’s degree at WVU. She became interested in data mining through forensic informatics and data science courses and chose to explore the field of forensic pattern impressions, namely footwear evidence, in order to better understand the decision-making issues involve with forensic pattern interpretation. She hopes to graduate in December 2016 and continue working within the forensic sciences.