

The CACNews

News of the California Association of Criminalists • Third Quarter 2019



The President's Desk

Get Involved!

**alice
Hilker**



CAC President

I have found that the more I become involved and invested in an activity, the more I get out of the experience. And I encourage those who have not yet had the opportunity, to find a way to be involved.

I would like to begin by thanking you all, the CAC members, for your support in electing me to serve as your president for this coming year. I would also like to thank the Oakland Police Department Crime Laboratory for all of their hard work in hosting the recent Spring CAC seminar "Facets of Forensic Science" and to congratulate them on their 75th anniversary. This seminar was well-attended, the speakers were excellent, and it also featured over twenty student posters.

As I look at the many past editions of "The President's Desk," I am inspired and amazed by the careers and achievements of those that have held this office over the years. I enjoyed reading about their aspirations for their presidencies, and then, later, what they achieved, not to mention the thoughts many of them had while driving down the I-5! The story of the coconut is found in Michael Parigian's 3rd Quarter 2002 message and I had not known this prior to the Oakland banquet. Thank you fellow board member for recalling the year and author of that message. The messages contain many inspirational thoughts and reflect some common themes over the years such as bridging generations, re-examining membership criteria, and commenting on the oversight committees and task forces established at the time.

At this time, the theme that resonates the most with me is the first one that I looked at. In a brief message from Greg Matheson in the Summer of 1992, he states, "If I was to accomplish just one thing this year, it would be to infect as many people as possible with the desire to get active and involved in the CAC." Before I proceed, I would like to thank all of those members who have been or are currently participating actively in the CAC in any capacity. Please know that your contributions are greatly appreciated.

I have found that the more I become involved and invested in an activity, the more I get out of the experience. I encourage those who have not yet had the opportunity, to find a way to be involved. I have been a CAC member since I moved back to California in 2001 from the east coast. My first CAC involvement was participation in the study groups and attendance at seminars. Eventually, I became a DNA Study Group Chair, organized those study groups, and in some instances, presented at those study group meetings.

After approximately six years, I was asked if I wanted to join the board as the regional director north. I began to organize the study group meetings, start new study groups (or support groups) such as the DNA Technical Leader Study group. This is my favorite part of being a CAC member, being able to meet and discuss topics outside of the bubble of your own laboratory, with scientists that may have had similar problems and solved them, or who have the same problem and want to collaborate on a solution.

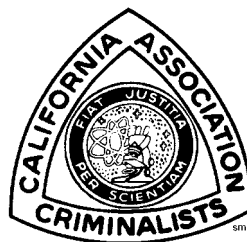
If you have ideas about how to improve the organization, feel free to let the board members know what those ideas might be, or better yet, join a committee and make a difference! If you have a great case or research project, share it with the membership by presenting it at a CAC meeting, or writing an article for the *CACNews*. If you have an idea for research, you might consider submitting it to the endowment committee for funding. Again, thank you to all of you who volunteer with CAC, and, to those who are considering it, just do it! You will be glad that you did!

Alice

THIRD QUARTER 2019

The CACNews

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Submissions should be made in the form of Windows compatible files on CD or by e-mail. Alternatively, text files may be saved as plain ASCII files without formatting codes, e.g. bold, italic, etc. Graphics, sketches, photographs, etc. may also be placed into articles. Please contact the editorial secretary for details.

The deadlines for submissions are: December 1, March 1, June 1 and September 1.



Recalling the recent "UN International Day of Women and Girls in Science," we offer this original digital art from high school student Naomi Aho.

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jonathan
Charron



CAC Editorial Secretary

While there may be many pitfalls and dangers for a person with an unprotected personal profile page, the intention and spirit of social media has an overwhelming potential for good.

The CAC's Cozy Corner

If asked to think back to the year 2004, many of us would try and recall a profound event in our life from that time to use as a mental reference. Some of us may conjure memories of interviewing for a criminalist position for the first time, the memory of a high-profile case you were called to testify on, or perhaps for some the first time learning about DNA in school. While this year may hold variant significance for everyone, or no significance whatsoever, 2004 was the year a monumental shift in culture as we knew it began. In February of 2004, a small social media website called thefacebook.com was launched¹ and the world has not been the same since. While many social media type sites preceded what is now referred to as just "Facebook," the launch of this powerhouse outlet has paved the way for many other social media platforms of varying foci and currently has over 2.3 billion active monthly users worldwide.² While there have been countless advances in online capabilities, and with technology continuing to change and grow, Facebook has been successful in maintaining its relevance across the years with little signs that it will be leaving as a cultural norm any time soon.

The proliferation of social media sites has created many places for people to interact and share information about one's life. With this avenue of information, investigators have access to a plethora of potential information about a suspect of a crime. While these websites enable an investigator to glean information about a suspect, users of social media must be aware that those committing these crimes may be using the same techniques to obtain evidence about their next victim. According to a poll of 50 ex-burglars conducted by Credit Sesame, almost 80 percent of these burglars would use social media sites to target victims. By keeping your account open to the public and posting your plans, vacations, and work schedules, criminals can ascertain when you will be away from your house in order for them to get in and leave undetected.³ Perhaps even more disturbing than burglary is how social media can be used as a venue for human trafficking. In a survey of human trafficking survivors, 57 percent reported being contacted by the trafficker in some way through social media.⁴

While there may be many pitfalls and dangers for a person with an unprotected personal profile page, the intention and spirit of social media has an overwhelming potential for good. Social media platforms have provided a place for people to keep in touch with others from all corners of the world through a constantly updating stream of tweets, posts, and pins. One can catch up on the lives of friends and family all while sharing their own personal challenges and triumphs with a single click of a button.

Aside from people's personal social media pages, there is also a noticeable increase in organizations creating and maintaining a social media presence, including law enforcement agencies. I have seen many police and sheriff departments use their Facebook page to reach out and communicate in real time

with the communities they serve. This platform allows the agencies to share success stories with the denizens of their jurisdictions while also being able to ask for tips and witnesses to incidents they are investigating. This interaction with the community is an amazing way for the law enforcement agencies to stay in touch with the community in a positive and productive fashion.

With an updated website, the addition of a social media specialist position and social media policy, and a drive to find new ways to engage and communicate with the membership, it is now time to create our own cozy corner in the social media world. By creating these social media pages, we will be able to provide an easy to access place to update everyone on upcoming seminars, study groups, surveys, job postings, and any other important information relevant to the CAC. I encourage you all to read through the Social Media Policy posted on the CAC website to prepare for the launch. With nearly 80% of the American population on some version of social media⁵, I know that many of you will embrace this new venue as we continue to adapt to the ever-changing technology around us.



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FEEDBACK ◀.....▶

It seems like only yesterday that Greg Matheson and I were sitting in a Seattle restaurant trying to persuade Meiling Robinson to take up the mantle of CAC editorial secretary. We had just attended the AAFS meeting and were now enjoying a bit of a well-deserved break. She was understandably reluctant but Greg and I were relentless. I think I can speak for Greg as well when I say the next four years would make us glad she gave in and proud of her accomplishment.

In the 28 years of producing the *CACNews* it has been my great honor to have worked with a number of editors, and I can tell you that I will miss Meiling's sharp eye, quick wit and unflagging energy. Keeping the prestige and quality of our newsletter the highest was always her focus. But more than that, I count her among my friends. May she find fair winds and following seas.

One door closes and another opens. I look forward to working with Jonathan Charron as he steps forward to take the helm. It was my pleasure to connect with him at the Oakland meeting and I already know we will make a great team. He is on fire to carry the tradition of excellence forward. Look out, future, here we come!

—John Houde

I enjoy reading the *CACNews*, and have been honored to speak to your organization. I also really enjoyed the recent piece on my dear friend Raymond Davis.

I hope that you might consider sharing my recent peer-reviewed commentary in *FSI Genetics* in your newsletter, and with your members.

—Greg Hampikian PhD

Forensic Science International: Genetics
Volume 41, July 2019, Pages 32-33
<https://doi.org/10.1016/j.fsigen.2019.03.005>

Editorial: **Correcting Forensic DNA Errors**

Abstract

DNA mixture interpretation can produce opposing conclusions by qualified forensic analysts, even within the same laboratory. The long-delayed publication of the National Institutes of Standards and Technology (NIST) study of 109 North American crime laboratories in this journal demonstrates this most clearly. This latest study supports earlier work that shows common methods such as the Combined Probability of Inclusion (CPI) have wrongly included innocent people as contributors to DNA mixtures. The 2016 President's Council of Advisors on Science and Technology report concluded, "In summary, the interpretation of complex DNA mixtures with the CPI statistic has been an inadequately specified—and thus inappropriately subjective—method. As such, the method is clearly not foundationally valid". The adoption of probabilistic genotyping by many laboratories will certainly prevent some of these errors from occurring in the future, but the same laboratories that produced past errors can also now review old cases with their new software—without additional bench work. It is critical that laboratories adopt procedures and policies to do this.



The CAC Publications Committee

(l-r) Incoming Editorial Secretary Jonathan Charron, outgoing Editorial Secretary Meiling Robinson, Webmaster Stephen Lu, Art Director John Houde, Social Media Specialist KC Canlas. Not pictured: Webmasters Regina Davidson and Bonnie Cheng.



Spring brings changes to the board...

The 2018-19 CAC Board of Directors. (clockwise from left) Recording Secretary Gunther Scharnhorst, President-Elect Alice Hilker, Regional Director North Cindy Anzalone, Immediate Past President Vincent Villena, Treasurer Helena Wong, Editorial Secretary Meiling Robinson, Membership Secretary Megan Caulder. (missing: President Mey Tann and Regional Director South Jamie Lajoie)



The 2019-20 CAC Board of Directors. (l-r) Regional Director South Stephen Lu, Recording Secretary Gunther Scharnhorst, Editorial Secretary Jonathan Charron, Membership Secretary Megan Caulder, President Alice Hilker, President-Elect Jamie Lajoie, Treasurer Helena Wong. (missing: Immediate Past President Mey Tann and Regional Director North Cindy Anzalone)



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In the next issue of the *CACNews*:
"History of Oakland PD Crime Lab"



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ABSTRACTS FROM THE SPRING 2019 CAC SEMINAR

CAC Founder's Lecture: The Technician - A Short-Lived 1940's Forensic Science Journal

William Randle, Missouri State Highway Patrol Crime Lab

John E. Davis was a well-known forensic scientist and lab director of the Oakland Police Department Laboratory. What is not so well known is that Mr. Davis started his career at the Missouri State Highway Patrol Crime Laboratory in Jefferson City, Missouri, and in that capacity edited, published and contributed to an early forensic science journal called "The Technician," published from May of 1943 to April of 1944.

What made this journal unique for its time was that it was written specifically for the laboratory technicians working as criminalists. This presentation will inform the attendees about these lost volumes and their content, as well as provide some information about Mr. Davis.

Quo Vadis? Quo Tendimus?

Lucien C. (Luke) Haag, Forensic Science Services

If we have not yet already arrived, it would appear that American crime laboratories are rapidly headed for a situation in which all evidence must fit into some pre-defined category for which any contemplated analysis must be selected from a menu of previously validated analytical procedures. These ever increasing restrictions appear to be the product of some who have never worked as criminalists in a traditional crime laboratory. Two examples from actual casework will be presented which likely could not be successfully undertaken in today's crime laboratory. The first, a drug case, was solved by some imaginative chemistry with its validity demonstrated by the successful isolation and identification of the controlled substance (LSD). The second, a shooting case in which a phenomenon, never seen before and not likely to be seen again, lead to the resolution of the case. Justice is clearly not served when today's crime laboratory turns down certain requests for analysis with the statement "We do not have a validated procedure for that".

Oikos University Mass Shooting - First Response, Crime Scene, and Prosecution Perspectives

Mark Bennett, Criminalist, Oakland Police Department

Dominique Arotzarena, Sergeant, Oakland Police Department

Stacie Pettigrew, Alameda County District Attorney's Office

A number of mass shootings hit the headlines in 2012, including the Aurora Colorado movie theater shooting (12 killed), the Sikh temple shooting in Wisconsin (6 killed) and the Sandyhook New Hampshire elementary school shooting (26 killed). Oikos University in Oakland was the scene of a mass shooting in April 2012 in which ten people were shot and seven were killed. This case is presented from the perspective of the first responders who were met with the initial aftermath of the shooting, the crime scene response, including logistical approaches to a large scene and reconstruction with trajectory analysis, and the prosecution aspect, including significant evidence of premeditation and deliberation and mental health issues of the defendant.

Results of the 2018 3D Virtual Comparison Microscopy Error Rate Study (VCMERS)

Ryan Lilien, Cadre Forensics

Todd Weller, Weller Forensics

3D Virtual Comparison Microscopy (VCM) is a powerful tool for microscopic examination which presents a firearms examiner with a highly detailed visualization of a tool-mark surface. We hypothesize that over the next several years VCM will prove increasingly useful and will begin to see use in many crime laboratories. To support the use of VCM within the laboratory it is critical to establish the performance of VCM. This presentation will teach the audience about VCM and will present the results from the 2018 VCM Error Rate Study (VCM-ERS) completed as a collaboration between Cadre and the Royal Canadian Mounted Police (RCMP) National Forensic Laboratory Service. The VCMER Study was designed to investigate error rates and to identify the specific topographic features used by examiners when reaching source conclusions via VCM. The study focused exclusively on virtual comparison microscopy of cartridge cases.

Forty test sets each containing three cartridge cases (two "known" and one "unknown") were created. The selected test sets represent a variety of tool manufacturing/finishing processes and class characteristics. The sets include both cartridge cases that are well marked and those that are minimally marked. The sets range in difficulty, from easy to hard, to represent the variability experienced in real casework. The 3D surface topographies of all scans were collected using Cadre's TopMatch-3D scanning system at a resolution of approximately 1.5 micrometers per pixel. Each participant was randomly and blindly assigned sixteen different test sets to evaluate. For each test set, participants were asked both to reach a source conclusion (utilizing the 5 Point AFTE range of conclusions) and to annotate areas of similarities and differences that were used when reaching their conclusion.

New Breath Technology for Measuring Marijuana Use Within the Peak Impairment Window

Jeff Stoll, Senior Director of Product Management, Hound Labs

Marijuana legalization continues to spread across the U.S., yet there still is no objective way for law enforcement to determine if someone is driving stoned. Current drug testing methodologies that utilize oral fluid, blood, and urine can measure the presence of marijuana long after impairment has subsided. This could lead to wrongful arrests of drivers who smoked and tested positive but were not under the influence of marijuana while driving. Fortunately, new non-invasive breath measurement technology can provide objective data on marijuana use within the last few hours -- which aligns with the time period of peak impairment. This presentation will discuss recent clinical trial results at the University of California, San Francisco -- how THC behaves in both breath and blood over several hours immediately after smoking marijuana, and what this means with regards to impairment. The session will conclude with an exploration of new possibilities for marijuana drug screening, confirmation testing, and DUID laws.

The CSI Effect: Overthinking a Crime

Gregory Laskowski, BS, MPA, D-ABC, Criminalistics Services International, LLC

Abstracts, cont'd

After watching episodes of the television series CSI, a killer decides to exhume the body of his victim that he buried in a remote location of the Mojave Desert and mutilate it so that it will not be able to be identified if found. He enlisted an accomplice to exhume the body who unbeknownst to the killer alerted law enforcement and informed them of the plan.

DNA Analysis for Cases Involving Commercial Sexual Exploitation of Children (CSEC)

Martin Ziebarth, Oakland Police Department – Officer, VICE/Child Exploitation Unit

This presentation will cover the outcomes of approximately seventeen (17) human trafficking and sexual assault cases involving the same minor victim. The specific focus will be the DNA analysis of sexual assault evidence kits, and follow up lab work done (collection of reference samples and comparison to evidence). Some of this lab work led to the identification of and successful prosecution of suspects that would have otherwise not been held accountable for their crimes. This presentation will also discuss the reasons for multiple donor profiles from a single sexual assault exam and how this can affect prosecution of a CSEC case.

The Value of the Child Forensic Interview

Maya Ynostroza, Deputy District Attorney, Alameda County District Attorney's Office

Calico is Alameda County's child-focused multi-disciplinary interviewing center. Calico serves children ages 2 - 17 as well as developmentally delayed adults who have been abused in Alameda County. It coordinates the investigation, prosecution and treatment of child abuse while helping abused children and their families to heal. Calico brings together professionals and agencies as a multidisciplinary team to create a child-focused approach to child abuse cases. On occasion Calico conducts interviews of children or developmentally delayed adults who are victims of human trafficking and exploitation. In October 2016 Calico conducted a forensic interview of a 12 year old developmentally delayed girl who presented as being a victim of commercial sexual exploitation/sex trafficking. The child disclosed being forced to walk

the track, being gang raped, being forced to orally copulate a male, being sodomized and being forced to ingest drugs. The child had a SART exam at Children's Hospital. DNA was obtained, entered into CODIS and there was a DNA hit on an adult male. The Oakland Police Department handled the investigation and the District Attorney's Office charged and ultimately convicted the adult male of Human Trafficking of the child for commercial Sex, a violation of CA Penal Code section 236.1(c) for which he received a state prison sentence and was required to register as a sex offender.

Challenges in Preserving Underwater Evidence

David McMurdie, Scott Harrison, Steven Day, Alameda County OES

Law enforcement faces unique challenges when working with underwater evidence. This session describes typical public-safety-diver working environments and details some limitations to evidence recovery and preservation in underwater recoveries. We will discuss the process of locating and recovering vehicles, bodies, and weapons from various aquatic environments, providing real-world examples that illustrate some of the challenges involved. As one of the oldest

active underwater recovery teams, we will also describe the evolution of search and recovery techniques.

Murder of Methias Warren, Father of Chief Supreme Court Justice, California Governor, and Former Alameda County Prosecutor Earl Warren

Gregory Laskowski, BS, MPA, D-ABC, Criminalistics Services International, LLC

Chris Livingston, Historical Research Center Coordinator, Walter Stiern Library at California State University, Bakersfield

On May 14, 1938, Methias Warren, father of former U.S. Supreme Court Justice Earl Warren (*Brown v. Board of Education*), presidential candidate, Governor of California, and Alameda County prosecutor was found bludgeoned to death in his home at 707 Niles Street in Bakersfield, California. Many theories regarding the identity of the killer and the motive were asserted. Many argued that the assailant was most likely a transient. The evidence, however, points to other plausible motives. There were many other whodunit theories, and, to this day, the case remains officially an unsolved mystery. Eighty years later, the Historical Research Center at the Walter Stiern Library on the campus of CSU, Bakersfield accessioned the records of the Kern County Superior Court. Buried within this body of records is information that sheds light on this cold case. This presentation will discuss this evidence, reflecting upon the investigative techniques of the time, the political implications, and brief bloodstain pattern analysis of the crime scene based on the evidence photographs.

Diamond Thieves in the New Millennium

Brigid Martin, US Attorney's Office, Northern Dist. of California

In contrast to the diamond heists often portrayed in movies with masked cat burglars rappelling dexterously through a field of lasers to avoid alarms, grab the loot, and disappear before anyone knows they were there, a robbery crew operating in the Bay Area used sophisticated, modern means to lure the owners of diamonds and luxury watches to the Bay Area where the crew used guns and violence to rob the victims of their jewels. Between November 2012 and December 2013, a robbery crew consisting of more than 7 members carried out an estimated 20 separate robberies and attempted robberies in the Bay Area. The robbery crew identified their victims on Craigslist. They chose victims located all over the country advertising the sale of diamonds, diamond rings, and luxury watches including Rolex and Philippe Patek. The crew members contacted the targeted victims via e-mail and cellular telephone and negotiated to purportedly purchase the jewelry items. The robbers frequently posed as music producers or pretended to be in the market for diamond engagement rings. The conspirators then induced the victims to travel to

the Bay Area to complete the sale of the jewelry item. Sometimes the robbery crew paid for the victim's airplane ticket or promised to reimburse the victim for travel. Often a robbery crew member posed as an airport limousine driver and picked up the victim at the airport using a rental SUV. The victims believed the airport limo driver was going to take them to meet the buyer at a jewelry store or bank for an appraisal and to complete the sale. Instead, the driver took the victims to a different, predetermined location where two or more additional robbers, using guns and physical violence, robbed the victims of the jewelry items and other personal property. The robbery crew is estimated to have been respon-

sible for stealing significantly more than \$500,000 worth of jewelry from victims traveling from more than six states, including Arizona, California, Colorado, Oregon, Washington, and Wisconsin. This case study will use selected evidence - audio, photographic, electronic, and forensic - to explore how this robbery crew was detected and apprehended through work by the FBI and police detectives from multiple local jurisdictions in California and nationwide. The FBI and local detectives used a variety of investigative methods ranging from electronic surveillance to forensic analysis to outmaneuver the sophisticated and cunning con men who orchestrated the conspiracy. Seven crew members were prosecuted federally for their roles in the robbery scheme. The federal defendants received sentences ranging from 41 months to 370 months. Only one of the defendants went to trial. Some of this presentation will focus on the evidence presented at that trial, including the trial testimony of the defendant.

Confession Confirmation - Monert Homicides

*Herb Webber, Sergeant, Oakland Police Department
Shannon Cavness, Criminalist, Oakland Police Department*

Four homicides committed between the late 1980s and early 1990s, linked by MO, are confessed to by the killer. One of the homicides was solved by latent prints from the scene. Another homicide was solved by DNA analysis of evidence from the scene 24 years after the murder. This presentation will focus on how the pieces of this puzzle were put together.

Cryptocurrency and Carding: Experiences from the Alameda County Sheriff's Office Crime Lab

*Michelle Dilbeck, Alameda County Sheriff's Office Crime Lab
Wansin Ounkeo, Alameda County Sheriff's Office Crime Lab
Sarah Cortes, Alameda County Sheriff's Office Crime Lab*

The use of cryptocurrency is becoming increasingly more common in crime, and computer forensic examiners, other forensic scientists, and investigators need to know how to recognize when it is being used and how to appropriately collect digital evidence associated with its use. In this presentation, we talk about recent instances of cryptocurrency being encountered in the ACSO Crime Lab during the examination of digital evidence. Examples include identity theft, credit card fraud, carding, and other criminal activities. We review cryptocurrency, and talk about recent trends including cryptocurrency pool mining. We also review carding and how it works and how identity theft can lead to credit card and other fraud. Additionally, we will discuss how surface net carding sites work alongside darknet carding.

A Head in the Wrong Space: A Dynamic Shooting Incident Reconstruction

Alexander Jason, ANITE Group

In this officer involved shooting incident a suspect was in a moving vehicle. A key question centered on where and when the bullet struck the suspect during the vehicles backward travel. This case required a comprehensive analysis to establish a reconstruction of the events and movements of the officers and the suspects. This presentation will discuss significant evidence items including GSR, bullet performance, blood spatter, ballistic penetration of glass, cartridge case ejection and more.

The Opiate Epidemic - Dealing with Fentanyl Exposures and Establishing a Narcan Program

Deputy Fenton Culley, Alameda County Sheriff's Office, Special Duty Unit (SDU)

1) The Epidemic of Opiates (Why this is such a problem); 2) Brief overview of types of Opioids and current trends (synthetic); 3) Symptomology (Methods of ingestion); 4) Overdose or exposure (Signs and Symptoms); 5) Fentanyl (recent seizures from bay area); 6) Law enforcement exposures (ACNTF / SRJ / Sunnyvale DPS); 7) Naloxone (Narcan Program); 8) Training bulletins and ACSO General Order 1.24 / 5.24 (Narcan and evidence Policy).

Occurrence and Utility of Fingermarks That are Not Identifiable Fingerprints

David Stoney, Stoney Forensic, Inc.

Currently, latent prints that experts judge to be insufficient for identification are not used as associative evidence. How often do such prints occur? What is their potential value for association? Would they actually impact case investigations or prosecutions in a useful way? We will present the results of an ongoing NIJ-sponsored research project on the associative value, occurrence and utility of nonidentifiable fingermarks, along with an initial assessment of the potential contributions. We believe the findings to be significant. We are currently seeking input on how helpful the proposed methods would be and under what circumstances. We are also seeking input on related flaws, problems or constraints, along with suggestions on developments or improvements. Latent prints, previously determined to be of no value for identification (NVID Latents) were collected from nine jurisdictions. To address variability in NVID decisions among laboratories and examiners, and ensure that the prints met program requirements, each latent print was re-examined by a single, highly qualified, certified latent fingerprint examiner (Pat Wertheim). Program requirements were latent prints with discernible Level 2 ridge detail and 3 or more Level 2 ridge characteristics, but without sufficient ridge detail for identification. Measurements of associative value were made (Christophe Champod and Marco De Donno, University of Lausanne) using an expected score based likelihood ratio (ESLR) with auto-encoding of minutiae using a SAGEM-Morpho Light-Out system in version 10. Similarity scores were computed using a Morpho DMA equipped with a matcher in version 9, based on minutiae meeting a quality level of 11 or above (using a scale from 2 to 14 as defined by the Light-Out minutiae detector). Same-source scores were computed using a calibrated distortion model. A total of 750 NVID Latent prints from 540 cases showed Log10 ESLR values between 2 and 10.9, with a mean of 5.7 (a likelihood ratio expected from a frequency of occurrence of about 1 in 380,000). Non-identifiable fingermarks (NIFM) with high associative value occur in large numbers of cases, with potential to provide useful information. The questions now become ones of utility: (1) how often, and to what degree, they would actually help resolve questions of importance in casework, (2) what are the associated issues, problems or constraints, and (3) what improvements could be made to address issues affecting utility. This project was supported in part by Award No. 2016-R2-CX-0060 awarded by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice. The opinions, findings, and conclusions or recommendations expressed in this pre-

Abstracts, cont'd

sentation are those of the authors and do not necessarily reflect those of the Department of Justice.

The Gypsy Hill Murders

Cindy Anzalone, San Mateo County Sheriff's Office

Alice Hilker, San Mateo County Sheriff's Office

Five murders of young women occurred between January 7, 1976 and April 1, 1976 in northern San Mateo County, an area known as Gypsy Hill. Copious amounts of forensic testing over the next 20 years did not yield any investigative leads. In 1996, autopsy evidence in two out of the five homicides were linked with DNA typing, but still no intimation to the actual perpetrator. The first victim, Veronica Cascio, was 18 years old and was last seen walking to a bus stop from her home. Her body was found the next day at a nearby golf course. The second victim, Paula Baxter, was 17 years old and was last seen leaving her high school. Two days later her body was discovered in a remote area behind a church, a few blocks from her school. DNA testing with these cases continued over the years to generate profiles for entry into the Combined DNA Index System (CODIS). In 2013, one of the profiles hit to a cigarette butt found at the crime scene of a 1976 homicide out of Reno, Nevada. The suspect still remained unknown. The victim of the Reno homicide, Michelle Mitchell, was 19 years old when her car had broken down across the street from her University. She called her mother for help and when her mother arrived 15 minutes later, the victim was nowhere to be found. Her body was found later that evening in garage of a nearby home, approximately 300 feet from her vehicle. The cigarette butt was located near her abandoned car. In 1980, a woman previously committed to mental hospitals, Cathy Woods, confessed to the murder and was convicted. In 1985, due to her mental state she was granted a second trial and was once again convicted. It wasn't until 2014, a felon was transferred from a Nevada prison to an Oregon prison to serve time for a violent assault. His DNA was typed and uploaded into CODIS. After 38 years, the murderer was finally identified, Rodney Lynn Halbower. In February of 2014, Cathy Woods with a new attorney filed a motion for a new trial based on the DNA results. After 35 years of incarceration, she was released. In September of 2018, Halbower stood trial for the murders of Veronica Cascio and Paula Baxter. During the trial, Halbower had numerous outburst including "I am not guilty of these charges", "He's a liar" (referring to the prosecution), and "Bullshit" (after the DNA results were presented). After 42 years, Halbower was convicted of two of the Gypsy Hill murders. The San Mateo County jurors deliberated for less than an hour before deliberating the verdict. With these cases in mind, the Washoe Sheriff's Office requested the Nevada State Attorney General review case law to include retroactive collection of DNA samples. The Attorney General determined that DNA specimens could be collected. Since then, samples have been collected from inmates who were convicted of felonies prior to 1996, in hopes to solve more crimes.

Family Assistance Centers in Mass Fatality Cases and Identification of Decedents

Michelle Rippy, California State University - East Bay

Mass fatality cases are becoming more commonplace, between natural disasters, wildfires, and attacks on crowds. A vital part of mass fatality plans is the establishment of a family assistance center, where kin can meet in one place to

give and receive information. This presentation will discuss the role of the family assistance center (FAC), personnel and training involved, and how the information gained can be used to identify decedents and injured persons. Case studies will be reviewed for mass fatality situations including disaster, aircraft and shooting incidents. Learning objectives include familiarization with mass fatality plans and the FAC, identifying roles within the FAC, examining information obtained in the FAC, summarize identification processes, and relate the information to case studies.

When a Case Turns on a Hair: Can Microscopic Hair Comparison Be Used to Prove Identity?

Linda Starr, STAR Innocence Project

Aaron Aguas-Rao, STAR Innocence Project

In 2013, the United States Department of Justice (DOJ) announced it would review cases involving hair microscopy analysis, testimony and reports provided by FBI. In 2015, the FBI case review found 26 of 28 hair examiners overstated the extent to which an association may be made between a questioned hair and a known hair sample. Overstatements were concerns in at least 90% of the cases. In the wake of the DOJ announcement, innocence projects questioned what could be done to review microscopic hair examinations performed by state and local laboratories given that the FBI assisted state and local laboratories in training hair examiners on microscopic hair analysis. Spearheaded by the Northern California Innocence Project (NCIP), a California coalition was formed to review cases involving microscopic hair analysis within our state. Coalition members include the California Innocence Project, Loyola Project for the Innocent and pro bono partner, Morrison and Foerster. The coalition sought to engage all community stakeholders including the American Society of Crime Laboratory Directors, California Police Chiefs, California State Sheriff's Association, California District Attorneys' Association, California Attorneys for Criminal Justice and the National Association of Criminal Defense Lawyers. The coalition's work led to a review of nearly 1,000 criminal cases involving microscopic hair analysis and has already led to the exoneration of NCIP client Glen Payne. This presentation will summarize the work of the California coalition reviewing microscopic hair comparison cases and use the case of Glenn Payne as an example. The most challenging aspect of the project has and continues to be identification of cases and access to case materials. The presenters hope that the audience will share ideas as to how we can identify cases for review.

Lightning Strikes Twice: STRmix Admissibility and the Kelly Test

Eric Halsing, Cal-DOJ Jan Bashinski DNA Lab

The Kelly test is California's standard for admissibility of expert testimony based upon the application of a new scientific technique. This talk will share the first-hand experiences, from the Criminalist perspective, of having participated in two full Kelly hearings on STRmix, focusing on lessons learned, prosecution and defense strategies, and explain the jury trial outcomes using specifics from the two cases. The talk will also include a general update on STRmix admissibility decisions around the country.

Portable and Accurate Hemp and Marijuana Potency Measurements via Mid-Infrared Spectroscopy

Brian C. Smith, Ph.D., Big Sur Scientific

Recent seizures by law enforcement of interstate hemp shipments have generated controversy and lawsuits over whether the quarantined cargo is above or below the legal Total THC limit. This means an accurate, easy-to-use, on the spot analyzer that can distinguish hemp from marijuana is needed by law enforcement. We show that a mid-infrared analyzer from Big Sur Scientific, the BSS 2000, can be used for this purpose. Calibration and validation data for the analysis of ground, dried hemp and marijuana plant material will be presented, showing this instrument accurately measures Total THC, THCA, THC, and several other cannabinoids. It uses an attenuated total reflectance (ATR) sample interface for speed and ease of use. As a result, each sample analysis takes only a few minutes. The system comes with a computer, is pre-calibrated so it works out of the box, and features push button operation so anyone can use it. It is small, lightweight, and works off a battery back so it can be used in police cars or most anywhere. Potential uses of such an analyzer in law enforcement will be discussed.

Case Presentation of the *People v. Earl Stefanson* and *People v. Eric Mora*

Casey Bates, Alameda County District Attorney's Office

I will present on two homicide cases that were tried to verdict. Both involve the use of DNA and scientific evidence which helped each case result in a conviction. The first case, *People v. Stefanson* involves a serial batterer of women who beat his then girlfriend to death. The second case, *People v. Mora*, involves a victim whose body has never been found. Nonetheless we produced sufficient evidence to convince a jury beyond a reasonable doubt that she was killed by her then boyfriend.

Manner and Cause of Death?

John Calvin Gaziano, Fremont Police Department

A review of a highly unusual bloodstain pattern analysis case.

The Murder of Virginia Vincent: A Body Exhumation Clears the Case

Pamela Hoffsass, Contra Costa County Office of the Sheriff's Crime Lab

Virginia Vincent, a 57 year-old realtor, was found brutally murdered in her home in unincorporated Danville, CA on September 20, 1985. With no witnesses and no motive, police struggled to identify the killer. Evidence was worked up and detectives submitted known reference samples (blood and 10-prints), however, all were excluded. In 2002, thanks to the NIJ Cold Case Grant, key evidence was analyzed using STR analysis and an unknown male profile was uploaded to CODIS with no Hit for over 15 years. This case represented a perfect candidate for Familial searching. In early 2018, the BFS/DOJ conducted a Familial search and presented the results to Contra Costa County Sheriff's Office. It turns out that in 1997, the prime candidate (derived from the Fam search results) committed suicide when he was accused of a brutal sexual assault of a minor. No surreptitious sample could be collected however his body was buried in a cemetery in a nearby county. By September of 2018, CCC SO homicide detectives se-

cured a search warrant for a body exhumation. Grave diggers, BFS, DOJ and SO personnel were on deck. A long bone was removed from his grave and BFS worked up the sample. The results were compared to the DNA profiles developed from the crime scene evidence/autopsy and revealed Joey Lynn Ford as the source of the DNA. This presentation will provide a Cold Case Familial Search review with the emphasis on the process, challenges and rewards of working on a 33-year case.

Intimate Partner Violence and Sexual Assault: What Can the ED Doctor Do About it?

Carolyn Joy Sachs, MD, MPH, FACEP, UCLA Department of Emergency Medicine, Clinical Professor of Emergency Medicine, Domestic Violence Committee Chair

Medical professionals frequently encounter victims of sexual assault and intimate partner violence (IPV) and may lack the necessary training to identify and treat them effectively. Emergency and forensic practitioners in particular provide front line care to victims of violence and with careful attention can impact the health of patients experiencing such violence. It is imperative that the medical community does not just treat the violent injuries, but also identifies and treats the root cause of injuries and somatic issues by connecting patients with the resource options to improve a dangerous situation. Failure to identify sexual assault or IPV may leave patients in a vulnerable environment at risk of further significant injury or even homicide. Through use of case examples, this lecture will provide an overview of the general societal problem of sexual assault and intimate partner violence and specifically addresses the physician's role in detection, treatment, documentation, referral and care of victims. It will also attempt to put a person behind the term "victim" for some of the forensic laboratory community who only encounter brown paper bags of evidence. While collection of sexual assault kit protocols vary from agency to agency, this lecture will discuss how kits are collected by the forensic sexual assault examiner program affiliated with the speaker (Forensic Nurse Specialist or FNS). The lecture may also cover: A discussion of victims' examination experiences in past decades describing that the police interview and forensic exam feels almost like being sexually assaulted again.

Time permitting, a video titled "Compassionate Care: An Overview of the Sexual Assault Clinical Forensic Medical Examination for Healthcare Providers" describing the exam from the California Clinical Forensic Medical Training Center (CCFMTCC) may be shown.

Background: In the US 1/4 women and 1/7 men report intimate partner violence in their lifetime defined as physical violence, rape, and/or stalking. Though women are more likely than men to experience severe physical violence (24% vs. 14%) and sexual violence (16% vs. 8%) by an intimate partner, the high prevalence demands that patients of both genders receive careful inquire and treatment. Both sexual assault and IPV cause physical and psychological symptoms as well as injury. Perpetrators employ emotional, economic, and physical attacks including strangulation, weapon use and sexual assault which often result in severe injury and even death. Approximately half of all women murdered in the US are killed by a male partner or former partner, versus five percent murdered male victims. The majority of women eventually killed by a partner in violent relationships access the medical system within a year of the murder with acute trauma care being a major portal of this contact. The first critical steps to uncov-

Abstracts, cont'd

ering a violent situation, screening and identification, allow victims access to help at an earlier stage. Danger Assessment with preplanned interventions provides physicians and patients with a tool to assess for this deadly risk. Medical centers must link with social support for immediate victim aid, danger assessment, and lists of local up-to-date referral resources.

POSTER SESSION ABSTRACTS

Assessing Decomposition Scales While Using Pig Carcasses In Varying Room Temperature Conditions

Jacqueline A. Abad Santos (San Jose State University)

The goal of this study is to assess the qualitative scoring of decomposition scales with statistical analysis while also determining which indoor environment will decompose the fastest. When looking at between three environments, water decomposition indoors appears to be the fastest, but the method of analysis for this study determines that using decomposition scales to analyze such environment analysis may get statistically insignificant results. For this study, piglets were put in a dry steel tub, a water filled steel tub, and a suitcase. These were recorded using photographs for 25 days and were scored using the scales. The total score would be divided by all points possible to show a percentage of decomposition and a comparison between three different scales using statistical analysis. The total body score being shown to be statistically insignificant further suggests decomposition scales and post-mortem interval methods that use these scales should not be used alone for courtroom purposes and medicolegal investigators need to apply other scientific methods in order to support their postmortem interval theory.

Discrimination of Black Writing Inks Using Thin Layer Chromatography Combined with Raman Microspectrophotometry

Chelsea Wiley, BS; Katherine A. Roberts, PhD (CSULA)

This study pertains to distinguishing dye components of black writing inks of various manufacturers by applying Raman microspectrophotometry (MSP) and qualitatively analyzing the spectra obtained. Raman spectral data were collected from 45 black inks from 10 different manufacturers representing 32 brands, including some pens of the same manufacturer and brand. Each dye component corresponding to a black ink was analyzed in triplicate and the spectral average was obtained using the CRAIC Raman Software Tool. Comparisons were performed to calculate discrimination capability percentages for each ink type using confusion matrix analysis. A spectral profile representing the dye components for each black pen ink was created. The results show that thin layer chromatography combined with Raman MSP differentiates among manufacturers and between brands within a single manufacturer. However, black writing inks of the same brand within a manufacturer cannot be differentiated.

Determination of Specific Absorbance (A_1) for Six Psychoactive Drugs Encountered in Forensic Toxicology

Cat-Van Quang Tran, Dr. Jay R. Vargas (CSULA)

Specific absorbance (A_1) is defined as the maximum absorbance of a 1% solution over a 1-cm path length as measured via spectroscopy. Finding a reliable value for specific

ic absorbance for a drug provides an important tool for the quantitative verification of analytical standard concentration. Although many new drugs have emerged within the last ten years, many of these drugs do not have a reliable value for A_1 , or a value simply has never been published. This work focused on determining the quantitative value of the specific absorbance of six psychoactive drugs using ultraviolet-visible spectroscopy, as well as comparing A_1 values of drugs purchased in 2017 to the A_1 of their counterparts purchased in 2019. The drugs analyzed included loperidone, risperidone, aripiprazole, vilazodone, vortioxetine, and suvorexant. Preliminary results and data interpretation will be presented.

Analysis of Gunshot Residue Associated with Suicide Cases Using SEM/EDS

Omolola N. Odeniyi, BS; Debra Gibson, MS; Katherine A. Roberts, PhD (CSULA)

Gunshot residue (GSR) is often a crucial component in the evidentiary analysis of forensic firearms investigations. The aim of this study was to determine and classify the GSR particle populations associated with suicide cases based on the firearm type, caliber of the firearm, and GSR sampling locations. The study focused on suicide cases to ensure a more accurate GSR distribution, assuming a stationary subject, given that post-firing activities affects GSR retention. This study examined 37 GSR kits, each containing two labeled stubs from known suicide cases under the jurisdiction of the Los Angeles County Department of Medical Examiner/Coroner. In addition to examining the GSR samples, the authors reviewed investigator reports and other documentation sources as part of the data collection. This poster presentation will report the results of our research findings and discuss the trends and differences observed for each independent variable with respect to the GSR criteria (characteristic, consistent and commonly associated) for each suicide case.

Discrimination of Black Pen Inks Using Thin Layer Chromatography Combined with UV-VIS Microspectrophotometry

Alicia M. Quintana, BS; Katherine A. Roberts, PhD (CSULA)

This study applies ultra-violet microspectrophotometry (UV-VIS MSP) in reflectance mode to differentiate among the dye components of the same and different brands of various manufacturers of black pen inks. Forty-five black pen inks, comprising of 10 different manufacturers representing 33 different brands were analyzed with each component dye. Reflectance data for the dye components were collected over the spectral range 300-825 nm using a Flex UV-VIS MSP (Craic Technologies). Comparisons were performed to calculate discrimination capability percentages for each black ink type using confusion matrix analysis. A spectral profile representing the dye components for each black pen ink was created. The results show that thin layer chromatography combined with UV-VIS MSP discriminates among black inks associated with different manufacturers as well as distinguishing different brands within the same manufacturer. However, discerning between black inks of the same brand and manufacturers is not as definitive.

Evaluation of Raman Microspectroscopy for the Determination of the Age of Bloodstains

Alexander Cheung, Donald Johnson, Katherine Roberts (CSULA)

The ability to quantitatively determine the age or time-since-deposition of a bloodstain would be of great advantage in crime scene investigation and reconstruction. In this study, the Raman Microspectrometer (MSP) was used to examine temporal changes in the chemical properties of bloodstains as possible indicators of the age of bloodstains. Raman MSP is a rapid, nondestructive technique that requires little sample preparation. In this study, aliquots of human blood were deposited on glass microscope slides, which were then allowed to age naturally at room temperature or were subject to accelerated aging by incubation in ovens at different temperatures. Bloodstains of specific ages were then examined in triplicate with the Raman MSP and a 785 nm excitation laser. The bloodstains ranged in age from one week to over two years. The initial results of this study suggest that bloodstains of different ages produce different Raman spectra. Additional samples are being tested to evaluate the extent of these spectral changes and their predictive value in determining the age of bloodstains.

ATR-FTIR Spectroscopic Evaluation of Postmortem Interval Changes in Porcine Vitreous Humor

Ayanna Harrison, Donald Johnson, and Jay Vargas (CSULA)

The determination of the postmortem interval is of great importance in forensic investigations. However, many of the indicators used to estimate the postmortem interval are inaccurate, unreliable, and highly susceptible to environmental conditions. In a pilot study conducted by the authors, Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) spectroscopy was used to examine global changes in the postmortem chemistry of porcine vitreous humor, and changes in the amide I, II, and III regions of the infrared spectra were observed at different postmortem intervals. This study examined a greater number of samples collected over a longer period of time. Here, eighteen pig eyeballs were obtained from a local slaughterhouse, which were collected at about the same time of death. A single set of eyes was then sampled for each day after death. The results suggest that the analysis of vitreous humor by ATR-FTIR spectroscopy could be a viable approach to the estimation of the postmortem interval.

Raman Spectroscopy Analysis of Postmortem Changes in Porcine Vitreous Humor

Tuyet Phan, Donald Johnson, Katherine Roberts, Jay Vargas (CSULA)

Vitreous humor is a promising candidate for the estimation of the postmortem interval because of its relative isolation from the rest of the body and its accessibility for collection. Previous investigations on the postmortem changes in the chemistry of vitreous humor have focused on changes of a single component, such as potassium ion concentration. In this study, the global changes in vitreous humor chemistry were investigated using Raman microspectroscopy, which is a rapid, nondestructive technique that requires little sample preparation. In this study, eighteen pig eyeballs were obtained from a local slaughterhouse, which were collected from animals at about the same time of death. A single set of eyes was then sampled for each day after death, and the vitreous humor samples then applied to glass microscopic slides. Analysis was performed on a Raman Microspectrometer with a 785 nm excitation laser. The preliminary findings of this

study indicate that the vitreous humor samples of the different postmortem intervals produce different Raman spectra.

Best Practices for Health Care Workers to Protect Against DNA-based False Accusations of Sexual Assault

Anna Plascencia, Summer DeRobertis, Kelly Faeth, and Ruth Ballard, PhD (CSU Sacramento)

This past year, we collaborated with the CSUS Nursing Department to perform a pilot project to investigate whether contamination from nurses performing sexual assault examinations is a likelihood based on a real case of a false accusation of sexual assault made by a patient against a nurse. Our primary objective was to determine how nurses typically clean their hands as they move from room to room, and whether that cleaning removes self-DNA effectively. We learned that nurses typically do not use gloves unless handling/examining a patient directly. In addition, their preferred method of cleaning their hands is with hand sanitizer. Yet, we found that hand sanitizer does not remove “self-DNA” from a person’s hands. Our current hypothesis is that hand sanitizer “moves cells around” without removing them, and that skin cell DNA regenerates on the surface of the palms soon after its removal with soap and water. Thus, our preliminary “best practices” suggestion is that health care workers wash their hands when entering a patient’s room to avoid the inadvertent, indirect transfer of their DNA onto a patient.

Secondary Transfer of Assailants’ Semen, Saliva, and Skin Cells to Bath Mats, Shower Drains, and Soap in Mock Sexual Assault Scenarios

Alfredo Arellano, Sara DeWilde, Raina Endo, Alexandra Frias, Bailie LaDesma, and Ruth Ballard PhD (CSU Sacramento)

The prosecution of sexual assault cases is easier if analysts find body fluids/cells from the assailant. However, victims sometimes engage in post-hygienic activities that remove this evidence. Moreover, some victims wait to report an assault until an exam is unlikely to yield foreign cells, yet have showered/bathed in the interim. In such instances, we wondered if it is possible to find the assailant’s DNA on bathmats, drains, or soap in the shower. We recruited volunteers to serve as mock assailants and victims where the assailant’s saliva and skin cells were transferred to the victim’s hands and arms. The victim then showered immediately afterward, and again at 24 and 96 hours. The drain, bathmat, and soap were swabbed at several intervals of time afterward. A sperm study was also conducted under conditions that did not require participant involvement. Overall, our experiments demonstrate that bathmats, drains, and soap are potential alternative sources of an assailant’s DNA in cases where the victim has showered post-assault and none of the assailant’s DNA remains on his/her body.

The Effect of the Wad Type on the Spread Pattern for Buckshot and Birdshot Ammunition

Andrea Muñoz, BS; Manuel Muñoz, MS; Katherine A. Roberts, PhD (CSULA)

The wad is a key, yet often overlooked, component in shot shells. The overall shot shell design has changed throughout the years, although, the core components remain the same. In the context of a shooting reconstruction, the wad may potentially aid in an association based on class characteristics due to

Abstracts, cont'd

transfer of the payload impression marks to the wad. However, the effect that the wad has on the spread pattern has rarely been explored as a research topic. The study presented here focuses on the correlation of wad type with the shot shell spread pattern dimensions for three muzzle-to-target distances. The specific objective was to evaluate whether the shot shell spread pattern dimensions are distinct for ammunition types based on the wad composition and design. This poster presentation will report the results and statistical analyses of our research findings and discuss the relationship between the spread pattern and the wad type for both buckshot and birdshot ammunition.

Age Determination of Long Term Bloodstains Using the Degradation Index

Donald J. Johnson, Guadalupe Hernandez (CSULA)

Bloodstains are an important piece of evidence in crime scene investigation and reconstruction. The ability to determine the age of bloodstains can be useful in establishing a timeline, corroborating eyewitness accounts, and narrowing the list of possible suspects. This pilot study focuses on the use of a nuclear DNA degradation index to determine the age of bloodstains. Human bloodstains were artificially aged in an environmental chamber to simulate bloodstains one year and older. Each week, a set of artificially aged bloodstains were rehydrated with phosphate buffered physiological saline, collected on a swab, extracted, and quantitated. The Quantifiler Trio DNA Quantification Kit has a degradation index feature designed to assess the quality of a sample for STR analysis. The degradation index compares the amount of a small amplicon to that of a large amplicon originating from the sample. The larger the value of the ratio, the greater the extent of degradation. Preliminary results show changes in the degradation index of bloodstains at different ages. Additional samples are being tested to determine if the degradation index can be used to predict the age of long-term bloodstains.

A Retrospective Analysis of Medical Examiner Benzodiazepine Drug Prevalence in Los Angeles County

Cherilyn Yee, Sarah Bruxton de Quintana, Jessica Gadoway, Jay R. Vargas (CSULA)

The benzodiazepines are a widely prescribed and often abused class of central nervous system depressant drugs broadly indicated in medicine for muscle relaxation, anxiety, seizures, and insomnia. In collaboration with the Los Angeles County Department of Medical Examiner- Coroner's Toxicology Unit, this study focuses on determining the benzodiazepine drug prevalence detected in medical examiner cases of Los Angeles County from 2016-2018. A descriptive presentation of the types of drugs encountered and their concentrations, sociodemographic factors such as race, age, and sex, and mode of death, will be presented. Also, correlation analyses will be performed to study the relationship between measured variables shown in this study.

Age Determination of Short Term Bloodstains using a Degradation Index

Daniel Solorzano, Donald Johnson (CSULA)

The development of a technique to determine the age of bloodstains has been an ongoing pursuit and has seen some success. The search is for a component of blood that changes after deposition in a time-dependent and predictable man-

ner. This study examined the degradation of nuclear DNA in bloodstains as an indicator of time-since-deposition. Human bloodstains were artificially aged in an environmental chamber to simulate approximately 7 weeks to 1 year of aging. The degradation index compares the amount of a small amplicon to that of a large amplicon originating from the sample. The larger the value of the ratio, the greater the extent of degradation. The initial results of this study show small changes in the degradation index as the samples age. Additional samples are being tested to determine if the degradation index can be used to predict the age of a bloodstain.

Development of a Controlled Substances Reference Database Using Raman Microspectrophotometry

Patricia Mazurek BS, Katherine Roberts PhD (CSULA)

This study employed Raman microspectrophotometry to establish a reference database of controlled substances for comparison with casework samples submitted to forensic laboratories. Controlled drug standards were purchased both as solutions in methanol or in solid form and prepared on individual microscope slides. Reflectance data for each drug sample were collected over the spectral range 120-2050 nm with an Apollo 785 Raman MSP (Craic Technologies). The initial objective was to determine whether the selected drug standards could be distinguished based on the specificity of the Raman spectral profile. A selection of casework controlled substances were compared with the Raman database. This poster presentation will report our assessment of the potential of the database library to assist forensic investigators in identifying drug and related compounds encountered in the course of forensic analysis.

An Authenticity Survey of Chinese Over-The-Counter Medications in the Los Angeles Basin

Abdullah Alzubi, Helen Ha, Jay Vargas (CSULA)

Mislabeled and counterfeit drugs pose a significant threat to consumer safety. Recently, the FDA recalled a Chinese herbal cough syrup product sold over-the-counter (OTC) due to mislabeling and the presence of unidentified morphine. The main goal of this work was to survey commonly encountered Chinese OTC products found in the Los Angeles area to identify possible unlisted ingredients and contaminants. The mislabeling and lack of quality control can also impact athletes who have anti-doping restrictions. An athlete who ingests one of these OTC holistic medications may find themselves disqualified from competition because they mistakenly took a banned substance. Survey medications will be extracted using a liquid-liquid extraction and analyzed using LC/MS/MS. This project has the added benefit of exposing students to consumer awareness issues in the region that inevitably keep students engaged in chemical education.

Accuracy Rate of Nonexpert Subjects in a Handwriting Recognition Study

Clayton Zhang, BS; Miriam Angel, MS; Katherine A. Roberts, Ph.D. (CSULA)

Federal and California state statutes permit nonexperts to authenticate handwriting provided they meet the personal knowledge requirement. However, a lack of published research raises the issue as to whether the personal knowledge requirement provides reliable evidence in practice. This is im-

portant because document experts may use such evidence as genuine known samples for comparison to disputed writing samples, and the use of tainted known samples may result in errors. We assessed the accuracy of 24 nonexperts in identifying the handwriting of a subject in specific cases where the nonexpert claims familiarity with the subject's handwriting. The objectives of the study presented here were to evaluate accuracy with respect to four independent variables: (1) the nature of the subject pair relationship, (2) length of time subject has known their paired subject, (3) self-reported familiarity with the paired-subject's handwriting, and (4) the format used for comparison. Our research aims to provide a better understanding of whether nonexperts who meet the personal knowledge requirement are qualified to state their opinion in court as to the authenticity of a handwriting source.

Kratom Method Development and Alkaloid Characterization – An Over-the-Counter Kratom Survey in Los Angeles and Orange County

Delfino Gaspar, Craig Lund, Paul Scott, Jay Vargas (CSULA)

Originally native to Southeast Asia, Kratom (*Mitragyna Speciosa*) has been used as traditional medicine since the nineteenth century to treat a variety of ailments. In 2016, the DEA announced plans to place Kratom temporarily into Schedule 1. However, officials backtracked after public outcry. Although characterization analyses have been performed on Kratom, its intricate compositional ambiguity has increased the curiosity and understanding of its overall user safety profile and abuse potential. In addition, a clear characterization of the composition of various Kratom samples will help determine its overall placement in the schedule list. To better understand the composition of Kratom alkaloids found on the retail level, this work seeks to survey over the counter Kratom products sold in Los Angeles and Orange County and identify the relative abundances of Mitragynine and Paynantheine using Liquid Chromatography – Tandem Mass Spectroscopy (LC/MS/MS). Kratom alkaloid composition and contaminate analysis will be presented.

Discrimination of Authentic versus Counterfeit Perfumes Using a UV-VIS Nanophotometer

Jessica Avina, BS; Katherine A. Roberts, PhD (CSULA)

Perfumes are of great economic importance to the cosmetic industry and, in recent years, the production of counterfeit versions of perfumes has increased significantly due to its profitability, given the value associated with high quality authentic perfumes. The influx of counterfeit perfumes into the market place has a detrimental effect on the perfume manufacturers and the economic losses may be passed on to consumers. In addition, counterfeit products bypass the perfume industry's quality control measures and may contain hazardous chemicals that create a public health risk. For this study, a UV/VIS nanophotometer (Implen) was used to establish a database of authentic perfumes. A selection of imposter and counterfeit perfumes were purchased and compared with the corresponding authentic perfume in the database. This poster presentation will report our assessment of the potential of the database to discriminate authentic versus counterfeit perfumes encountered in the course of forensic analysis.

Heroin Identification by IR Spectroscopy on Petroleum Ether-Based Extracts

Roehl Cinco (Oakland PD Criminalistics Laboratory)

Because heroin (diacetylmorphine) has been a major factor in the current opioid crisis and epidemic, we in the City of Oakland have explored ways to supplement current analysis techniques for seized suspected heroin samples. Currently, petroleum ether-based extracts are used for microcrystalline testing to help identify heroin. Consequently, it was a logical step to use these extracts for Fourier-Transform Infrared spectroscopy with Attenuated Total Reflectance (FT-IR/ATR). After analyzing over 200 casework samples, results from IR spectroscopy that are backed by GC/MS analysis show that FTIR/ATR on these petroleum ether-based extracts is an efficient and effective tool for routine heroin identification in various street samples.

Postmortem Quantification of Endogenous Gamma-Hydroxybutyrate on Negative Ingestion Samples

Helen Ha, Dani Mata, Jay Vargas (Orange County Crime Lab)

In the U.S., GHB has a history of being manufactured illicitly and abused but its prevalence has declined in recent years since DEA scheduling of the molecule. However, GHB remains a holdout drug with misguided proposed benefits for the body-building and athletic community and remains a popular party drug with reported GHB overdoses occurring annually; especially outside of North America. The detection of GHB in postmortem biological fluids carries complications due to the endogenous nature of the molecule that often requires analysis to be performed on more than one biological matrix to detect exogenous exposure, typically in urine. The analysis is further complicated by the endogenous de novo production of GHB in postmortem specimens. This work sought to examine the prevalence of endogenous GHB concentrations in postmortem toxicology samples comprising Orange County, CA and to establish suitable in-house secondary matrices to confirm or rule out exogenous GHB exposure.

Direct PCR Amplification of Nuclear DNA from Shed Dog Hair Using DogFiler

Vamsi Krishna Thiriveedhi (UC Davis)

Shed or exogen dog hair is often obtained from crime scenes and may be instrumental in solving a criminal case. Trace numbers of epithelial cells may be on the surface of the actual hair; however, between 20-90% of DNA is lost occur during the conventional extraction procedures. To alleviate this inherent loss in conventional extraction techniques, direct PCR has been evaluated by many research groups to determine the likelihood of obtaining an STR profile by skipping DNA extraction and quantitation steps. The current research study aimed to determine if a nuclear DNA profile could be obtained from shed dog hair using the DogFiler STR panel while simultaneously allowing for mitochondrial typing. Additionally, after the Dogfiler amplification reaction, the leftover hair was amplified for the HV1 (Hypervariable region I) of mtDNA (mitochondrial DNA) to maximize the data resulting from consumption of the entire sample. The results of this study suggest that inclusion of a Direct PCR amplification reaction before extracting the hair sample for DNA using traditional DNA extraction on samples lacking obvious roots, enhances the power of shed hair found as evidence at a crime scene.

Reaping What We Sow (Sometimes it's Sweet)

John Houde

The CAC has been posting its newsletter online for years, and once a document is released into the wild, one never knows who might happen upon it or what impact it may have. This is a story of how one such article became the stimulus for the creation of a granite memorial to a fallen police officer 60 years later.

A bit of background. If you haven't read the original story, I highly recommend it. See <https://www.cacnews.org/news/news.shtml> and select the Second Quarter, 2008, "Bridge 35-199."



In 1959, my father, Walter, had just been hired as a crime scene photographer at the San Mateo County Sheriff's crime lab. As I grew up, he shared many of his interesting cases with me and no doubt that's where I caught the forensic science bug. His first homicide case was of particular interest. As we

would often drive over the new I-280 freeway near Hillsborough, without fail, he'd point to the dedication sign naming the "Eugene Doran Memorial Bridge" and tell me the now familiar tale of how he had drawn on his technical resources and photographed a bloodstained driver's license using infrared film. This was a key part to the solving of a police officer's murder that had occurred almost directly underneath where the bridge was constructed years later. The IR technique worked and the illegible license was again readable.

I was hooked. In the following years, I would meet and befriend Morris Grodsky, the criminalist who had responded to that crime scene and who played a key role in successfully apprehending and prosecuting the perpetrator, Alexander Robillard. Morris shared his case photos and story outline and allowed me to flesh out the whole affair from start to fin-

ish, with considerable assistance from the microfilm library at the University of Washington.

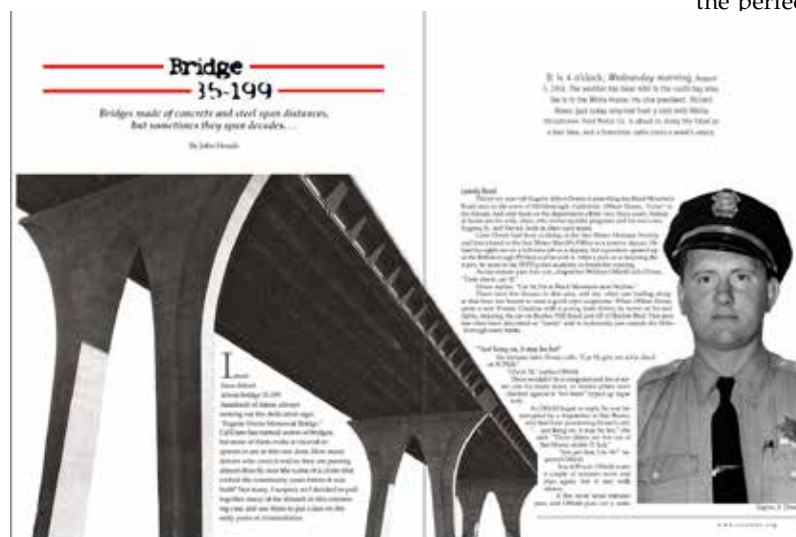
The posting of our newsletter online yielded an unexpected result: I was contacted nearly simultaneously by two men researching the Doran case independently from each other. One of whom was a retired DA from Santa Clara named Bill Larsen. I put the two men together and the game was afoot. After almost five years of delicate negotiations with the various governmental agencies controlling the precious area of the Crystal Springs reservoir--success! The researchers, who were now supported by a group called "The 100 Club," had secured their most desired spot for the granite memorial, the head of the Camp Sawyer Trail at the end of Crystal Springs Road where it meets Skyline Boulevard.

Bill Larsen informed me that his former boss, Keith Sorenson, was the actual DA who prosecuted Robillard just a few years before Mr. Larsen joined the DA's office (in San Mateo at the time). The case held a special fascination for him not only because of his proximity but also because of his involvement in the 100 Club of San Mateo. That organization describes itself as *"...dedicated to supporting the Peace Officers of San Mateo County by providing immediate financial assistance to the families of law enforcement officers killed in the line of duty, granting scholarships to their children, and funding instruction that will better prepare our officers to protect the communities they serve and protect themselves from harm's way in the performance of their duties."*

It became important to these people to see that Officer Doran received due recognition all these years later. The simple dedication sign on the bridge was good, but a driver speeding past wouldn't get the whole story and they wanted something more. Bill Walsh, the other fellow who had seen the CACNews article, scoured the archived records of the SMSO and agreed that my article was factually correct. He wanted to know if I would help them in their quest to erect a suitable memorial near the crime scene that would summarize the case for all those traveling near.

What Mr. Larsen envisioned was a granite stone, large enough to contain an inscribed paragraph summarizing the events that had transpired that fateful night. As early as 2014 he reached out to various groups including the original prosecutor, Keith Sorenson and the Hillsborough Police Officer's Association, all of whom were interested in supporting the project. After much discussion and site inspections, the trailhead at Sawyer Camp near Crystal Springs Dam was deemed the perfect place for a monument and V. Fontana & Co. was selected to carve the stone. The cost for the monument is estimated to be around \$10,000 and donations were received from supporters.

Being painstakingly carved means the wording has to be perfect and after many revisions, stone yields to hammer. The site is prepped, excavated and the finished monument installed. A dedication ceremony was held at the site on May 13 and featured speeches by San Mateo's current district attorney, Steve Wagstaffe, Hillsborough Chief of Police Mark O'Connor, Bill Larsen and Jim Burke on behalf of the 100 Club who supported the project. The unveiling was performed by Keith Sorenson's son Tom and by Gary Doran, Eugene's son, who was himself in his mother's womb when his father was slain.



THE INSCRIPTION

In the early morning darkness on August 5, 1959, near the intersection of Skyline Blvd. and Bunker Hill Drive Hillsborough Officer Doran stopped a 19 year old convicted felon who was on probation for burglary and interstate auto theft. The felon was driving a stolen vehicle displaying stolen license plates. Officer Doran was not aware of any of these circumstances. The auto thief fatally shot Officer Doran with a stolen revolver. As a result of skillful investigation by the sheriff's office, citizen cooperation, and forensic science the killer was identified. A manhunt involving many law enforcement agencies ensued. In a span of just 72 hours he was located in Salt Lake City, Utah in possession of the murder weapon. He was arrested and returned to San Mateo County for trial. District Attorney Keith Sorenson prosecuted the case. The killer was convicted of first degree murder and executed at San Quentin, California State Prison on April 26, 1961. In 1969 the magnificent 280 Freeway bridge crossing San Mateo Creek Canyon east of this marker was named "Eugene A. Doran Memorial Bridge."



Stone yielding to hammer

(top) Point man Bill Larsen with the fruits of his five-year quest. (above, l) Tom Sorenson (l) and Gary Doran unveil the monument. (r) Theresa works on the inscription at V. Fontana & Co. in Colma. (below) San Mateo District Attorney Steven Wagstaffe addresses the gathering and introduces the supporters of the monument project at the Sawyer Camp Trail head.



Finding Good Fortunes ⁱⁿ Oakland

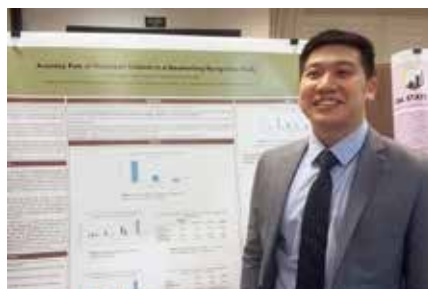
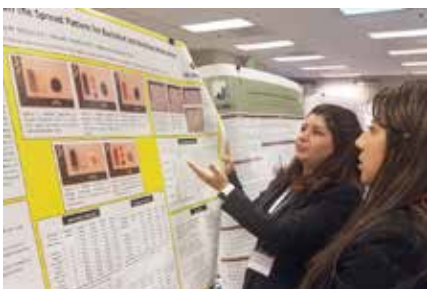
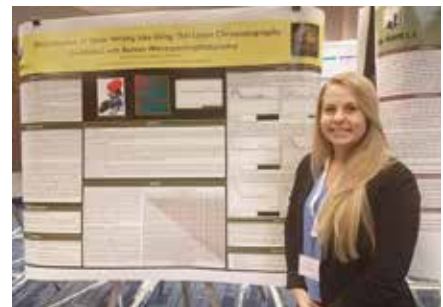
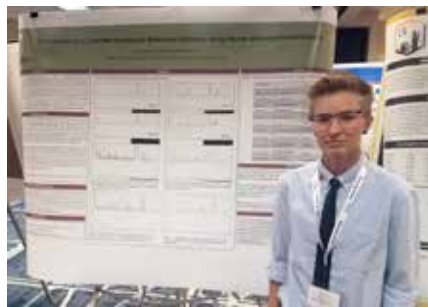
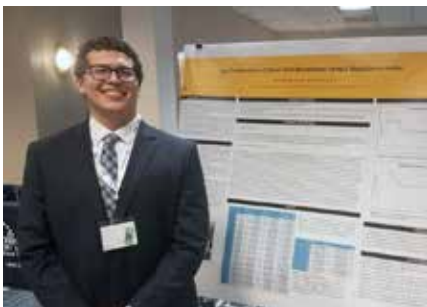
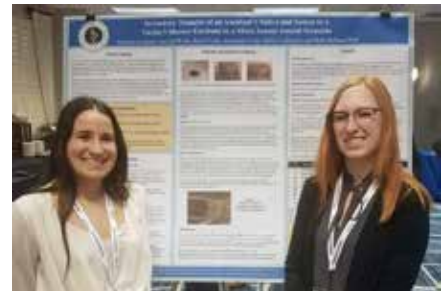
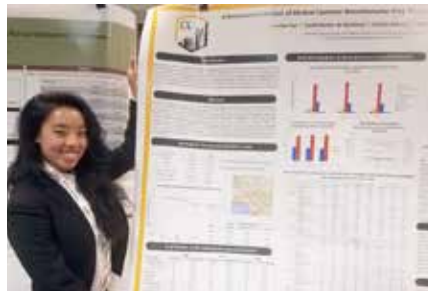
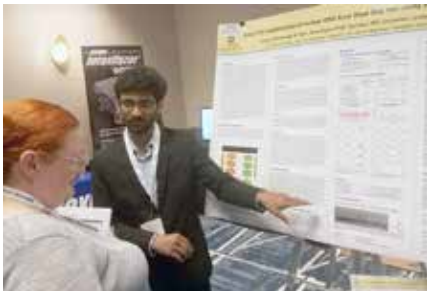


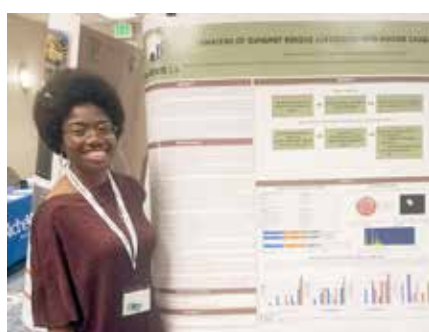
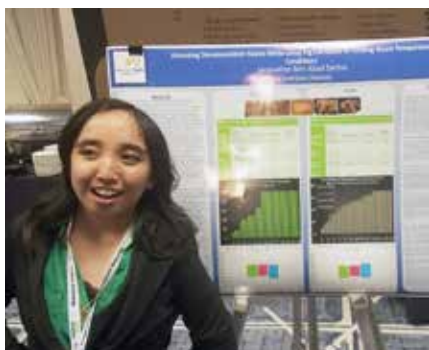
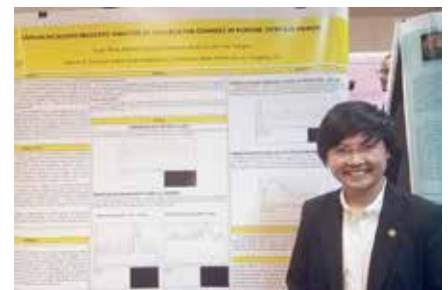
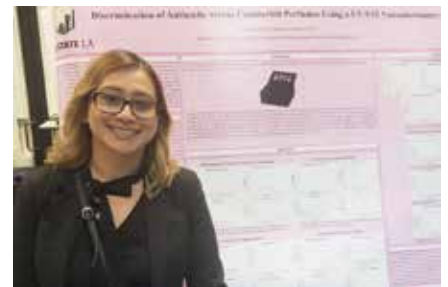
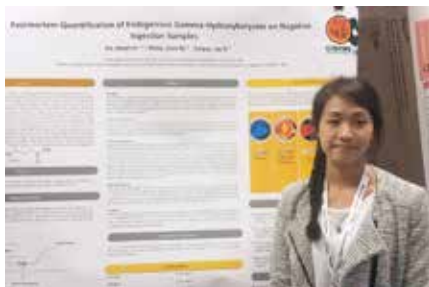
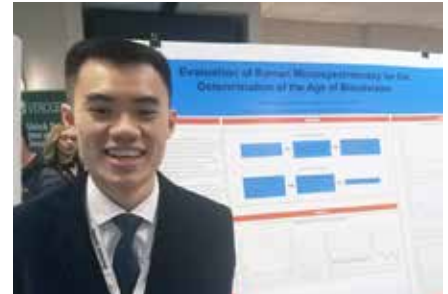
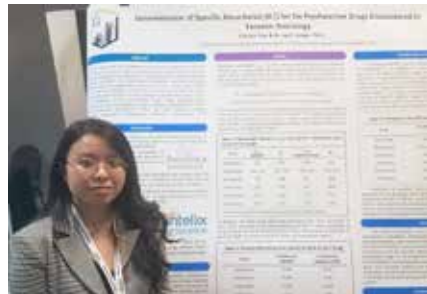
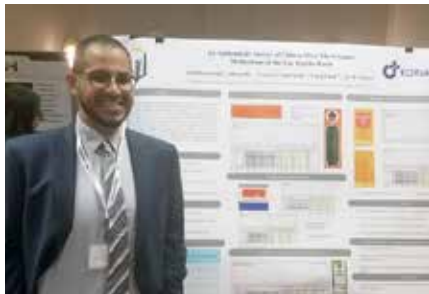
The Spring 2019 CAC meeting was hosted by Oakland PD Crime Lab, coincidentally celebrating their 75th Anniversary. The theme was "Facets of Forensic Science" and indeed, a multi-faceted program was offered complete with workshops and presentations from every discipline featuring not less than twenty-two posters.

Included in each attendee's "goody bag" was an assortment of sweets including fortune cookies with fortunes written especially for our event.

The banquet featured a lively game of trivia where a friendly (but surprisingly fierce) competition arose between tables. It was all in good fun and a great opportunity to make new friends and contacts at distant and not-so-distant labs.











General Session









When outgoing CAC President Mey Tann couldn't attend, former President Vincent Villena stepped in to do the coconut honors. New CAC President Alice Hilker accepts the gavel and presents the awards. (clockwise from above left) President-elect Jamie Lajoie, outgoing Editorial Secretary Meiling Robinson each receive recognition for their service on the Board of Directors. Susan Molloy (and the Oakland PD staff) receive service awards for hosting the seminar. Luke Haag receives the Al Biasotti Most Outstanding Presentation Award for his Fall 2018 paper on Huey Long.



(Not pictured: Kenya Thomas—Best Poster Fall 2018; Kristine Myhre—ABC Exam Award; Mark LaVigne—Ed Rhodes Memorial Award and Danielle Baute—Seminar Lottery.)





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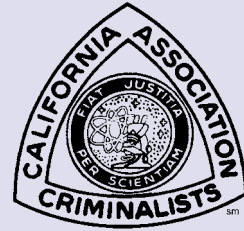


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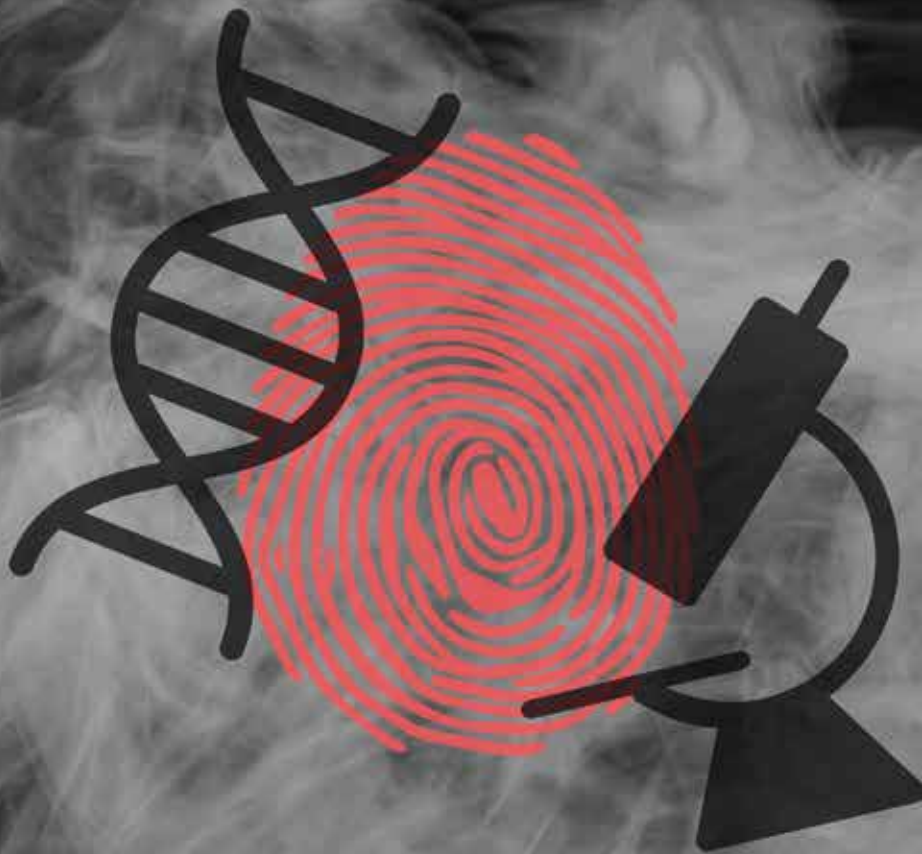
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