



THE
CRIMESCENE
 NEWSLETTER OF THE LAKE COUNTY CRIME LABORATORY

Ray Jorz is Fired Up About Prints

BY ROBERT SBERNA

When Ray Jorz was hired at the Lake County Crime Laboratory in December 1999 as a fingerprint/firearms expert, he brought 27 years of law enforcement experience and a passion for forensic science.

After serving in the U.S. Navy in the early 1970s, Jorz worked at the Euclid Police Department as a patrol officer, field training officer and detective. He discovered early in his police career that he had an interest in forensics.

“When I was a patrol officer, I was responsible for processing crime scenes and investigating serious motor vehicle accidents,” Jorz said. “I became adept at working the crime scenes. When I joined the detective bureau, I found that I really enjoyed using forensic science to make identifications of people and come up with solutions to criminal cases.”

Jorz is now the Senior Forensic Fingerprint/Firearms Examiner at the LCCL. His wide range of duties include processing and developing (CONTINUED ON PAGE 3)



Ray Jorz

Prescription for Murder

BY ROBERT SBERNA

Dr. Yazeed Essa, a respected emergency room physician, had spent his career saving lives. But on February 24, 2005, he committed a murder.

When Essa’s wife, Rosemarie, died after a minor car crash, doctors were mystified. The Cuyahoga County Coroner’s Office performed an autopsy and toxicology screening, but was unable to determine a cause of death. Only Essa knew how Rosemarie, 38, had died.

Although the Essas appeared to be a happy couple—they lived in a luxurious Gates Mills home and Yazeed doted on his wife and their two young children—he had carried on numerous affairs while married. And now, with Rosemarie gone, he was free to remarry while avoiding a costly divorce. (CONTINUED ON PAGE 5).



Frequently Asked Questions

This Column
Answers
Questions
Commonly
Asked of our
Scientists



ANSWERED BY LINDA ERDEI
LABORATORY DIRECTOR

Q: How do I know when to call out the Lake County Crime Laboratory Crime Scene Response Team? Do they come to any type of crime? What types of things will they do at the crime scene?

A: The LCCL Crime Scene Response Team is available to respond to process a crime scene whenever there is a major crime or a crime that involves collecting evidence that your agency cannot process itself. The Crime Scene Response Team will assist you with processing a scene for:

- Latent Prints;
- Trace Evidence (shoeprints, tire tracks, tool marks, impressions, glass, hairs, fibers, paint, etc.);
- DNA evidence (blood, body fluid, and touch DNA);
- Bloodstain pattern interpretation;
- Firearms (guns, projectiles, shell casings, and trajectory determinations); and
- Digital Evidence (computers, GPS, and cell phones);
- Fire and post-blast scene processing.

In addition, the Investigators from the Office of the Lake County Prosecuting Attorney have the capability to conduct 3D imaging of crime scenes.

Any time you have a question about a crime scene, collection of evidence, or documentation of a crime scene, you may call the LCCL scientists, even if you are not asking the Response Team to come out to the scene. A phone call may quickly clarify your ques-

tions concerning the proper collection and packaging of evidence in order to properly preserve evidence, ensuring that the required testing can be performed. If you find yourself at a crime scene and lacking the supplies required to collect the evidence, such as Micro-Sil™ or AccuTrans® for toolmark collection, feel free to call us for assistance. Supplies, such as metal cans for collecting fire debris, or blood or urine alcohol collection kits, can also be obtained from the Crime Laboratory as needed.

The LCCL Crime Scene Response Team differs from most other crime scene responders in the state. Our team consists of Laboratory Scientists and Examiners whose primary job is to examine and process evidence at the laboratory. These individuals have additional training in crime scene processing, and have many years of experience at processing crime scenes of all types.

A new aspect of crime scene processing is the 3D crime scene scanner, which is conducted by the Investigators from the Lake County Prosecutor's Office. This laser instrument is available for documenting crime scenes and will generate panoramic photographs in addition to the 3D scan. The panoramic images will be provided to you at the crime scene whenever possible so that you will have an accurate depiction of the entire scene. This will enable you to evaluate the crime scene and refresh your memory on the relationship and distance between different items without having to go back to the scene. These images can also be a helpful tool for use when explaining the crime scene to others from your agency who might not have been on scene. In addition, a 3D digital model of the crime scene can then be created for use in court. (CONTINUED ON PAGE 8)



HIGHLIGHTS

- Certified AFIS and Livescan Instructor
- President of the Cogent Automated Fingerprint Identification System International User Group
- Past President of the Ohio Identification Officers Association
- 4th Vice President of the International Association for Identification

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latent fingerprints, matching fingerprints to known suspects, examining guns that have been used in criminal acts, and ensuring that fingerprint and firearms databases are updated daily.

“It takes years to hone the skills and knowledge for this job,” Jorz said. “I’m always learning. I attend seminars and training programs annually, both for fingerprints and firearms.”

Jorz has received extensive training through the FBI, Ohio Police Officer Training Academy, Case Western Reserve University, Sam Houston State University, and the Mississippi State Crime Laboratory. He holds an associate’s degree in criminal justice from Lakeland Community College, and is an active participant in professional organizations such as the Ohio Identification Officers Association and the International Association for Identification.

Jorz has also served as an instructor to U.S. and international agencies on crime scene processing, as well as latent print examination and development.

While fingerprints and firearms may seem an unlikely pairing of responsibilities for a forensic examiner, Jorz explained that suspects and guns share a common trait—they both leave their own unique “fingerprints.”

When firearms involved in a crime are submitted to the LCCL, the first step in the examination process is to determine whether the weapon is actually capable of functioning.

“We want to make sure that the gun was operable during the commission of a crime,” Jorz explained. “We then look at the identifying characteristics of the gun, particularly the rifling and toolmarks. These are basically the fingerprints that set guns apart from each other.”

Rifling is the process of cutting spiral grooves inside a gun barrel. The grooves impart spin to the bullet, which serves to stabilize it on its flight. Bullets fired from rifled weapons acquire a distinct pattern of grooves and scratches that correspond to the gun barrel.

Tool marks are impressions and striations left by contact between two objects of differing hardness. As an example, a gun’s firing pin is made of a harder material than a cartridge casing, so the firing pin leaves its “fingerprint” in the form of a unique impression on the center ring of the casing.

Using a comparison microscope, Jorz compares the microscopic marks and scratches on bullets and shell casings recovered from a crime scene with the markings on bullets and shell casings test-fired from a suspect’s gun. The results of the side-by-side comparison can help determine if a specific gun was used in a crime.

The Firearms Examiners at the LCCL have (CONTINUED ON PAGE 4)



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access to the federal government's National Integrated Ballistic Information Network (NIBIN). The NIBIN database contains nearly 2 million digital images of bullets and shell casings used in shootings or test-fired from confiscated weapons. Law enforcement personnel and forensic examiners in the U.S. and other countries use NIBIN to search for "hits" or matches to the ballistic evidence from their criminal investigations. NIBIN enables users to quickly identify links between different shootings where no known connection previously existed. Bullets and cartridge cases examined at the LCCL are sent to the Bureau of Alcohol, Tobacco, Firearms, and Explosives where they are digitally imaged and uploaded into NIBIN to enable continuous searches.

Just as NIBIN has helped forensic examiners to identify firearms evidence more efficiently, Jorz said the implementation of the Automated Fingerprint Identification System (AFIS) has been an immense help in identifying suspects.

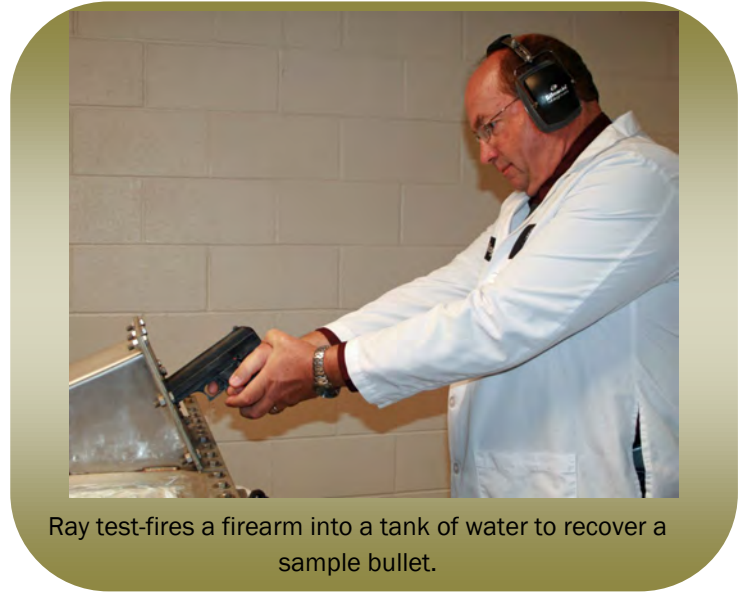
The LCCL obtained AFIS in 1993 which ultimately included search capabilities against their local database and the Ohio BCI and FBI AFIS databases. Access to the Ohio BCI database provides search capabilities of over 5 million fingerprint and almost one million palm print records. The FBI AFIS database, which was launched in 1999 by the FBI, contains the fingerprints and criminal histories of more than 76 million individuals.

AFIS enables users to scan latent fingerprints and suspect fingerprints, and then electronically transmit the information. Within minutes, AFIS returns information on possible fingerprint matches.

"In forensic science, we've seen some great advances in technology over the past couple of decades," said Jorz. "The development of tools such as AFIS and NIBIN has enabled us to perform our jobs better and come up with solutions more quickly."

Jorz credited AFIS, in particular, for helping investigators solve cold case crimes. Although DNA profiling has emerged as a powerful tool since it was first used in 1986, Jorz said the relevance of fingerprint evidence hasn't diminished.

Recalling a crime that was solved with the assistance of the AFIS database, Jorz said, "We had a case that involved a middle-aged woman who had been raped in 1995. A guy broke into her home at night and attacked her. He slashed her with a knife and threatened to kill her daughter who was sleeping nearby."



Ray test-fires a firearm into a tank of water to recover a sample bullet.

The LCCL's Crime Scene Response Team assisted the Willoughby Police Department in processing the crime scene where they found latent fingerprints. "But at the time we were unable to find matches for the prints," said Jorz. "Despite the tremendous investigative efforts of the police, the case went cold."

In 2007, Willoughby Police asked the LCCL to take another look at the case. "I submitted the fingerprints to AFIS and this time, we were able to develop a suspect," said Jorz. "It turned out that the attacker had been arrested for a traffic offense several years after the rape. His fingerprints had been entered into AFIS and I got a hit."

Jorz, who is a certified AFIS instructor, said a key to the effectiveness of AFIS is ensuring that police and forensic examiners are diligent about entering fingerprints into the system. "The rape victim was very relieved to learn that her attacker had finally been apprehended," he said. "For 12 years, she was afraid that the rapist was going to come back to her home some night."

Saying he finds it gratifying to help bring closure to cold cases, Jorz noted, "It gives me special satisfaction to serve my community through my work."

Jorz and his wife have three children and five grandchildren. After 42 combined years in law enforcement and forensics, Jorz said he is still enthusiastic about using his expertise to help solve crimes.

"Going forward, I'm excited to see the new technologies being developed in the forensics field," Jorz said. "In the future, it's going to be more difficult for people to get away with committing crimes. While people may lie, forensic evidence doesn't." 🐾

Prescription for Murder

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In fact, just days before Rosemarie's death, Essa sent one of his mistresses a handwritten Valentine's Day card that read: "Next Valentine's Day will be all ours. I love you with all my being."

Essa's deadly plan would soon unravel, however. Within weeks of Rosemarie's crash, Detective Gary McKee of the Highland Heights Police Department and Douglas Rohde of the Lake County Crime Laboratory would discover evidence that implicated Essa in Rosemarie's death.

On the afternoon of February 24, 2005, Rosemarie left her home to meet her sister at the movies. About 10 minutes into her drive, Rosemarie phoned a friend, Eva, to tell her that she felt "strange."

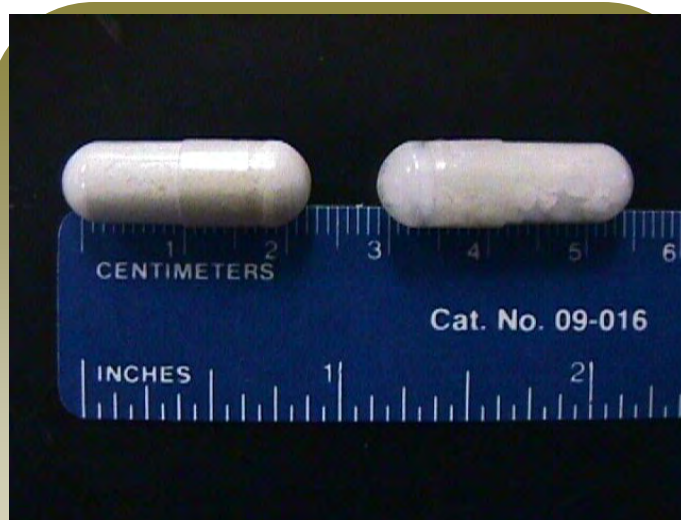
Rosemarie, a former nurse, told Eva that she had taken a calcium supplement just before she left her house. She added that she was reluctant to take the capsule, but her husband had insisted. "I wonder if that's what's making me sick," Rosemarie told Eva.

In the weeks leading up to that afternoon, Rosemarie had been taking calcium supplements at the urging of her husband. Although she had no symptoms of osteoporosis, Essa told her the calcium pills would "safeguard" her against bone loss.

Rosemarie ended her cellphone call with Eva and continued driving along the winding road to the movie theatre. Minutes later, as Rosemarie drove on Wilson Mills Road in Highland Heights, other motorists noticed that Rosemarie's car was swerving. Her car grazed another vehicle and then rolled slowly to a stop. A motorist approached Rosemarie's car and saw that she was vomiting and drifting in and out of consciousness.

She was rushed to Hillcrest Hospital in Mayfield Heights, but died 30 minutes later. The inconclusive autopsy and toxicology screening distressed Rosemarie's siblings, who had learned from Eva that Rosemarie was suspicious of the calcium capsules.

Detective McKee, the lead investigator on the case, had also been tipped about the possible link between her sudden bout of nausea and the calcium. On March 17, 2005, McKee interviewed Essa at the Highland Heights police station. McKee then followed Essa to his home so that he could take a look at Rosemarie's various pills and medications. At the Essa residence, McKee asked for permission to take Rosemarie's calcium supplements and other pills back to the police station. Essa seemed surprised by the request, but McKee



Typical powdery calcium capsule (left) and suspicious crystalline capsule, determined to be cyanide (right).

assured him that he was merely "covering all his bases."

With the potential evidence in hand, McKee now needed to have the suspect calcium supplements analyzed. He turned to the LCCL and its Supervisor of Chemistry and Toxicology, Douglas Rohde.

"The Highland Heights Police Department knew that we had the capability to do an extensive analysis and get the results back to them quickly," said Rohde. "Detective McKee brought in the evidence. He said a healthy 38-year-old woman had died and he thought the calcium might have something to do with it. McKee asked me to examine the calcium first and then everything else."

Upon preliminary visual examination of the calcium capsules, it was noted that several of the capsules were distinctly different. Nine of the 56 capsules retrieved by McKee contained a crystalline substance, the remaining 47 capsules contained a powdery substance consistent with calcium.

When analyzing substances, Rohde relies on two main tools: gas chromatography/mass spectrometry (GC/MS), which utilizes electrons to separate and identify the various chemicals in the substance; and Fourier transform infrared spectroscopy (FTIR), which bombards the substance with a beam of infrared radiation.

"The infrared radiation causes the molecules in the substance to vibrate," Rohde explained. "Different substances have different vibrational patterns. When I analyzed the crystalline (CONTINUED ON PAGE 6)

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Presumptive color test shows that the crystal in the capsules has chemical properties similar to cyanide.

material using the FTIR, I saw a unique pattern that was specific for cyanide.”

Recalling his reaction when he discovered the poisonous capsules, Rohde said, “It was a moment of ‘Wow, he killed her with cyanide.’”

Deaths due to cyanide poisoning are relatively rare, due to the restricted availability of the substance. But Rohde was able to recognize its presence because he had worked on a cyanide poisoning case in 2004. In fact, on the day of Rosemarie Essa’s autopsy, Rohde was presenting a paper on the 2004 cyanide case at a meeting of the American Academy of Forensic Sciences.

“Cyanide poisoning doesn’t happen very often,” noted Rohde. “Most forensic scientists don’t see a cyanide case in their entire career. But within one year, I had two cyanide deaths.”

After McKee and the Cuyahoga County Coroner were told of Rohde’s discovery, McKee secured a search warrant for Rosemarie’s car. Investigators scraped the seat covers and found traces of cyanide in her vomit. The coroner ordered a new toxicology screen of Rosemarie that showed she had a blood cyanide level of 9.1 milligrams per liter, about three times the level that is considered fatal.

“Essa had filled the calcium capsules with 600 to 800 milligrams of pure cyanide,” said Rohde. “That was enough to kill her three or four times over.”

Noting that cyanide can kill within seconds, Rohde said the reason Rosemarie didn’t die instantaneously is because the poison had been loaded into slow-release capsules.

Investigators would later discover that Essa had expected Rosemarie to take a highway route to the movie theatre on the day of her crash. He had hoped that the cyanide would take effect while Rosemarie was driving 60 miles an hour.

“If she had passed out and crashed at a high rate of speed, the coroner might have ruled that her death was a result of the crash. They may not have investigated further,” Rohde said. “But Essa’s plan was thwarted when she decided to take back roads that had a low speed limit.”

As a result of the police investigation and the analyses performed by the LCCL, the Cuyahoga County Coroner announced on April 22, 2005 that Rosemarie’s death was caused by acute cyanide intoxication.

In February 2006, the Cuyahoga County Grand Jury indicted Essa, charging him with aggravated murder. Essa, however, had fled the U.S. shortly after McKee had interviewed him in March 2005. The FBI tracked Essa to Lebanon, but because the country doesn’t have an extradition treaty with the U.S., agents couldn’t arrest him.

Essa was finally captured when he traveled to Cyprus in October 2006. After a protracted legal battle, he was returned to the U.S. in early 2009 to stand trial. On March 5, 2010, a jury found Essa guilty of killing Rosemarie. He is now serving a life sentence and all appeals have been denied.

“Solving the Essa homicide case was a collaborative effort by the Highland Heights Police Department, the FBI, the Cuyahoga County Coroner, The State of Ohio, and the LCCL,” said Rohde. “The science revealed the truth, and as a result a murderous doctor was sent to prison.”



After being found guilty of aggravated murder, Essa is serving a term of 20 years to life in prison.

Touchy Subjects

Searching for Touch DNA

When a crime has been committed where no body fluids have been left behind, touch DNA evidence becomes an evidentiary focal point. Touch DNA evidence refers to the potential transfer of epithelial (skin) cells from an individual to an object they come in contact with. The Lake County Crime Laboratory has been actively performing touch DNA analysis for several years for both violent and non-violent crimes.

According to Edmond Locard's Exchange Principle, "every contact leaves a trace." The success of touch DNA analysis has been the thorn in many a suspect's side; however, the ability to detect these minute amounts of skin cells left behind is challenging and frequently does not yield a meaningful DNA profile. At the LCCL we will examine any evidence that we deem suitable for touch DNA analysis (both property and violent crimes alike) and use our investigative expertise to determine the best evidence that will maximize our resources to help solve a crime.

Oftentimes, agencies will submit multiple items for a single case in which touch DNA analysis is requested. The DNA analysts then determine which items will most likely yield a useable, CODIS eligible profile. We make our decisions based on many factors, including the narrative in the police report of the events that occurred during the crime. If there are any questions or ambiguities, the analyst will contact the investigating officer or detective to help determine the best evidence on which to perform DNA analysis.

We are often asked what makes good or bad evidence when it comes to touch DNA. There are no clear guidelines as to what is effective because many factors come into play on each piece of evidence. For example, the duration and force of contact with the suspect (items handled in a firm or prolonged manner will potentially have more DNA), the object's surface (rougher surfaces tend to gather more cells than smooth surfaces), and the

number of other uninvolved individuals who have also come in contact with the item in question. These are all factors that need to be taken into consideration when collecting touch DNA evidence.

Examples of evidence that have a higher potential of providing DNA results are clothing (pants, shirts, hats, gloves), swabs of smudged fingerprints from windows or doors to private houses (that are of no value for latent fingerprint examination), or tools used during the crime by the suspect (pry-bars, screwdrivers). Objects that are generally poor for obtaining touch DNA include items



that have been handled extensively by multiple individuals. For example, swabs from public door handles, any type of publically accessed item, or money. These publicly handled items often provide an uninterpretable profile (generally a mixture that cannot be interpreted). Another issue with a profile that is rendered by touch DNA is its eligibility for submission to CODIS. CODIS guidelines strictly define eligibility requirements for a profile to be uploaded into the database. Such guidelines demand that the

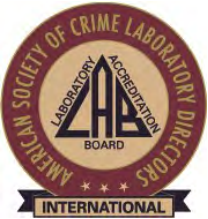
profile being submitted to CODIS must reasonably be believed to have originated from the suspect's DNA. A profile obtained from a publically used item could likely be from an innocent bystander rather than the suspect and would not be eligible for submission to CODIS. For evidence submitted from a residential burglary, it is easy to rule out innocent bystanders by obtaining elimination standards from residents of the home. Elimination standards from a public venue, such as a jewelry store or bank, would be nearly impossible to obtain.

Collection of the evidence is also important to increase the chances of obtaining an interpretable profile. First and foremost, contamination must be minimized and all precautions must be taken to avoid introducing additional, unrelated cells to the scene. For items that cannot be transported to (CONTINUED ON PAGE 8)



LAKE COUNTY CRIME LABORATORY

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An ASCLD/LAB-International Accredited Laboratory since 2009

An ASCLD/LAB-Legacy Accredited Laboratory 2000-2009

Touchy Subjects Searching for Touch DNA

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the laboratory, swabbing the surface using a single lightly moistened swab to concentrate the potential skin cells is recommended. This will potentially increase the amount of suspect cells on the swab and increase our chances of obtaining a suitable profile. Additionally, collect any elimination standards from the homeowners for any burglary in which touch DNA swabs/items are submitted. This will help expedite the results.

Touch DNA analysis, while successful, has limitations and does not eliminate the importance of other types of evidence that may be available at the scene. Trace evidence such as hairs, fibers, shoeprints, toolmarks, as well as fingerprint evidence must be included in an investigation. All types of evidence, in conjunction with each other, will help to substantiate the case, so always strive to obtain all evidence from a crime scene.

As a full service laboratory, we are here to serve all your evidentiary needs and welcome any questions you may have. 🐾

The CRIMESCENE

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Frequently Asked Questions

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The 3D model can be used to demonstrate the crime scene in its entirety: showing relationships between different rooms, locations of evidence, bloodstain patterns, and trajectories. The crime scene can also be shown from the viewpoint of someone walking through the scene, which may assist a jury in understanding what actually took place. You may request the 3D scanner on any major crime scene or whenever the scene is too complex for your agency to document.

The Crime Scene Response Team can be called to come out and process any type of scene, day or night. During the day, call the LCCL directly at 440-350-2793. After hours, or on the weekend, call Central Dispatch. 🐾