

National Association of Legal Investigators (NALI)
Welcomes New Members

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Quality continuing education is the hallmark of a great professional organization. NALI has always been at the forefront, in the area of criminal defense and civil practice. Now 400 member strong NALI, founded in 1967, offers first-class training in the criminal and civil practice areas and welcomes new investigators to apply for membership.

I applied to join NALI and recently attended their Mid-Winter Conference in Scottsdale, Arizona (February 4-6) - a hands-on, experiential weekend that got rave reviews from everyone who participated. It was one of the best conferences I have ever attended. Crime Scene Analysis for Criminal and Civil Litigation at the Salado Sportsman's Club; Night Time/Low Light Digital Photography on the hotel grounds; and Accident Investigation - Techniques for Information Collection, Testing and Analysis at the 160 acre Exponent (Failure Analysis Associates of Menlo Park) testing facility.



We stayed at the Scottsdale Cottonwoods Resort and Suites where we had use of their conference center and enjoyed the hotel amenities. On Friday we were bussed in luxurious buses to the Rio Salado Sportsman's Club in the desert on the outskirts of Phoenix. Divided into two groups, our group spent the morning at the shooting range in a test-firing pit with ballistics expert **James Serpa** learning about

guns, ammunition and the damage they can do, while the second group stayed in the training facility classroom for a video/lecture presentation by retired Mesa P.D. Detective **Don Vogel** reviewing evidence and facts in a high-profile murder case in Mesa, AZ. Forensic Pathologist **Dr. Philip Keene** presented on wound evidence interpretation. After a wonderful box lunch, we switched stations and did the afternoon training.



Jim fired shots from various rifles and handguns at varying distances to targets including a mock dummy with a white t-shirt to show stippling and powder burns at various distances; a piece of wooden wall to show the effects of various shells including shotgun shells; a small station wagon into which he fired bullets into the glass windows and doors to show shatter patterns and the damage various guns and bullets do to the interior (and the passengers) of the car and how the bullets could be deflected by items inside walls and various parts inside car doors; a block of hardened soap; and finally plastic soda bottles and aluminum cans. We were able to examine and interpret what each type of weapon and ammunition did to its intended target.

Jim fired a 9mm, a 357, a 40 caliber and a 45 caliber handgun. He talked about the various ammunitions and provided examples for us to see and touch. He said it was the weight of the bullet, not the velocity that determined the kick back of shrapnel in the door shots he did. Hollow points bullets are designed to go in and do extensive damage without coming out the other side and possibly hitting someone on the other side of the intended target. No bullet fired into a tire can be identified by size, unless the bullet is recovered, because rubber flexes.

We learned about bullets being measured not by length but by their diameter, and that there are single shot (1 projectile), buckshot (.33 caliber 9 pellets) and birdshot (275-300 pellets) shotgun shells. We examined the contents of shotguns shells with powder (burns, not explodes), the wad, the projectile and the wad, and saw the results of the shells fired into the wooden piece of wall.

Jim also fired various rifles as well including an AK47 (invented by Andre Kashnikoff in 1947), a Belgium made FN, and a 223 Colt developed in 1963 (the same as a Smith and Wesson AR15 Ruger).

After a wonderful box lunch, we finished the afternoon in the classroom. Don Vogel presented on the August 25, 2003 officer involved shooting of 16 year old, 5'5 inch, 114 pound Mario Madrigal at the family home located at 513 South Johnson in Mesa. Four officers fired a total of 15 rounds in rapid fire into Madrigal. The boy's parents witnessed the shooting and a media circus followed the incident primarily because the Madrigal shooting was on the heels of 5 other shootings in the Mesa area within a very short period of time. The family had a history with the Mesa Police and had called them numerous times to help them with their very troubled son.



The media videotape coverage of the crime scene showed the boy's mother with her own video camera documenting what happened after the scene in the kitchen was cleaned up. She alleged that the gun was 12-14 inches from her son's body when the shooting happened on the kitchen floor but there were no corresponding marks on the floor to support her allegations. The officers were using Glock 22, .40 caliber handguns. There was gunshot residue on the body but again no marks were found on the floor. The parents, quick to blame the Mesa police officers who killed their son, accused them of shooting him inside the kitchen without provocation. The case became and remained "political" throughout the investigation.

Another issue in the case was the boy being tasered with an M26 model used by the department. There is a "21 foot rule" in the use of tasers. Within a 21 foot circle, a taser can be used with success. Any closer, the probes have limited spread and will not likely contact and adhere to the intended victim. The goal is to aim at the center mass where there are large muscle groups for the probes to affix to. When the taser was fired, the boy was less than 21 feet, the probes did not work and the boy continued to aggress on the officers with a knife in his hand.

The police had to disprove the family's theory, and were able to show, by re-creating the incident through Shooting Incident Reconstruction (book by the same name authored by Lucien "Luke" Haag (Academic Press, \$70 on Amazon) - the bible of shooting reconstruction), that the boy had, in fact, come out of the kitchen to an outside carport area where he attempted to slash an officer with a knife resulting in shots being fired.

Forensic examination documented that the officer's belt had trace evidence visible only under a microscope, of a slice to the officer's belt indicating the boy tried to slice at him with a knife as he was aggressing on the officer resulting in the first shots being fired, supporting the police's theory of the case. A duplicate belt was obtained and sliced with the same knife in a lab. The same slash that appeared on the officer's belt appeared on the test belt and again no trace evidence was found on the blade of the test knife - just like the boy's knife. It was because of this aggressing by the boy that the first officer opened fired, the other officers reacted and shot as well and the boy was killed. While the parents had accused the police of gunning their son down in the kitchen, gun trajectory interpretation showed that the boy, after being shot, got back into the kitchen where he fell against the door frame and ultimately died slumped on the floor. There was no evidence found in the kitchen to support the parents' contention the police gunned the boy down in the kitchen.

The 911 tape was analyzed and revealed that the 15 shots fired were all done within 2.2 seconds. Of the 15 shots, 10 hit the boy's body and 13 of the 15 shots were recovered. From the location of the four officers in the carport area, it was clear that the boy could not have been shot and killed inside the kitchen as the parents alleged.

Unfortunately the victim in any case is often not the only victim, such as in this case where all four officers involved in the shooting have since left the police force.

Dr. Keene discussed gunshot wounds. One could not say with any certainty what the sequence of wounds were, or what the sequence of shots fired were. There was an entry wound in the back and went to the front - either the boy was standing or bent over at the waist when he was hit by that bullet. According to the officers, the boy was constantly moving and changing positions in the carport area.

The gunshot residue (GSR) test only indicates that a person was in the proximity of a gun that was fired. It is not a conclusive test. - it is a test of elimination. Some ammunitions fire "cleaner" than others. In addition, there are 5-6 shapes of gunpowder, and the shapes can be the first eliminating test. Shotguns use gunpowder flakes; handguns use gunpowder.

There was a fine trail of lead particles left by the bullet passing through the body. If the entry wound was an exit wound, the identification would be incorrect. Trace evidence was used to prove/disprove the theory of the case.

To prove or disprove any theory, it is always recommended to think outside of the box.

Dr. Keene talked about wounds and examining them by distance, angle, contact (hard or soft), muzzle against the target, near range and distance firing. Only the deficit from the wound can indicate the distance. Bullets fired into the body “grow as they go,” the exit wound is much larger than the entrance wound.

There was discussion about Dr. Kewinski’s research and theory on “Decide, Pull and Shoot.”

The civil case against the City was finally settled for \$3 million with no admission of guilt on the part of the department or the officers involved.



Back at the hotel we had dinner at a local restaurant and then attended a short PowerPoint Presentation by Certified Forensic Photographer **Randy Anglin** before setting out with our cameras and tri-pods to the hotel cactus garden to practice different aperture, shutter speed and ISO settings with light using street and available lighting, while painting the night with artificial light added to the scene. The technique of adding artificial light is especially important in gathering photographic evidence at night scenes of, for example, foot/shoe impressions left in grass or sand and other trace evidence left at a night crime scene, to illuminate trace evidence for identification purposes.



Don’t be afraid to use flash in bright light situations or turn it off in low light situations. Be aware of all of the available light sources at the scene and use them to your benefit. And, be sure to have the auto focus, sound and flash turned off, especially if you are doing nighttime surveillance photography. The auto focus light is a dead give-away that you are there.



On Saturday, we were again bussed to the Exponent facility where we were again divided into groups and throughout the day visited various stations in the facilities for presentations about the Biomechanics of Seatbelt Defense; Electrical and Mechanical Systems Failures; Investigation Techniques for Premises Liability Issues; a presentation during lunch on the Comparison of Vehicle Measurement Techniques; 4 short presentations after the lunch hour; Motorcycle Rider Trajectory in Pitch-Over Brake Applications; Look But Fail to See - Inattentional Blindness and Change Blindness; and Roadway Conditions and Human Factors as a Cause of Vehicle Accidents. No photographs were allowed on the premises, because of on-going testing and experiments for clients.

Exponent (Failure Analysis Associates of Menlo Park) opened their 160 acre facility with several buildings for testing and administration to us for a day of Accident Investigation - Techniques for Information Collection, Testing and Analysis.



We were broken up into groups and attended simultaneous presentations. No group missed any one particular presentation as we rotated from presentation area to the next.

Janine Smedley presented on the Biomechanics of Seatbelt Defense - the application of engineering and physics to the human body. She talked about injury biomechanics; the affects on seat belt units and the evidence left after an accident; crash events and injuries; accident severity and the forces involved; the principle direction of force; the use of seat belts; auto sled testing clothing; and seat belt design and airbag deployment.

We had a chance to view a vehicle seat belt system and learn how it works, and examine a number of seat belts involved in accidents to show the trace evidence left on the various components after accidents.

Darko Babic and **Ashish Arora** presented on Electrical and Mechanical System Failures. Ashish presented on a diesel pusher motorhome electrical fire where the source could not be identified. He talked about the collection and preservation of evidence; photo documenting damage; corrosive degradation of evidence; evidence spoliation due to inadequate preservation; basic electricity using the water faucet analogy (voltage is water pressure; current is the water flow rate; power is volts times current; fuse is pressure relief value); types of electrical problems; batteries and their inherent problems; and the cause of the motorhome fire - the theory was the engine starter cable caused the fire that must have started in the battery box - this is always the first thing to look at because there is no fuse between the battery and starter. Their testing revealed it was a loose alternator connection - witnesses had seen smoke initially coming from the engine compartment not the battery compartment where the theory would have had the smoke coming from.

Darko presented on material stress and deformation. Each material deforms, either elastic or permanent, under force (the world is made of Jello) and permanent deformation leaves clues to the force direction. Excessive permanent deformation can lead to overload, fatigue and stress corrosion cracking and failure of the part in question. Examples of materials examined included a helicopter chair, reverse osmosis filter, baby carrier handle, garage door, roof fall, nylon strap failure, pipe leak investigation, flow switch investigation, aluminum melting furnace, weld failures, crane collapse at Hoover Dam, steam turbine failure, a helicopter crash, king pin failure, and a Stairmaster accident.

He closed with an excellent thought - things are not what they initially appear to be. He showed a video clip of a life-size farm tractor and a Mercedes Benz pulling up behind/beyond it. A man gets out of the Mercedes and walks over to a tripod and picks the toy tractor off the tripod! Not what it appeared to be.

Michelle Heller presented on Investigation Techniques for Premises Liability Issues. Slip and fall cases involve biomechanical investigations. A woman went to resort in a foreign country and after some cocktails went to the office late at night, claimed the door was locked and slipped and

fell into a pond with some turtles in it tearing up her leg. She was suing the manufacturer of the shoes.

Heller discussed ways to document and measure the scene including the context of the overall location of the accident; what witness statements provided; factors to be considered; evidence obtained or not obtained at the scene; distracted gait; inattentional blindness; the computer simulation model created to re-create what the plaintiff said happened versus what really happened; the comparison of what she said happened to the simulation and injury photographs; and finally the hallway experiment at Exponent that was littered with objects to illustrate inattentional blindness.

Their hallway experiment had subjects walk the hallway three times, in one minute each time, and then tell them what they observed - they walked the route and observed, then talking on a cellphone with an easy call and finally talking on a cellphone with a hard call. The more distractions, the less each subject saw in the hallway.

The plaintiff had not in fact slipped and fallen into the turtle pond. She stepped in to get one of the turtles to take back to her room (way too many cocktails) and got her lower leg caught between two rocks. As she tried to lift her leg out of the rocks, she tore open the calf in a V pattern, leading to her injuries - an explanation consistent with the computer simulation model.

We had a wonderful box lunch in their lunch room with a presentation by **Daniel Peterson** on the Comparison of Vehicle Measurement Techniques including measuring and photographic techniques - never use zoom, always use the widest angle lens your camera has to capture all of the vehicle and always include a scale on the ground for reference.

After lunch, there were a number of stations to visit before the afternoon round, including viewing two similar automobiles that had been crashed head-on into each other at 50 mph to demonstrate the exact damage to each (Myth Busters was involved in this experiment); **Kate Pittman** presenting a demonstration on Building Simulation and Animation Models; **Christine Roach** presenting on and in the crash test dummies lab; and **Reed Thomas** presenting a demonstration on Instrumenting Vehicles for Testing.

Todd Frank presented on Motorcycle Rider Trajectory in Pitch-Over Brake Applications. The male motorcycle rider with a female passenger on the back came up on a car crossing in front of them, panicked, braked hard and pitched the motorcycle over throwing he and his passenger off the motorcycle. The passenger died when she flew over the first car and into an SUV going in the opposite direction to the car they tried to avoid running into. He talked about accident reconstruction; pedestrian and occupant kinetics; braking systems and motorcycle design; high braking deceleration, weight transfer and braking capacity; and crash testing a similar motorcycle.

Mike Kuzel and Joseph Cuadrado presented on Look But Fail To See - Inattentional Blindness and Change Blindness.

There were a number of experimental tests done with us as subjects. We were given handouts to fill out about what we observed and the data was collected and tabulated. Now we are not “witnesses” who fail at eyewitness identification - we are trained investigators who should be good witnesses.

The results were striking, to say the least, and say a lot about the human condition and our inability to see what is right in front of us - it is a limitation of our brains to be able to see and identify everything that is before us.

The first video clip shown was a television reporter who was walking along and talking about an issue when he walked head-on into a pole. This was a test of our abilities to recall specifics in the video clip - a witness memory test. There were 10 questions after he walked into the pole - what was the date and time; what TV station; what was in the background; what was the story about; and what was directly behind the reporter? Everyone reported he walked into a pole. That is what most people remembered. The average correct response was 3.5. All of this information was presented visually yet we failed to see it all.

The second was Inattentional Blindness. We were asked to watch a film clip and count the number of passes of a basketball the white team made to each other. During the first exercise, while the ball was being passed, a moonwalking bear walked through the group. In the second exercise, a gorilla walked through the group (see Simons and Shabra).

This is a result of the limitation of our cognitive faculties when our attention is engaged. The degree to which our attention is engaged influences what we see and new objects must stand out as new for us to see them. Visual and auditory processes share the same area of our brains - changes create too much input and information for our brains to process quickly or accurately.

Of the people watching the bear clip, 4 of 53 saw the bear. The average pass count was 13 - the actual count was 13 so we did very good on this exercise. We tend to attend to one thing and not see the others. The people who saw the bear typically failed to count the number of passes and instead focused on the bear or gorilla thus providing an inaccurate number of passes.

The third exercise was Change Blindness. We miss pertinent changes in our visual world. We fixate on the rich world around us. By fixating, we develop abstract meanings and the gist of what is going on. We assume details because we are operating in the same system we are used to. To capture each change before us would overwhelm our brain capacity and create confusion. The system that integrates the gists of what we get give uniform stability rather than chaos.

In this exercise, we were asked to watch another video clip from Transport for London. This piece was done to bring about public awareness surrounding bicyclists. There were 21 changes in

the video piece called, Who Dunit. We were shown a video of several suspects in a library with weapons in their hands and an inspector trying to figure out who dunit and killed the victim that was lying on the Persian rug.

As the film progresses, things in the room change. There are a total of 21 changes during the clip, most of them people could not see to report. After the viewing, we are shown another clip with the camera panned back to the entire scene that showed the items that were changed

before our very eyes that we didn't see - the weapons, the flowers, paintings on the walls, the Persian carpet and even the victim laying on the changed carpet!

The results were interesting - the maximum number of changes people saw were 7 - the average was 3.8.

Look But Fail To See is the law enforcement definition and application in the real world of Inattentional Blindness and Change Blindness, two scientific names for the LBFTS phenomenon. In Britain, is it often referred to as SMIDSY - Sorry mate, I didn't see you.

We develop fixed search pattern strategies based on the environment, our experiences and expectations. Too much additional information can cause you to be selective in your search strategies and not see what is there. You may actually fail to detect what is right in front of you. For example, who of us has not come to a corner to make a right hand turn, stopped, looked both ways, saw no one and began to make the turn only to find a person about to cross the street in front of us on our right screaming at us or pounding on the fender of the car. We never saw that person standing on the corner but that person was there. And we have driven by that corner a hundred times before! This is a well-documented phenomenon. It is a true limitation of being human and doesn't excuse our failing to see but explains why we fail to see.

By example, there was a case involving a woman driving along an open stretch of highway curving gently uphill to the left. She had driven the road many times before yet she hit two cyclists riding along on the side of the road in broad daylight with clear weather and traffic conditions. She swore she never saw them before impact.

The fourth video clip was related to Change Blindness. We were shown two identical photographs that switched back and forth from one to another. But, there was something different - can you find it? There was a statue that was missing in one of the pictures.

22 of 56 respondents saw that the statue was missing. That is less than 50%.

And finally, **Andrew Kwasniak** presented on Roadway Conditions and Human Factors as a Cause of Vehicle Accidents. We were presented with a folder of photographs of different views of sections of highways and intersections and asked to number 1-3 the first things we saw. Andrew asked us to react to what we looked at first, driver distraction and where else we focus

our attention on while driving. The key was a brightly lit animated billboard in one of the views giving variable messages. He talked about original vs. LED headlights and the spread of light on the roadway; roadway lighting conditions; the environment in which the vehicle was operating; and the fact that 85% of the time humans make errors in judgment.

He offered valuable resources for assessing roadways including the National Cooperative Highway Research Program (provides information on road users, human factors, principals and findings and driver characteristics); the Highway Safety Manual (provides analytical tools and techniques); and the Road Safety Audits (statistical data). These documents are used for planning purposes and offer a wealth of information about roadways, conditions and traffic patterns and are essential tools when analyzing roads and conditions.

The testing Andrew did with us was done to show what we each view at intersections - what environmental features capture our attention the most. The attention results will lead to additional research. The on-going investigation was whether dynamic billboards capture the driver's attention rather than distract the driver. We can only attend to one thing at a time. What we pay attention to depends on whether the object is static or dynamic. The goal in the next 5-8 years is to look at the role of human error and re-define with more science the issue of Look But Fail To See to determine if this is normal human functioning.



We ended our two-day training with a scrumptious outdoor evening barbecue at the Cookout Corral complimented by a video history tribute and awards ceremony to NALI members of 25 years or more, many of whom were in attendance, and an Indian hoop dance

presentation. It was a stellar training and networking experience in the desert.



For more information, please visit NALI at nalionline.org and Exponent at exponent.com. You can also contact **Mike Kuzel**, Senior Managing Engineer, Vehicle Practice, at 623-587-4124 (cell: 602-402-7839).



Our California contingent of investigators.