



WEST VIRGINIA STATE POLICE FORENSIC LABORATORY

# THE LAB REPORT

VOLUME 4 NO. 1



JANUARY 2018

## SPECIAL POINTS OF INTEREST:

- **AFTE Conference 2018**
- **Firearm Reference Collection Needs Your Help**
- **Photography Techniques for Footwear Evidence**

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## A MESSAGE FROM THE DIRECTOR

### Greetings!

We have come to the end of a very successful year here at the WVSPFL. We have many new faces who have joined our laboratory team to better serve you! Here are some facts that may be of interest from 2017:

- Our laboratory staff has increased by approximately 20%! Although they are not all fully trained and some vacancies still remain, this will put us in a great position to provide forensic services more efficiently and effectively in 2018 and beyond.
- By returning older, inactive cases and focusing on our customers' current evidence testing needs, our Drug Identification backlog has dropped by more than 50%.
- The Toxicology Section has new, more sensitive technology online and their backlog has dropped by 350 cases overall in 2017.
- The Latent Print, Firearm/Toolmark, and Trace Evidence Sections all have little to no backlogged cases resulting in turnaround times measured in days.
- The Central Evidence Processing/Biochemistry Sections have streamlined procedures to make the serology and DNA analysis processes much more efficient.

The implementation of our case acceptance policies (limiting what we accept and what we test), increased staff, as well as improved communication with our customers, has helped us strengthen our overall laboratory processes and decrease our backlog by 1400 cases this year. We appreciate your cooperation in helping us to be a better resource to law enforcement and the criminal justice system in WV. We look forward to serving you in 2018!

Kind regards,  
**Sheri Lemons**

### Links:

- [WEST VIRGINIA STATE POLICE FORENSIC LABORATORY FIELD MANUAL](#)
- [FORENSIC LABORATORY EVIDENCE SUBMISSION FORM](#)
- [CURRENT JOB POSTINGS](#)

# AFTE 2018 IS COMING TO CHARLESTON

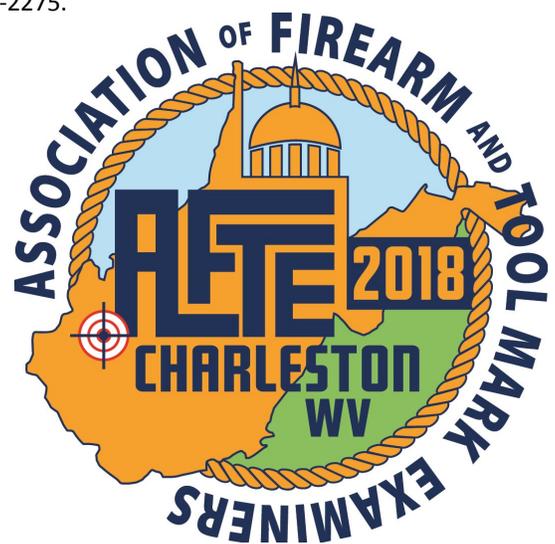
**Calissa N. Carper**  
**AFTE 2018 Host Committee Chair**  
**Firearm/Toolmark Section Training Officer**

The WVSP Forensic Laboratory's Firearm and Toolmark Section won the bid to host the Association of Firearm and Tool Mark Examiner's (AFTE) annual training conference in June of 2018. AFTE is a non-profit, international professional organization of forensic scientists who primarily examine firearm and toolmark related evidence. This annual training, which started in 1969, is held in various locations in North America and in 2018 it will be held at the Charleston Civic Center and Charleston Marriott Town Center located in downtown Charleston, WV. The conference is a six-day technical meeting, scheduled for June 3 – 8, 2018. This event will bring in approximately 500 forensic experts and crime scene technicians from both stateside and abroad. It provides the greatest opportunity for experts across the world to share research and new information, via technical presentations, specialized workshops, and firearm armorer courses.

Attendance to this training is not just restricted to AFTE members. The conference is open to interested nonmembers including lawyers, law enforcement officers, crime scene technicians, private examiners, and forensic science college students. Any nonmembers who wish to attend simply must pay the nonmember registration fee. Registration costs include access to the following events:

Sunday welcome reception, Monday – Thursday technical meeting (presentations), Poster and Slide presentations on Monday night, morning and afternoon food breaks, and one Thursday night banquet ticket. There are also daily registration options or one day workshop registrations available.

We encourage any WV agencies to attend this event as there will be training related not only to forensic laboratories, but to crime scene processing, testimony practices, and more. Online registration for this training event will be posted in January 2018 on the organization's website. Registration, accommodation information, workshop descriptions, and additional information regarding the conference can be found and regularly updated at <https://afte.org/meetings/afte-2018-charleston>. If your agency has any questions, please contact us at the [afte2018@gmail.com](mailto:afte2018@gmail.com) account or call Calissa Carper at 304-746-2275.



# CALL FOR ARMS (FIREARMS)

**Ryan D. Christopher**  
Firearm/Toolmark Section Forensic Analyst

The Firearms Identification Section is requesting the help of various agencies around the state in order to add new firearms to its reference collection. There are several purposes to the laboratory's firearm reference collection. First, having a similar working firearm in the reference collection aids the examiners in determining the operability of a firearm submitted in a case, which may be modified or inoperable or missing parts, etc. If the firearm is inoperable, parts can be pulled from the reference firearm to make the submitted firearm operable, which allows test fires to be obtained for comparison. Second, the reference collection allows examiners to determine the location, structure, and appearance of information stamped onto a given firearm, specifically the serial number. When a firearm is submitted to the laboratory for a Serial Number Restoration, having a firearm of the same make and model in the reference collection aids the examiners in finding the serial number, as well as determining the number of letters and/or numbers present in the structure. Third and lastly, the reference collection is a source of training for new examiners or continued education training.

Currently, the firearms reference collection has approximately 475 firearms. This amount is small compared to other laboratories around the country, which can have several thousand firearms or more. On top of this, the collection has be-

*The WVSP Forensic Laboratory's reference collection is small and outdated, potentially causing difficulties in casework involving function testing—we need the help of our law enforcement to update and expand our collection.*

come significantly outdated, and does not contain many of the newer, more modern firearms that have been developed in the past 15 years. Many of these newer firearms are also commonly submitted in cases to the laboratory, so it is becoming increasingly important to add these firearms to the reference collection. Some examples of these newer guns include Generation 4 Glock pistols, Ruger SR and LC series pistols, Smith & Wesson SD series pistols, Smith & Wesson M&P series pistols (regular M&P's, as well as M&P Shields), Springfield Armory XD Series pistols, and many of the other polymer frame pistols that have become normal submissions in casework. If any agencies in the state have any firearms in their property rooms, such as the ones listed previously, that are going to be destroyed or turned over to the State Treasurer's Office, the Firearms Identification Section asks that you contact us first to see if there is a way that these firearms can be added to the laboratory's reference collection. **(Continued on page 4)**

## CONT: CALL FOR ARMS

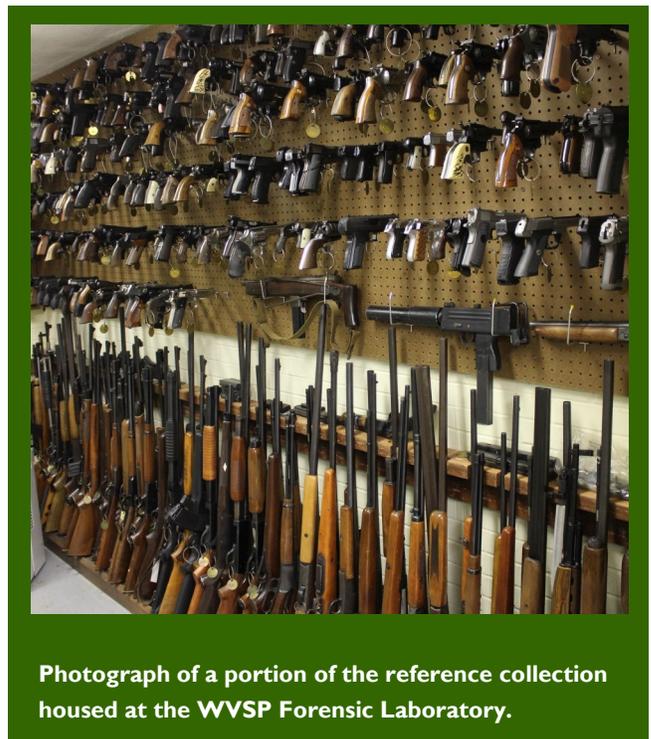
Unfortunately, there are some stipulations to be aware of first. According to the state code, §36-8A-5, there are two ways that the laboratory can appropriate firearms into its reference collection, and it is based on whether the agency is a part of the West Virginia State Police, or if the agency is a local sheriff's department or police department.

1) For West Virginia State Police detachments, any firearm can be transferred to the Forensic Laboratory reference collection pursuant to State Code §36-8A-5 (d). This section of the code allows any firearm to be appropriated for law enforcement use. However, it can only be used by that specific agency. Since the Forensic Laboratory is a part of the West Virginia State Police, firearms can be transferred to the lab using this provision.

2) For local sheriff's departments and police departments, only firearms that are deemed unsafe may be transferred to the Forensic Laboratory. State Code §36-8A-5 (f) states that if a firearm is deemed 'unsafe for use because of wear, damage, age, or modification, and any such firearm shall at the discretion of the superintendent be transferred to the State Police Forensic Laboratory for training or experimental purposes...'. Unfortunately, the Forensic Laboratory is looking for firearms that are in good working condition that can be added to the reference collection. However, if any agency has firearms that are not functioning properly, please contact the Firearms

Identification Section. In some cases, the Firearms Identification Section might still ask for those firearms to be transferred if the firearms can be repaired to working condition.

Once again, the Firearms Identification Section is asking for help. The reference collection is in desperate need of an update, but it cannot grow without assistance from all of the local agencies from around the state. If any agencies have any firearms that they would like to transfer to the forensic laboratory, please call the Firearms Identification Section at 304-746-2168. The success of a case you submit in the future may depend on your contribution of firearms to the reference collection.



Photograph of a portion of the reference collection housed at the WVSP Forensic Laboratory.

# IT'S ELEMENTARY, MY DEAR: PROPER TERMINOLOGY

**Philip K. Cochran**

**Firearm/Toolmark Section Supervisor**

Some of us still have nightmares about being in elementary school as children. Flashbacks about cafeteria food, playground bullies, math quizzes, and let's not forget those dreaded glossary tests. However, we quickly learned how important it is to use the correct words when describing something.

The Firearm/Toolmark Section of the laboratory stresses the importance of using proper terminology in all documentation, especially on submission forms submitted to the laboratory. When it comes time for trial, the jurors may be unnecessarily confused if the submitting officer talks about submitting a spent slug, the Processing/DNA analyst talks about taking swabs of a used round, then the firearms analyst talks about examining a fired bullet. While common slang terms are familiar to a lot of people, they may not be familiar to all, so everyone using the same terminology will make it much easier for all the jurors to understand.

Below is a list of proper terminology for evidence commonly submitted to the Firearm/Toolmark Section:

- **Loaded cartridge**- A unit of ammunition consisting of the cartridge case, primer, gunpowder, and projectile(s).  
NOT loaded bullet, live round, live bullet, etc.
- **Fired cartridge case**- The container, usually brass or nickel plated, that held all the components of a cartridge together. The fired cartridge case will not have a projectile or gunpowder and the primer will have a firing pin impression.  
NOT spent shell, spent round, used hull, etc.
- **Fired bullet**- A bullet that has been fired from a firearm.  
NOT fired slug, spent slug, spent bullet, etc.
- **Loaded shotshell**- A unit of ammunition consisting of the shotshell, wads, primer, gunpowder, and one or more projectiles, designed to be fired in a shotgun.  
NOT loaded shell, live shell, etc.

**(Continued on page 6)**

## CONT: PROPER TERMINOLOGY

- **Fired shotshell**– A shotshell that has been fired and no longer contains gunpowder, wads, or projectiles. The primer will have a firing pin impression.  
NOT spent shell, used hull, etc.
- **Fired slug**– A shotgun slug that has been fired from a shotgun.
- **Wad**– Cardboard or plastic shotshell components used to: 1) protect the shot pellets, 2) fill the spaces and separate the gunpowder from the projectiles and 3) help seal the gunpowder gases.
- **Pellets**- Small spherical projectiles loaded in shotshells. Also known as shot pellets.
- **Rifle**- A firearm having rifling in the bore and designed to be fired from the shoulder.
- **Shotgun**- A firearm usually having a smooth bore and designed to be fired from the shoulder firing shotshells containing numerous pellets and sometimes a single projectile.
- **Pistol**– A handgun where the chamber (the part of the firearm designed to hold the loaded cartridge for firing) is part of the barrel.
- **Revolver**– A firearm, usually a handgun, with a cylinder having multiple chambers arranged to rotate around an axis and be discharged successively by the same firing mechanism.

These terms should be used when describing evidence on DPS-53 submission forms. But please note that when submitting firearms, don't stop at the basic definitions above. Include the following information on the submission form when possible: manufacturer, model, chambering/caliber, and serial number. For example, instead of just saying one 9mm pistol is being submitted, say one Glock model 19 pistol, 9mm Luger, S/N EVG625. Also, make sure the submission form includes ALL items being submitted. We often open cases that have loaded cartridges or additional magazines that are not listed on the submission form. If it is in the package being submitting, it should be listed on the submission form.

Beyond using the proper terminology for submitting items of evidence, it is also important that the specific examinations needed for these items are listed as well. In the "Examinations Requested" section of the submission form, a request of "Firearms" can cover many types of examinations, leaving it unclear to the examiner what needs to be done with the evidence. This can cause delays in processing the evidence, so it is best practice to be specific. Below is a list and brief description of the primary examinations performed in the Firearm/Toolmark Section: **(Continued on page 7)**

# CONT: PROPER TERMINOLOGY

- **Firearm Examination/Comparison:** Determine whether a fired bullet, fired cartridge case, fired shotshell or other fired ammunition component(s) was fired from a specific firearm.
- **Firearm Function Check:** All submitted firearms go through a general function check examination to determine if the firearm is operable as received. However, extensive function check examinations may be specifically requested, to include
  - I. **Trigger pull measurements-** determine the amount of weight the trigger of a submitted firearm will consistently hold and the amount of weight on the trigger where the firearm consistently fires. This will be performed for both single and double action firing modes when the firearm is capable of both.
  - II. **Full auto vs. semi-auto firing-** determine if a firearm only fires in semi-automatic mode. If the firearm can fire in fully automatic mode, is it designed that way or has been modified to be able to fire in fully automatic mode.
  - III. **Impact/drop testing-** test whether impact to the firearm can cause unintentional firing.
  - IV. **Rusted firearm restoration-** clean rusted firearms in order to make them operable for function testing and/or for the recovery of know test fired samples.

**NOTE:** For firearms recovered in water, please submit them to the laboratory in a water-tight container filled with the same water as they were recovered in. For example, place the firearm in a cooler filled with water from the creek where the firearm was recovered.

- **Determination of short barreled shotguns and rifles:** Measure and report barrel and overall lengths for shotguns and rifles.
- **General Rifling Characteristics (GRC) Search:** Examine a fired bullet or fired cartridge case to provide a FBI database generated list of possible firearms (make, model, and caliber/chambering) as an investigative lead.
- **Ammunition Component Examination:** Determine if a loaded cartridge was cycled through a particular firearm. Determine if a fired ammunition component is similar to the submitted loaded ammunition.
- **Distance Determination:** Determine the approximate distance from the muzzle of the firearm to the victim or other object based on the microscopic and/or chemical examination of the gunshot residues around the bullet hole or shot pellet pattern. **\*\*Four Items Must Be Submitted for Distance Determinations: (Continued on page 8)**

## CONT: PROPER TERMINOLOGY

- I. The suspect firearm.
- II. The same/similar ammunition used in shooting: For distance determination testing, the best results will be from test firing at known distances using the exact same ammunition that was in the firearm at the time of the shooting. All ammunition recovered in the suspect firearm should be submitted to the laboratory, as well as any similar ammunition recovered at the suspect's residence.
- III. A fired bullet, fired cartridge case, or fired shotshell: we must have a fired item of evidence that we can identify as being fired by the suspect firearm. If we cannot identify fired evidence to the suspect firearm, we cannot scientifically say that distance testing using that firearm will be valid since we cannot eliminate the possibility that the gunshot residue or shot pellet patterns were produced using a completely different firearm.
- IV. The victim's clothing with bullet hole(s): Submit the outermost layer of clothing containing bullet hole(s). If the victim was wearing a sweatshirt over a tee shirt, we only need to examine the sweatshirt. Also, please only submit clothing articles that contain bullet holes or are associated with bullet holes in the body. If the bullet holes are in the victim's chest, do not submit pants and socks. Allow the clothing to air dry completely, and then lay the clothing out on a piece of butcher type paper and roll the clothing up in the paper. Seal the rolled clothing in a paper bag for submission... do NOT use plastic bags for clothing items.

When requesting distance determination, it is also helpful for us to have information about where entrance and exit holes are located. This can be via a copy of the medical examiner's report, or notes included with the submission form.

- **Bullet passage determinations:** Examine evidence items through visual examination and chemical processing for gunshot residues to determine if damage to the item is consistent with the passage of a fired bullet.
- **Ejection Pattern Determination:** Determine the average distance and direction a submitted firearm will eject fired cartridge cases using a specific type of ammunition. Any loaded ammunition recovered with a suspect firearm should be submitted to the laboratory and may be used for test firing purposes.
- **Serial Number Restoration:** Restore serial numbers or Vehicle Identification Numbers (VIN) that have been obliterated.
- **Bullet Trajectory/Shooting Scene Reconstruction:** Determine possible bullet paths; recover fired bullets and other firearm related evidence found in the vehicle or other objects.

## CONT: PROPER TERMINOLOGY

- **Toolmark Examination/Comparison:** Determine if the submitted tool (pry bar, bolt cutters, pliers, screwdriver, hatchet, tire iron, etc.) made the toolmark(s) on the piece of evidence in question (door, latch, lock, fence, safe, cable, etc.).
- **Physical/Fracture Match:** Determine if two or more items were once a single piece, such as duct tape, fractured metal, fractured glass, fractured plastic (vehicle head lights, side-view mirrors), etc.
- **Footwear Examination/Comparison:** Determine if the submitted footwear made the questioned footwear impression(s).  
\*If only questioned footwear impressions are submitted, possible shoe make and model can be determined.
- **Tire Track Examination/Comparison:** Determine if the submitted tire(s) made the questioned tire impression(s). The entire vehicle (with the tires still on) must be submitted to the laboratory in order to make known test standards of the suspected tires. \*If only questioned tire impressions are submitted, possible tire make and model may be determined.

Please feel free to contact the Firearm/Toolmark Section if you are unsure if an examination you would like falls under these categories. This is just a general list of examinations, and sometimes speaking with an analyst in the section will be the best way to determine if we are capable of doing the type of examination you are interested in.

The Firearm/Toolmark Section is here to do everything we can to give you answers you need about the evidence you are submitting. Using the proper terms for evidence items and being specific with the requests you are making are just two of the ways you can help us so that we can better help you. Any time you have questions, more information can be found in the Laboratory Field Manual (see the links on the front page of the newsletter). You can also call the Section (304-746-2167) during regular working hours (8:30 a.m. to 4:30 p.m.) or email us ([firearms@wvsp.gov](mailto:firearms@wvsp.gov)) at any time.

# HISTORIC TEST FIRE PROJECT UPDATE

**Philip K. Cochran**  
Firearm/Toolmark Section Supervisor

If you haven't seen it already, then you should soon start noticing an additional attachment being returned to your agency along with your case reports from the Firearm/Toolmark Section of the laboratory. This letter is to provide your agencies with an update to the historic test fire project begun by the laboratory in 2013.

In 2013, the Laboratory decided that we were no longer going to maintain test fires from casework as part of our case files. Instead, we began treating them as evidence and returning them to our submitting agencies when we returned their completed cases. We sent out letters at that time informing our submitting agencies that at some point we would also be returning the historic test fires that had been maintained by the Firearm/Toolmark Section for many years. However, in sorting through these historic test fires, we also found that in many cases the laboratory was still in possession of what appears to be actual case evidence.

The time has now come to start returning these historic test and evidence items to the agencies who originally submitted the cases to the laboratory. While we have not completed the sorting process, we are beginning to run out of space for the project and need to start returning some of these items that have been sorted. This will open up the space needed to continue sorting and packaging these items for return.

Please, when you are at the laboratory to submit or pick up cases, stop by the Firearm/Toolmark Section to see if we have historic items for your agency to be picked up. Also, be looking for the "Test Fire Letter" being attached to your case reports to learn more details about the project and the process for picking these items up at the laboratory.

## WHY AMMUNITION IS SO IMPORTANT TO US

**Blake N. Reta**  
Firearm/Toolmark Section Technical Leader

Today's market is flooded with various types of ammunition which vary in designs, weights, and material. These differences in the ammunitions overall design correlate to the function they serve. The ammunition may be for home protection, hunting, training, etc. These differences in the design of the ammunition have an effect on the testing performed here at the forensic laboratory. **(Continued on page 11)**

## CONT: IMPORTANCE OF AMMUNITION

A single unit of ammunition consists of the cartridge case, the primer, the propellant, and the projectile(s). Having similar or the same type ammunition for examination in the field of Firearm Identification can be critical to the success of the testing. While the forensic laboratory is equipped with a number of different types of ammunition in its ammunition supply, it still does not encompass all of the many types that may be out there and encountered in casework submitted to the laboratory.

It is known in our field of Firearms Identification that the microscopic marks being examined by the forensic analysts at the laboratory can vary from one test shot to the next. It is understood that there is always the potential and likelihood for some minor differences to be seen. The best way to minimize these potential differences is to use the same type of ammunition. This includes having the same material for the cartridge case and primer, having the same bullet weight and design, and also having a similar propellant. The most common material types in ammunition components include brass, nickel, aluminum, copper, or a combination thereof. Using these same material types and brands of ammunition will minimize differences that can be seen microscopically from one shot to the next when shooting the same firearm.

This article will visually show the importance of having similar or the same ammunition for comparison purposes. When looking at the pictures included, the most noticeable differences can be seen when looking at the breechface markings (on the primer and the cartridge head), and firing pin impressions (shape and depth). It should be understood that these are rare occurrences and not regularly encountered in casework; however, due to the potential results of using different ammo it is important to educate everyone about the importance of test firing similar or the same ammunition type.

**(Continued on page 12)**



## CONT: IMPORTANCE OF AMMUNITION

The following images show different types of ammunition fired in the same firearm. Some of the differences may be minor or even unnoticeable to the naked or untrained eye. However, some of the differences are drastic. There is potential even for a trained examiner, if not thorough, to come to the conclusion of a false elimination when using different ammo types. This is one of the reasons that similar or the same type ammunition is used in comparisons.



Firing the same type of ammunition used is more likely to reproduce microscopic characteristics in the same manner than if using different type ammunition. The differences observed may only occur in 1 of 3 test fires we produce but it can still occur. We generate 3 test fires at minimum so that we can verify the reproducibility of microscopic characteristics we examine. The best likelihood in verifying the reproducibility of these marks comes with using the same ammunition. However, as the following images show (seen on next page), even firing the same ammunition can result in differences in how the fired cartridge cases are marked.

## CONT: IMPORTANCE OF AMMUNITION

As you can see, examinations are not always simple. When these rarer occasions arise, the analyst must go further and perform additional test firing to confirm microscopic characteristics are reproducing, even among the same ammunition. Due to the reasons elaborated in this article we do request that when law enforcement comes across ammunition in a case, that the ammunition is collected so that it may be submitted to the laboratory for comparison purposes, if needed. If you are unsure, then we encourage you to contact the laboratory and verify if the ammunition should be submitted or if we already have the same ammunition as part of our laboratory supply.



# PHOTOGRAPHY OF FOOTWEAR EVIDENCE

**Blake N. Reta**  
Firearm/Toolmark Section Technical Leader

*This article will relate to photography of footwear impression evidence and should not be directly associated to procedures used for other items of evidence photographed at the crime scene such as fingerprint evidence, biological evidence, etc.*

Photography at the crime scene is one of the most valuable collection techniques available to officers, crime scene technicians, or anyone authorized for the collection of evidence. Photography, when conducted properly, has the ability to show items of evidence in great detail, the item's relationship to its surroundings, and the item's relationship to other items of evidence. The photography of footwear impressions is critical to assist our forensic analysts in the evaluation of evidence. In many cases, photographs taken will be the critical factor in determining if a strong association or disassociation can be made to suspect shoes. This can, in turn, be important to determining guilt or innocence of a suspect.

Photography at the crime scene falls into two categories for footwear evidence: general crime scene photography and examination quality photographs.

**General Crime Scene Photography** – photographs taken from three distances (long range, medium range, close up). These types of photographs provide information as to the location of the item in relationship to its surroundings (house, garage, vehicles, additional footwear impressions, etc.).

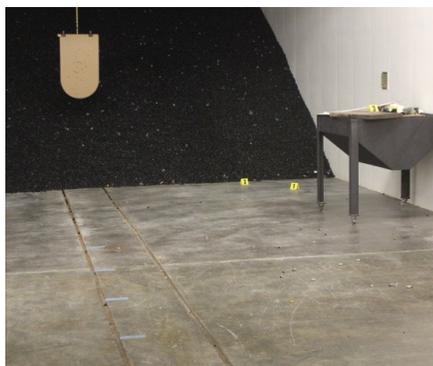
The camera used for general crime scene photographs needs to be capable of having a zoom option that will provide the ability to take long (distant), medium, and close range photographs. Most current single-lens reflex (SLR) cameras on the market today have a lens that provides these capabilities. Unlike examination quality photographs, the general crime scene photographs do not need to be taken at the highest possible image size (quality). The general crime scene photographs you take may be scaled back slightly to help retain smaller file sizes for your convenience.

General crime scene photographs should document the recovery, location, and orientation of the footwear impressions. Photography does not replace handwritten logs or notes documenting these important details. Notes regarding footwear impressions should include the description of the impression, their direction, the weather, and substrate conditions. All footwear impressions being photographed should have a placard or identifier associated with them, which can be referred to later for documentation and note taking.

Example: Item 1 is one muddy footwear impression located in a flower bed oriented with the toe pointing towards the 2nd window from the right corner of the front of the house. Weather conditions are sunny with no previous rain or snow apparent.

**(Continued on page 15)**

## CONT: PHOTOGRAPH OF FOOTWEAR EVIDENCE



**Examination Quality Photographs** – photographs taken to record the maximum amount of detail in the impression. The detail recorded in these photographs is necessary for forensic analysts to perform comparisons with suspect shoes that are submitted. To obtain this detail, the photographs must be taken in a specific manner with your camera set to the highest image size (quality). Most current SLR cameras on the market today are capable of taking examination quality photographs.

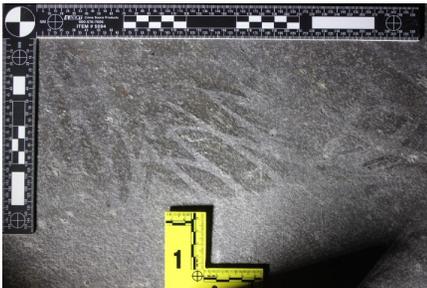
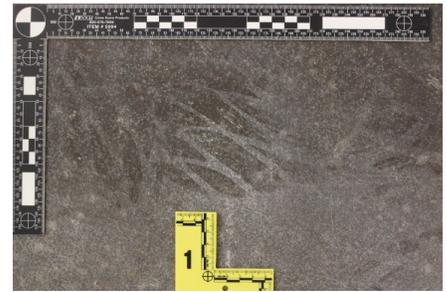
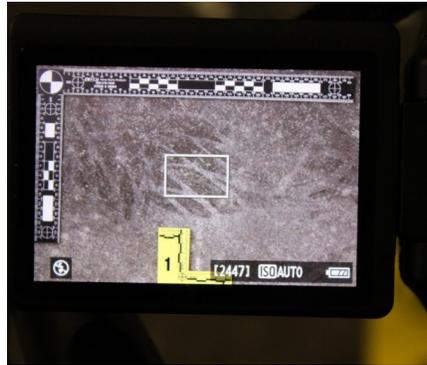
The list of equipment needed for examination quality photographs is as follows: a camera with a manual focus option and a zoom lens, flash (or other source of oblique lighting), scale(s), a tripod with a reversible / interchangeable center post, and a dark cloth (black) to block out ambient light.

Procedure for examination quality photographs:

1. Locate and identify the impression (with a placard or other identifier), place a proper scale next to and on the same plane as the impression. If possible include a small label in the photograph to identify the impression.
2. Place the camera on a tripod and have the lens directly over and parallel to the impression. Adjust the height of the camera or the zoom of the lens to fill the frame with as much of the impression and scale as possible.
3. Verify the f-stop (3D impressions F/16 or higher, 2D F/16 or lower), ISO settings (400 or less), and image size (largest non-raw file size) are set correctly.
4. Block out any ambient light using a dark cloth or screen. If need be, another person's shadow can also be used.
5. Focus the camera on the bottom of the impression, the focus should not be on the ruler. (If desired, take photographs with existing light prior to blocking it out, but after focusing on the bottom of the impression.)
6. Apply oblique lighting - the light source (crime light or flashlight) should be held anywhere from 3 to 5 feet away and at multiple low level angles to find the best contrast.

## CONT: PHOTOGRAPH OF FOOTWEAR EVIDENCE

7. Use a remote to capture the photograph if available. This will prevent the possibility of shaking the camera when pressing the capture button.
8. Take multiple photographs and then move the light to another position and repeat. Photographs should be taken with lighting from at least three different positions around the impression (examples below).



**Tri-Pods** – The best tri-pod is one that will allow the camera to attach to an arm that can be flipped/reversed in a vertical manner and held below the center of the tri-pod legs but directly above the impression. The tri-pod should also have adjustable legs to allow for any differences in leg height you need when taking images on an incline or hill.

**Scales** – Scales are what the forensic analysts use to make natural size photographs for comparison purposes. A scale should be used when taking any examination quality photographs to allow for accurate sizing at the forensic laboratory. Without a scale, the analyst will not be able to evaluate the size of the questioned footwear impression. It is vital to have an appropriate scale in every photograph due to not knowing which photograph may have the most value to the forensic analyst. Scales should always be placed on the same plane as the impression when possible. This may require digging out of snow or dirt next to the impression, be careful not to disturb the impression when doing so. **(Continued on page 17)**

## CONT: PHOTOGRAPH OF FOOTWEAR EVIDENCE

An appropriate scale is flat, thin, rigid, and contrasting (black/yellow, white/black, etc.). The scale should be a minimum of 6 inches in length and measure in units as small as 1/32 of an inch. The scale needs to have features to help provide you confidence that you are taking a photograph with the proper perspective. These features can include right angles, circles, or rectangles to name a few. The scale should also be dull and non-reflective to make them easily readable under any lighting condition.

**Lighting** – Natural or ambient light is the natural or existing light surrounding the impression. This comes from sources such as room lighting, the sun, etc. It is a good idea to photograph impressions initially using this already available light source.

Reflected lighting (such as camera mounted flashes) is something that should never be used when taking examination quality photographs. When taking a photograph with the flash aimed directly at the impression, the reflection from the light back at the lens will result in overexposure. This can make the examination very difficult.

Oblique lighting is the application of a light source at various angles and from various directions. Using oblique light will provide a great amount of contrast and detail in the photographs being taken. If inside a dwelling, lights can be turned off to maximize oblique lighting techniques.

**Camera Focus** – The camera should always be used with manual focus controls when taking examination quality photographs. The manual focus controls will provide you with better control over the focus plane and position of focus. Out of focus or poor focus photos are common mistakes and should be avoided at all costs. The bottom of the impression, and not the scale, should always be the primary focus for the photograph being taken. It is recommended to never hold a camera by hand to take examination quality photographs.

**Point and Shoot Cameras** – Point and shoot cameras are not recommended when taking examination quality photographs. However, at the laboratory we understand a standard point and shoot camera may be all that is available to law enforcement who are documenting the crime scene. If your point and shoot camera can be mounted to a tri-pod, then the steps laid out earlier in this article should be followed as closely as possible. However, if your point and shoot camera cannot be mounted to a tri-pod, the above steps should still be followed as closely as possible, and extra care should be taken to obtain good focus and keep the lens of the camera parallel to the impression. **(Continued on page 18)**

## CONT: PHOTOGRAPH OF FOOTWEAR EVIDENCE

The approaches and examples discussed in this article are a general overview and some specific scenarios may require you to think outside the box and somehow alter general steps. This could mean altering what steps you do in a different order or if you need to modify a step completely to fit the scenario before you. However, photographs should always be taken in focus, with a scale, an identifier, and parallel to the plane of the impression. Photography should never be skipped or looked at as being unimportant. This is especially important when other enhancement or recovery techniques are being used. If those techniques are not successful, then having exam quality photographs to fall back on can still provide you with the chance for a successful examination at the laboratory. Successful photography will help yield more successful results in the examination of the evidence.

## A “Pat on the Back” for Parkersburg Police Department

**Calissa N. Carper**  
**Firearm/Toolmark Section Training Officer**

As mentioned in the previous article, examination quality photographs for impression evidence can make or break a case. The laboratory receives excellent exam quality photographs for analysis in some cases and, unfortunately, there are other cases in which the lab receives impression evidence photographs that are out of focus or do not have a scale. With that being said, the Firearm and Toolmark Section would like to recognize a law enforcement agency and the involved officer for a job well done in a footwear case that was worked this year at that laboratory. The Parkersburg Police Department submitted a footwear case in which exam quality photographs using proper techniques was submitted to the lab that resulted in identifications being made to submitted shoes by the forensic analyst. The submitted CD contained overall close images of the questioned footwear impressions

and then examination quality images of specific areas of the overlapping questioned impressions. The officer used proper techniques including using oblique lighting – low level, from the side – using a flashlight, including a scale, having the camera lens parallel to the impression (with the appearance of being handheld and not using a tripod), using a high resolution camera setting for maximum detail, and making sure the photograph was in focus.

As forensic analysts we realize that there are limited resources available to some agencies, and exam quality photographs may not be obtained in the exact manner as we may perform them in a laboratory setting. But being able to maximize each step with the resources you do have will allow for better analysis results in the laboratory. Therefore, we would like to say kudos to Parkersburg Police Department and all of our other law enforcement agencies that utilize their resources to the best of their abilities for examination quality submissions.

# CONT: A "PAT ON THE BACK"



# EMPLOYEE SPOTLIGHT: Ryan Christopher



**Hometown:** Holyoke, MA

**Education:** B.S. Forensic Science (Chemistry Concentration) from the University of New Haven in Connecticut

**Work Experience:** WVSP Forensic Laboratory, Firearm/Toolmark Section since 2012

**Role at WVSP Forensic Laboratory:** I currently work as a forensic analyst in the Firearm/Toolmark Section working casework. I analyze firearm and toolmark related evidence that is submitted to the laboratory, issue reports, and then testify in court if necessary.

**Favorite Part of the Job:** My favorite aspect of the job is the challenge that casework presents. Every case is different, and every case provides a unique “puzzle” that needs to be solved. I look forward to each and every case, and I take pride in knowing that, when I finish a case, I can provide answers to those that are seeking them.

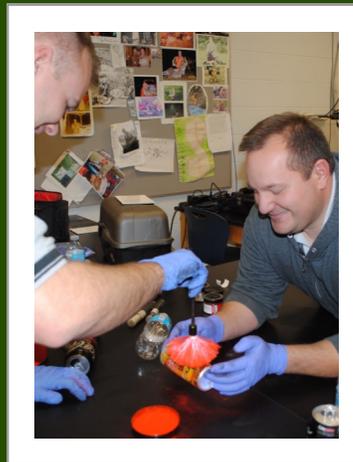
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# The Crime Lab Road Show

The West Virginia State Police Forensic Laboratory is providing training opportunities for law enforcement, attorneys, and judges! To help us do this we need volunteer agencies to host a one day training opportunity. If you are an interested party please contact Blake N. Reta. (contact information below)

- One day training opportunity for any law enforcement agencies, attorneys, and judges.
- Maximum of 30 attendees.
- Training will feature 1 to 2 sections of the forensic laboratory for lecture and hands on experience with evidence collection.
- The sections that will be providing training will be agreed upon by the forensic laboratory and the volunteer host.

**Note: Law enforcement officers are eligible to obtain in-service hours for attending this training.**



**Note: The training provided will be free to the attendees!**

**What we are asking of the host agency:**

- Provide an area (local school, department complex, etc) for training to occur
- Provide material needed for the training

**West Virginia State Police Forensic Laboratory**

Blake N. Reta  
 Email: blake.n.reta@wvsp.gov  
 Phone: 304-746-2171

**Sections of the West Virginia State Police Forensic Laboratory that can provide lecture / training include:**

- Biochemistry
- Firearm/Toolmark
- Toxicology
- Drug Identification
- Footwear/Tire Track
- Trace Evidence
- Evidence Processing
- Latent Prints

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## FEEDBACK

We always welcome feedback for the upcoming newsletter!

Have comments or suggestion?

Want to know how we do something?

Need to know how we recommend to collect a specific type of evidence?

Feel free to contact the editors and suggest topics and provide us with any comments or feedback.

Your Editors,

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## Laboratory Mission and Goal

### Mission:

It is the mission of the West Virginia State Police Forensic Laboratory to provide accurate and impartial scientific support services to all criminal justice agencies operating in the State of West Virginia.

### Goal:

The goal of the West Virginia State Police Forensic Laboratory is to generate accurate, impartial, and timely scientific examinations and opinions for the criminal justice system of the State in the interest of public safety. Establish and maintain a database of convicted felons, sex offenders, case work profiles, and missing persons.

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