Circuit Court for Anne Arundel County
Case No. C-02-CR-16-001584

UNREPORTED

IN THE COURT OF SPECIAL APPEALS

OF MARYLAND

No. 2135

September Term, 2018

JAYMARRI RODNEY BOYKIN

v.

STATE OF MARYLAND

Graeff,
Beachley,
Eyler, James R.
(Senior Judge, Specially Assigned),

JJ.

Opinion by Graeff, J.

Filed: April 30, 2020

Appellant, Jaymarri Rodney Boykin, was convicted by a jury in the Circuit Court for Anne Arundel County of first-degree murder, use of a firearm in the commission of a crime of violence, illegal possession of a regulated firearm, firearm possession by a minor, and wearing, carrying or transporting a handgun on the person. The court sentenced appellant to life for the conviction of first-degree murder, twenty years consecutive for the conviction of use of a firearm in the commission of a crime of violence, the first five years without possibility of parole, and five years concurrent for the conviction of illegal possession of a regulated firearm. The remaining convictions were merged for sentencing.

On appeal, appellant presents the following questions for this Court's review:

1. Did the circuit court err in denying appellant's motion to exclude evidence pertaining to the gunshot residue analysis done on his thigh?

2. Was the evidence sufficient to sustain appellant's convictions?

For the reasons set forth below, we shall affirm the judgments of the circuit court.

FACTUAL AND PROCEDURAL BACKGROUND

On Sunday, June 26, 2016, at approximately 4:15 p.m., a masked shooter fatally shot Shaun Crowdy thirteen times as he sat in the driver's seat of a vehicle in the 1400 block of Tyler Avenue in Annapolis, Maryland. The State's main evidence at trial included witness testimony that appellant was in the area at the time of the shooting wearing clothing similar to that worn by Mr. Crowdy's assailant, appellant's DNA found on a black ski mask recovered near the scene that matched appellant's DNA profile, and gunshot residue found

on appellant's inner right thigh.[1] The police were unable to find the weapon and no witness could specifically identify appellant as the masked shooter.

At trial, the State called Robert Wells, who was visiting his daughter and grandchildren in the area on that Sunday. Mr. Wells testified that, when he stepped outside his daughter's house for a cigarette, he heard gunshots. Mr. Wells looked up and saw a man shooting a handgun towards a dark-colored car parked near the dumpster. The shooter "was taking care of his business and leaving, you know. . . . He was just releasing his gun fire." The shooter was between six feet one inch and six feet five inches tall, he weighed 180 pounds, and he was wearing a dark ski mask pulled down over his face, a white shirt, and blue jeans. After ceasing fire, the shooter fled into the woods.

Cecilia Parker also lived nearby. She was familiar with appellant and saw him, wearing a white t-shirt and blue jean shorts, in the parking lot near her house earlier that day. Later that afternoon, while she was upstairs inside her house, Ms. Parker heard a loud noise that she thought was firecrackers, followed by screaming. After Ms. Parker's daughter ran into the house, Ms. Parker went outside and saw two people running around the corner. One was wearing a black ski mask, long blue jean shorts, and a white shirt.

[1] "Gunshot residue consists of particles of three elements: antimony, barium, and lead." *Smith v. State*, 423 Md. 573, 583 (2011). "Gunshot residue (GSR) particles form as a result of rapid cooling of the discharge gases and solid matter, originating from partially reacted components of the primer and propellant, as well as from the metallic components of the ammunition and firearm." *Guide for Primer Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry 11-29-11*, p. 6, https://www.swggsr.org/publications, available at https://perma.cc/U296-TBEH (last accessed April 28, 2020).

Ms. Parker reiterated that appellant was wearing similar attire when she saw him earlier that same day. She also testified that the person running away appeared to be the same height as appellant. On cross-examination, Ms. Parker testified that she did not see appellant with a gun that day.[2]

Keetah Matthews, who lived on Tyler Avenue, testified that she saw appellant in the neighborhood earlier that Sunday wearing a white t-shirt and blue jeans.[3] That afternoon, appellant came by Matthews' house and asked to use her bathroom. He washed his hands and used a paper towel. Afterwards, Ms. Matthews gave appellant a ride to his mother's house.

Police surveillance cameras showed that Ms. Matthews drove out of the neighborhood at 4:18:43 p.m., approximately five minutes after the first 911 call was received. Other cameras depicted appellant getting out of Ms. Matthews' vehicle near his mother's house, while wearing a white shirt. On cross-examination, Ms. Matthews testified she did not hear gunshots and did not see appellant with a gun that day.

Appellant was arrested at approximately 11:20 p.m. that day. He was transported to the Annapolis City Police Station, where Officer Dan Dekowsy and Detective Charles Bealefield collected appellant's clothing and observed what appeared to be dried blood on

[2] On cross-examination, Parker admitted that, in January, she signed a statement that she did not see anything on Sunday, June 26, 2016. On redirect, Ms. Parker explained that she did that because she did not want to have to testify.

[3] Ms. Mathews testified that she was a mother-figure to appellant. She was not appellant's mother, but she shared children with appellant's father and appellant called her "Mom."

appellant's right leg in an area covered by a Band-Aid. After appellant removed the bandage, Officer Dekowsky saw an open wound on appellant's leg. Detective Bealefield testified that this area is referred to as "the dip," a location where people often store firearms. Officer Dekowsky then collected a gunshot residue ("GSR") swab from appellant's right inner thigh, as well as from both his hands.

These swabs were later sent to the RJ Lee Group for examination. As discussed in more detail *infra*, Stephanie Hrico, accepted as an expert in gunshot residue, testified that gunshot residue was present on appellant's right leg.

Although a gun was never recovered, thirteen .40 caliber fired cartridge cases, as well as a black ski mask, were found in the neighborhood following the shooting. Ashley Hayes, an expert in forensic DNA analysis, testified that a mixture of DNA from at least four individuals was found, both inside and outside the mask, and that the major component of both matched appellant's known DNA profile. Ms. Hayes concluded that the chances of finding another unrelated individual who has the same profile as the major component found on the inside and the outside of this mask is approximately 1 in 190 nonillion.[4]

We will include additional details, as warranted, in the following discussion.

[4] Hayes testified that "[a] nonillion is the number 190 with 30 zeros after it." She also testified that the approximate population of Earth in 2017 was 7.6 billion.

DISCUSSION

I.

Appellant's first issue concerns the gunshot residue evidence found on his person after he was brought to the police station. He contends that the court erred in denying his motion to exclude this evidence for three reasons: (1) the evidence, and the supporting expert testimony, did not satisfy the requirements of the *Frye-Reed* test; (2) there was an insufficient factual basis for the expert's testimony pursuant to Maryland Rule 5-702; and, (3) the evidence was unfairly prejudicial and that prejudice substantially outweighed its probative value.

The State contends that only the *Frye-Reed* argument is preserved for appellate review. In any event, it asserts that appellant's arguments fail on the merits.

A.

Proceedings Below

1.

Suppression Hearing

Prior to trial, appellant filed a motion to suppress the results of the GSR analysis performed in this case. He stated that, after he was arrested on outstanding bench warrants in unrelated cases, both his hands and an area near a wound on his upper right leg were tested for GSR. Particles characteristic of GSR were found on his left hand and right leg. Appellant argued that, although GSR evidence generally may be admissible under *Frye-*

Reed,[5] the results should be excluded here because there was no evidence linking the GSR found on his leg to the shooting in this case, and any probative value was substantially outweighed by the danger of unfair prejudice.

Appellant also argued that, pursuant to Maryland Rule 5-702, there was an inadequate factual basis for the GSR expert's testimony. He asserted that, in the absence of evidence that he "tucked a gun, specifically the gun used in this homicide, into his waist-band," it was "entirely conjecture that [his leg] wound was caused by the hot barrel of a firearm."

The State filed a response asserting that the GSR tended to show that appellant was in the proximity of a handgun, which was the type of weapon used to murder the victim in this case. It argued that "the reason for the burn mark and the presence of GSR on" the right hand and inner thigh was because "the Defendant shot a firearm and then shoved it down his pant leg as he was running from the scene." The State noted that a witness would testify that she saw appellant wash his hands after the shooting. It argued that the factual basis for the expert's opinion was adequate, and the evidence was direct evidence of appellant's involvement in the murder.

Appellant then filed a third motion to exclude the GSR results and expert's opinion, arguing: (1) the evidence was unreliable based on the "significant possibility of collection contamination," especially with respect to appellant's left hand; (2) the testimony was

[5] Appellant attached to his motion a letter from his forensic consultant, John Kilty, recognizing that the generally accepted method of identifying GSR particles is by the use of adhesive lifts and "electron microscopy with energy-dispersive X-ray analysis (SEM/EDS)."

unreliable because the testing laboratory "failed to follow scientific guidelines for methods, principles and analysis"; and (3) the State could not demonstrate, under *Frye-Reed*, that the GSR test results were reliable with respect to appellant's left hand. With respect to the *Frye-Reed* argument, appellant stated:

> The GSR report found zero GSR particles on Mr. Boykin's right and left hand. With regard to his left hand, five (5) two-component particles were found. There is no scientific consensus that such a low number of GSR particles can meet the threshold for reliability. In fact, as mentioned above, the FBI has established a minimum of three GSR particles before concluding that there was exposure to GSR.
>
> To the extent that the State intends to rely on non-GSR particle material with one or two "component" particles, it likewise cannot demonstrate reliability. In the first place, the GSR Report itself does not classify such particle matters as "GSR." Moreover, there is no scientific consensus that such "component" particles reliability demonstrate GSR. It is entirely possible that the component particles are derived from another source. . . .

Finally, appellant argued that the expert testimony concerning the GSR results should be excluded because the probative value was outweighed by the danger of unfair prejudice. Appellant's specific complaint was that the expert would testify "that miniscule amounts of GSR were identified in the State's testing, without being able to identify the source of the GSR."

At the January 5, 2018, hearing, defense counsel argued there were three motions at issue: (1) to exclude any evidence that "two-component particles" consistent with GSR were found on appellant's left hand because the evidence was irrelevant and unfairly prejudicial; (2) to exclude GSR evidence seized from appellant's right leg on the grounds that the evidence was unfairly prejudicial, it was not reliable based on the time taken to

recover it, and it did not meet the requirements of *Frye-Reed*; and (3) to exclude expert evidence that the burn mark on appellant's leg was consistent with a hot gun barrel being put down appellant's pants, based on a lack of notice of such expert testimony. The State argued that appellant's arguments went to the weight of the evidence, not its admissibility.

The State then called Stephanie Hrico, who was accepted as an expert in the field of forensic science involving gunshot residue analysis. Ms. Hrico testified that, on or around July 5, 2016, she analyzed GSR samples in this case. She explained the process as follows:

> Once the samples are received, they are processed. Basically, I open the packaging, I document the contents of the package, and how it was received. I photograph all the evidence. Following that, the samples are loaded into the scanning electron microscope, which is the instrument used to analyze gunshot residue. The instrument performs an automated analysis, I then go back and confirm what the instrument found. That information is placed into a report, and the report and the evidence is then sent back to our client.

Ms. Hrico analyzed three GSR "stubs" in this case, labeled: "Boykin, right hand; Boykin, left hand; and Boykin, right leg." She explained:

> [T]hese samples are loaded into the microscope, the microscope will aim a beam of electrons at the sample, and the interaction of those electrons with the sample electrons can tell me two things. The first thing it allows me to do is view these particles magnified thousands of times. So that's how I'm able to look for the correct shape, or morphology associated with gunshot residue.
>
> The second thing that this instrument allows me to do is see the elemental composition of the particle, so that's how I'm able to look for the elements of lead, barium, and antimony, which are associated with gunshot residue.

Asked to explain "gunshot residue," Ms. Hrico continued:

> So in the broadest sense of the term, gunshot residue was all particulate expelled from a firearm during discharge. When I refer to gunshot residue,

> I'm specifically talking about the primer residue. So for me to say that a particle is characteristic of gunshot residue, or highly specific to the discharge of a firearm, I have to see two separate things about that particle. The first thing I look for is the correct elemental composition. So I'm looking for the elements lead, barium, and antimony. The second thing I look for is the correct shape or morphology. The particle itself has to have rounded edges, as if it's heat-treated, since the discharge of a firearm is a very high heat reaction.
>
> [THE STATE:] Is it this scanning electron microscope that allows you to make that three-dimensional determination of the morphology?
>
> A. Yes. These microscopes allows [sic] us to see the particle magnified, as well as view the elemental composition.

Ms. Hrico further explained that, when a particle is "characteristic of gunshot residue," it contains all three elements: lead, barium, and antimony. Items other than gunshot residue also could include these elements, but those items, such as brake pads, often include "other elemental tags or markers," which distinguish them from gunshot residue. She testified that she always looks for other elemental tags and is not limited to lead, barium, and antimony.

Ms. Hrico then testified with respect to the samples she received. With respect to the sample obtained from appellant's right hand, she found "zero particles characteristic of gunshot residue," and "zero two-component particles." With respect to the left hand, she found "zero particles characteristic of gunshot residue," and she "confirmed five two-component particles." The sample obtained from appellant's right leg contained "at least ten particles characteristic of gunshot residue, and at least 47 two-component particles."

She testified that two-component particles that contain "two of those three elements, so like a particle made of lead and antimony, or lead and barium, or barium and antimony,"

are consistent with gunshot residue. She explained: "Two-component particles can and will be produced when the firearm is discharged, but they do have other sources. We view those particles as consistent with gunshot residue."

Ms. Hrico had testified as an expert more than 50 times in Maryland and elsewhere, and her opinion that two-component particles are consistent with gunshot residue had been accepted in these courts. Her laboratory, similar to others in the industry, did not have "acceptance criteria that limits collection time for analysis." She acknowledged, however, that, in a situation where a sample is collected several hours after an incident, "[t]he more time that passes, the more opportunity for particle loss," as well as the possibility of "contamination of other particles." The location where a swab is obtained also may affect the amount of GSR present. Hand washing and clothing could potentially affect collection. Ms. Hrico explained: "[T]hese particles will remain until they are removed by either wiping off, or falling off, so if you have an area that's protected, that was preventing the particles from falling off, they could remain on that surface longer." In her experience, Ms. Hrico had examined samples obtained from individuals' hands, as well as their face, nose, ears, and clothing. Ms. Hrico explained that, when she finds particles considered characteristic of gunshot residue, the three-component particles, if they "do not contain anything that would let me know it came from another source, I typically refer to those particles as highly specific to the discharge of a firearm." In response to the State's question whether she would "ever opine where that gunshot residue actually came from, and whether an individual had fired a firearm," Ms. Hrico stated:

> No. When we find gunshot residue, I am never able to say how that gunshot residue got on a surface. So when we find gunshot residue on a subject, we can say that that person either discharged the firearm, were -- were in vicinity of a firearm being discharged, or they came into contact with a surface that has gunshot residue on it.

She stated that "[t]hose three scenarios only apply to . . . three-component characteristic particles," not "two-component particles, [which] are considered consistent with gunshot residue."

Ms. Hrico testified that the five "two-component particles" on appellant's left hand contained lead and antimony, a combination that could be associated with things other than guns. The observed particles in that sample, however, included rounded edges, which was "consistent with the high heat reaction."

The "two-component particles" from appellant's right leg included 30 particles containing lead and antimony and 17 containing lead and barium. She explained:

> [W]hen we see two-component particles and one-component particles in combination with these three-component characteristic of gunshot residue particles, you have even more support, or proof, that what you're looking at is a population of gunshot residue.

Ms. Hrico testified that, in her opinion, "the population of particles seen on the right leg, it is from the discharge of a firearm."

On cross-examination, Ms. Hrico agreed that the Federal Bureau of Investigation ("FBI") no longer analyzes gunshot residue. She agreed that, if a test revealed a three-component particle in the same sample as a two-component particle, that would be considered "more significant." She explained that, "when a firearm is discharged it will

create three-, two-, and one-component particles that will land on the shooter, and the surrounding area." Ms. Hrico's lab did not confirm one-component particles on appellant.

Ms. Hrico agreed that she trained police officers and recommended that "samples be taken as soon as possible at the scene, if possible," and officers should wear clean gloves, and if possible, a lab coat. If sampling cannot occur at the scene, she recommended that a suspect's hands be bagged as soon as possible. She agreed that, "[a]s time passes, that allows more particles to either fall off the hands, so there's the potential to lose gunshot residue on the hands," and "there's also the potential for contamination of the hands as time passes."

Ms. Hrico was familiar with a study of special forces units from Belgium that concluded that the "level of contamination of GSR during the arrest of the suspect can be evaluated as high, depending on how the arrest was performed." And she recognized that contamination was possible in multiple types of police environments, including police cars, interrogation rooms, and handcuffs.

On redirect examination, Ms. Hrico testified she was not surprised that there were fewer particles on appellant's left hand than under his clothing on his right inner thigh. She stated: "I would expect most, if not all, particles to be removed from a subject's hands within four to five hours" with normal activity such as washing hands or wiping them off. She was not familiar with any studies concerning the transference of GSR particles through clothing to a person's skin. Ms. Hrico concluded her redirect examination by opining on the GSR on appellant's leg:

> [I]n my opinion, there's the population of particles, highly specific to the discharge of a firearm on the right leg, so, again, either the subject discharged the firearm, was in the vicinity of a firearm being discharged, or this area came into contact with a surface that has gunshot residue on it. The size of the population does not change those results, and, again, in this scenario, I only confirmed ten. The instrument itself, it's possible that the instrument could have found more. So we only con -- confirm up to ten particles, or we look it up to 20, so there could be a higher population, but since the size of the population does not change the results, we don't confirm every particle that is on the sample.

On recross-examination, Ms. Hrico agreed that some laboratories would not test for GSR after a specific time between the incident and the test. Some labs cut off at four to six hours after the shooting event, while others used eight hours or twelve hours as the outside limit. The Virginia Department of Forensic Sciences applied a four- to six-hour limit, and the FBI, at the time, used a five-hour cut off.

Detective Tyler Fedeli testified that he arrested appellant at approximately 11:30 p.m. on the day in question and transported him in his unmarked Ford Explorer. No one had ever fired a gun in that vehicle, and the last time Detective Fedeli fired his service weapon was approximately eight and a half months prior to this arrest. Detective Fedeli handed appellant over to Detective Bealefield in the holding area of the police station. It was Detective Fedeli's understanding that this area was regularly cleaned by a cleaning crew. According to the testimony at trial, neither Detective Fedeli's police car, nor the holding cell and immediate area nearby, were swabbed for GSR in connection with this case.

Detective Bealefield testified that he was in the police station when appellant was first brought in after being arrested, at approximately midnight on the day of the incident.

Appellant's hands were not bagged. Detective Bealefield did not know if appellant had been tested for GSR prior to his arrival, but at approximately 12:30 a.m., he witnessed another officer swab a wound on appellant's right inner thigh for GSR. This occurred after appellant disrobed, when his clothes were collected for evidentiary purposes.

Officer Dekowsky was the officer who collected appellant's clothing. Appellant disrobed and placed his clothing in brown paper bags. As appellant removed his pants, Officer Dekowsky observed a blood stain, and a bandage over a fresh wound. The wound was located on appellant's right inner thigh, toward the top of his leg, and underneath appellant's underwear. The bandage was collected as evidence.

Officer Dekowsky, who was wearing latex gloves, used the GSR kit to collect evidence. He changed gloves prior to collecting each sample to avoid cross-contamination. The last time he had fired a gun was during training six months earlier. Officer Dekowsky collected swabs from appellant's hands and the burn mark on his thigh.

On cross-examination, Officer Dekowsky agreed that the GSR swabs were collected from appellant's person shortly after midnight, or approximately eight hours after the 4:00 p.m. shooting. Officer Dekowsky believed that appellant was handcuffed and that his hands were bagged before he was swabbed, but he did not know when his hands would have been bagged.

The court heard argument on the appellant's motion to exclude the GSR test results. It ultimately excluded the GSR evidence with respect to appellant's left hand, stating:

> I am going to exclude the expert testimony with regard to the two particles consistent with gunshot residue. I do find that, number 1), her testimony is confusing with regard to that, as to what exactly it is, and what it means.

> More importantly, I find that the probative value, when all she can say is two particles consistent with gunshot residue, but could be consistent with a number of other sources, as well, is simply outweighed by the unfair . . . prejudicial nature of the evidence, so I'm going to exclude the particles on the left hand.

With respect to the GSR evidence on appellant's right inner thigh, the court asked if the issue was different because the GSR was found under a bandage and there were three components, as opposed to two. Counsel agreed, stating that his argument was "more under *Frye-Reed*." He stated that, "if we get into a balancing and relevance, I'm not going to weigh them, in all candor." With respect to *Frye*-Reed, counsel asserted that "the evidence is not generally accepted in the scientific community, given the cut off for all these other labs, and, so, for those reasons, the Court should exercise its gatekeeping function, and exclude the evidence from the right thigh."

The State argued that appellant's own expert said the method used for identifying gunshot residue particles was generally accepted. The court denied the motion with respect to the GSR recovered from the thigh, stating that defense counsel's problems with the timing of the testing went to the weight of the evidence, not its admissibility.

2.

Trial

At trial, during the direct examination of Officer Dekowsky, defense counsel asked to approach the bench for the purpose of preserving the record regarding GSR. Pertinent to the State's preservation argument, the following ensued:

> [DEFENSE COUNSEL]: And I just, I don't want to say I waived it.

> THE COURT: Okay, we'll note your objection for the record. I have denied, I have denied the motion, or granted the motion to suppress on part of it, denied it on part of it.
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> [DEFENSE COUNSEL]: And every time he says I collected it do I have to object again? Or --
>
> THE COURT: No, you don't. We'll give you a continuing objection because it was (1) the subject[] of our motions to suppress, which I did grant some and deny some, and it's been clearly stated on the record for purposes of the appeal that the defense objects to any mention of the GSR on the leg whatsoever subsequent to the motion to suppress particles that were found on the hand and we're all going to be careful not open any doors (inaudible at 4:43:08 p.m.) we go.

Officer Dekowsky then testified that he collected a gunshot residue ("GSR") swab from appellant's right inner thigh, as well as from both his hands. On cross-examination, Officer Dekowsky admitted that the GSR was collected approximately seven and a half hours after the shooting.

Ms. Hrico, who was accepted as an expert in the field of gunshot residue, testified regarding the process through which gunshot residue is formed.[6] She explained:

> So a cartridge is loaded into a firearm. When the trigger is pulled, the firing pin will strike the back of the primer cap. Inside that primer cap is where these elements of lead, barium, and antimony are. When the primer cap starts to burn, that will, in turn, ignite the gunpowder. As the gunpowder burns, it builds up a lot of pressure within the firearm and that's what will actually force the bullet out of the firearm.
>
> So while this is happening, these tiny particles are going to escape from the firearm through any opening. So they can come out the muzzle or they could come out the ejector port. And they are going to form what's called a plume or a cloud around the shooter and the surrounding area. So the

[6] Prior to Ms. Hrico's trial testimony, defense counsel objected to her findings based on the same objections made at the motion to suppress. The court noted the objections for the record but denied them.

> particles in that cloud, as they cool, are going to condense and land on the shooter and the surrounding area.

Ms. Hrico testified that "the cloud can typically be seen when the firearm is discharged. However, the individual particles themselves are very, very small, which is why we need a high-powdered microscope to view them individually."[7] Ms. Hrico explained the collection process as follows:

> So GSR is typically collected using what's called a scanning electron microscope stub. The stub is just a small plastic vial. Inside of the vial is a metal insert. The top of that insert is flat. It's about the size of a dime. On top of that, it's almost like a double-sided sticky tape.
>
> So to collect from, say, a subject's hands, you would just have to take that stub and press the sticky surface down onto the subject's hands. Typically, you would make a grid pattern to ensure you're covering the entire area.

Ms. Hrico stated that barium, lead, and antimony are produced from inside the primer cap, and the discovery of those three, in a rounded shape, leads to the conclusion that the sample is gunshot residue. Consistent with her testimony at the motions hearing, she then informed the jury of the difference between three-component and two-component particles, and the categorization of those types of particles, respectively, as "characteristic

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[7] She testified:

> So during my analysis, I would just load the samples into the microscope. The microscope will aim a beam of electrons at the sample and the reaction of those beam electrons with the electrons in the sample will show me two things. The first thing it can show me is what elements are actually in that particle or what that particle is made out of, and that's how I'm able to look for the elements of lead, barium, and antimony.
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> The second that that microscope is able to do is magnify that particle thousands of times. So that's how I'm able to look at the shape or the morphology of that particle.

of" and "consistent with" gunshot residue. She also explained how gunshot residue can be preserved by such items as clothing, or removed by washing one's hands or wiping them off, or other factors.

Ms. Hrico then turned to her analysis in this case. She examined samples from appellant's right hand, left hand, and right leg. Once the samples were loaded onto a "stage plate," a scanning electron microscope digitally analyzed all three samples, individually. Once the microscope marked "the location of any particles that contain lead, barium or antimony," Ms. Hrico then manually confirmed the composition of the particles.

Ms. Hrico testified that there were no particles characteristic of GSR on either of appellant's hands.[8] On his right leg, however, Ms. Hrico found "at least 10 particles characteristic of gunshot residue and at least 47 two-component particles." The 47 two-component particles were consistent with GSR, but Ms. Hrico agreed that they could have originated from another source. She ultimately concluded, however, that, "[l]ooking at this population of particles, in my opinion, there is a population of gunshot residue on the sample taken from the right leg."

On cross-examination, Ms. Hrico agreed, as she did at the motions hearing, that she usually recommended that officers take samples for GSR testing as soon as possible near the scene because of the risk of particle loss and contamination. She was aware of studies

[8] As indicated, the motions court excluded the State from admitting any evidence of two-component particles on appellant's hands that the expert concluded were "consistent with" gunshot residue.

that indicate that GSR can be contaminated by residual GSR that may be present in police patrol vehicles, police stations and on handcuffs.

Ms. Hrico also agreed that the FBI no longer tests for GSR, but she testified that they still "support gunshot residue testing as a science." For funding reasons, "they outsource gunshot residue testing."[9] She agreed that many labs have cutoff times for GSR collection, although she was not aware of any specific times or lab policies. She did concede that some labs would not test GSR that was collected eight hours after a shooting. She also testified that, "with normal movement of a subject, . . . most particles would be gone from a subject's hands, within four to five hours." Her lab, however, upon request, would analyze samples taken beyond that time.

B.

Preservation

We begin our analysis with the State's contention that only the *Frye-Reed* argument is preserved for this Court's review. "Generally, in order to 'preserve' an issue for appellate review, the complaining party must have raised the issue in the trial court or the issue was decided by the trial court." *Nalls v. State*, 437 Md. 674, 691 (2014). "In other words, if a party fails to raise a particular issue in the trial court, or fails to make a

[9] In a *Baltimore Sun* newspaper article, a spokesperson for the FBI was quoted as saying that they stopped analyzing GSR "because of a shift in priorities, not a lack of confidence in the science"; and the "agency decided its resources were better used in 'areas that directly relate to fighting terrorism.'" *See* Julie Bykowicz, *FBI lab scraps gunfire residue*, The Baltimore Sun (May 26, 2006), https://www.baltimoresun.com/news/bs-xpm-2006-05-26-0605260327-story.html, available at https://perma.cc/9R4H-B8ZD (last accessed April 28, 2020).

contemporaneous objection, the general rule is that he or she waives that issue on appeal." *Id*.; Maryland Rule 8-131(a) (The appellate court ordinarily will not decide an issue "unless it plainly appears by the record to have been raised in or decided by the trial court.") "The purpose of the preservation rule is to 'prevent[ ] unfairness and requir[e] that all issues be raised in and decided by the trial court, and these rules must be followed in all cases[.]'" *Peterson v. State*, 444 Md. 105, 126 (2015) (quoting *Grandison v. State*, 425 Md. 34, 69 (2012)).

Here, the court granted appellant's motion regarding GSR on the hand, and the only evidence at issue on appeal relates to GSR found on appellant's thigh. In this regard, we agree that the only issue preserved for this Court's review is the argument that the "evidence and expert testimony failed to satisfy the *Frye-Reed* standard for scientific evidence." Although counsel raised several arguments in his written motions, when the court focused specifically on the evidence found on appellant's thigh, counsel limited his argument to *Frye-Reed* and specifically stated that he was not going to weigh the probative value versus the unfair prejudice.[10]

Because appellant did not argue, with respect to the evidence recovered from the thigh, that Ms. Hrico's testimony was inadmissible under Md. Rule 5-702 or because the probative value was outweighed by unfair prejudice, these arguments are not preserved for

[10] As indicated, counsel stated: "[I]f we get into a balancing and relevance, I'm not going to weigh them, in all candor."

review.[11] Accordingly, we will not address them.

C.

Analysis

A trial court's ruling on the admissibility of evidence generally is reviewed for an abuse of discretion. *State v. Robertson*, 463 Md. 342, 351 (2019). Appellate review of a decision regarding admissibility under *Frye-Reed*, however, is *de novo*. *Savage v. State*, 455 Md. 138, 157 (2017).

In Maryland, the standard of review of scientific evidence is governed by what is known as the *Frye-Reed* doctrine, the standard set forth in *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923), and adopted by the Court of Appeals in *Reed v. State*, 283 Md. 374 (1978). Pursuant to this standard, "[t]estimony based on a technique which is found to have gained 'general acceptance in the scientific community' [m]ay [b]e admitted into evidence[.]" *Reed*, 283 Md. at 389. The Court held that, "[o]n occasion, the validity and reliability of a scientific technique may be so broadly and generally accepted in the scientific community that a trial court may take judicial notice of its reliability[,]" including the use of such things as "ballistics tests, fingerprint identification, blood tests, and the

[11] Maryland Rule 5-702 provides:

> Expert testimony may be admitted, in the form of an opinion or otherwise, if the court determines that the testimony will assist the trier of fact to understand the evidence or to determine a fact in issue. In making that determination, the court shall determine (1) whether the witness is qualified as an expert by knowledge, skill, experience, training, or education, (2) the appropriateness of the expert testimony on the particular subject, and (3) whether a sufficient factual basis exists to support the expert testimony.

like." *Id.* at 380. When the trial court is unable to take judicial notice of a scientific technique, however, "it is necessary that the reliability be demonstrated before testimony based on the technique can be introduced into evidence." *Id.*

The Court explained:

> [P]rior to the admission of expert testimony based on the application of new scientific techniques, it must be first established that the particular scientific method is itself reliable. Where the validity and reliability of a scientific technique is so broadly and generally accepted within the scientific community, as is the case of ballistic tests, blood tests, and the like, a trial court may take judicial notice of its reliability. Likewise, a court may take judicial notice that certain procedures, widely recognized as bogus or experimental, are unreliable. When the reliability of a particular technique is not subject to judicial notice, however, "it is necessary that the reliability be demonstrated before testimony based on the technique can be introduced into evidence. Although this demonstration will normally include testimony by witnesses, a court can and should also take notice of law journal articles, articles from reliable sources that appear in scientific journals, and other publications which bear on the degree of acceptance by recognized experts that a particular process has achieved." The Court concluded that the proper test for establishing the reliability of scientific opinion is whether the basis of the opinion is generally accepted as reliable within the expert's particular scientific field.

Wilson v. State, 370 Md. 191, 201 (2002) (citations omitted). *Accord Savage*, 455 Md. at 157–58 (quoting *Armstead v. State*, 342 Md. 38, 54 (1996)) (Scientific evidence may be admitted either by statute or if "the proponent can prove that the evidence meets the *Reed* standard of 'general acceptance' in the relevant scientific community. This can be accomplished through expert testimony, judicial notice, or a combination of the two.").

"In the mid-2000s, the Court of Appeals expanded the *Frye-Reed* general acceptance test to include techniques that are not novel and also to include scientific conclusions, as well as techniques." *Burks v. Allen*, 238 Md. App. 418, 453 (2018). Thus,

an expert must bridge the "analytical gap" between accepted science and the ultimate conclusion in a particular case. *Id.* at 453–54. *Accord Blackwell v. Wyeth*, 408 Md. 575, 608 (2009) ("Generally accepted methodology, therefore, must be coupled with generally accepted analysis in order to avoid the pitfalls of an 'analytical gap.'").

Here, appellant acknowledges that "GSR analysis is generally accepted in the scientific community."[12] Appellant argues, however, that "the methods used to perform the analysis in this particular case are not generally accepted in the scientific community." In this regard, he asserts:

> The undisputed evidence shows that GSR swabs taken more than four to six hours after a shooting are not generally accepted for analysis in the scientific community due to the risk of contamination, and that multiple studies have shown police environments to pose a high-risk of GSR contamination. As such, evidence of the GSR testing done on [a]ppellant eight hours after the shooting, and after [a]ppellant spent an hour inside a police station without bagged hands, should have been excluded.

The premise of appellant's argument in this regard, that the "undisputed evidence shows that GSR swabs taken more than four to six hours after a shooting are not generally accepted for analysis in the scientific community due to the risk of contamination," is not

[12] Indeed, this Court has noted that GSR evidence has been admitted, albeit without a *Frye-Reed* discussion, in numerous Maryland cases. *See, e.g.*, *Gregg v. State*, 409 Md. 698, 702–03 (2009); *Anderson v. State*, 227 Md. App. 329, 336 (2016); *State v. Latham*, 182 Md. App. 597, 605 (2008), *cert. denied*, 407 Md. 277 (2009); *Jones v. State*, 132 Md. App. 657, 679–80, *cert denied*, 360 Md. 487 (2000). *See also People v. Palmer*, 80 Cal. App. 3d 239 (Cal. Ct. App. 1978) (use of scanning electron microscope was a reliable and generally accepted method to detect GSR). And appellant's expert, John W. Kilty, in his May 5, 2017, letter stated that "[t]he analytical method used to examine the adhesive lifts in this case was scanning electron microscopy with energy-dispersive X-ray analysis (SEM/EDS). This method is generally accepted in the forensic science community as the method of choice for identifying GSR particles."

supported by the record. Although Ms. Hrico agreed that some laboratories would not test for GSR collected more than four to six hours after the shooting event, she testified that other laboratories used eight or 12 hours as an outside limit, and her laboratory, similar to others, did not limit collection times for analysis.[13] The evidence did not, contrary to appellant's claim, show a consensus that a GSR swab taken eight hours after a shooting posed too great a risk for contamination, particularly where, as here, the swab is taken from an area covered by a bandage and clothing.

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[13] Appellant's information about cutoff times appears to be based on a summary of a Federal Bureau of Investigation symposium on GSR testing. *See Summary of the FBI Laboratory's Gunshot Residue Symposium, May 31–June 3, 2005*, https://archives.fbi.gov/archives/about-us/lab/forensic-science-communications/fsc/july2006/research/2006_07_research01.htm, available at https://perma.cc/QC4A-HD9M (last accessed April 28, 2020). This summary, which was attached as an exhibit to one of appellant's motions, states:

> Symposium participants also discussed time limits between a shooting incident and the collection of GSR on live subjects. Many participants stated that an acceptable cutoff time is 4 to 6 hours after the shooting event, whereas some felt that up to 8 hours was appropriate. Still others were comfortable accepting lifts taken more than 12 hours after the shooting. The Virginia Department of Forensic Science recommends sample collection within 4 to 6 hours of the shooting event as long as the hands have not been washed. . . . For its acceptance policy, the FBI Laboratory uses a cutoff of 5 hours. The Florida Department of Law Enforcement and the Centre of Forensic Sciences in Toronto, Canada, both have a stated time limit not to exceed 8 hours (Radcliffe 2005; McVicar 2005). All of the attendees stated that they recommend that samples be collected from the hands as quickly as possible and that laboratories may elect not to analyze lifts from the hands of live subjects 4 to 12 hours after the event in question.

Id.

Moreover, the time lapse between the shooting and the GSR collection had no impact on the limited scope of Ms. Hrico's testimony. Her ultimate conclusion was merely that there was GSR on the sample taken from appellant's leg. Ms. Hrico did not opine whether the GSR was from the shooting or other sources. Thus, there was no analytical gap between the testing and her limited opinion.

As the circuit court noted, the time lapse went to the weight of the evidence. The court properly denied the motion to exclude the GSR evidence.

II.

Appellant next contends that the evidence was insufficient to support his convictions. In support, he argues that

> there is no evidence of [a]ppellant's guilt besides vague and conflicting descriptions of his and the shooter's generic clothing; a ski mask with the DNA of five people on it, which was found and handled by the victim's family at an unknown time before being provided to police; and some GSR particles found on the swab of [a]ppellant's leg. This is the epitome of "[c]ircumstantial evidence which merely arouses suspicion or leaves room for conjecture," which the Court of Appeals has recognized is "obviously insufficient" to support a conviction.[14]

The State contends that these arguments were not presented to the trial court and are not preserved for review. In any event, it asserts that the eyewitness testimony, combined with evidence derived from the ski mask, the GSR, and appellant's flight from the scene, were sufficient to support appellant's convictions.

Maryland Rule 4-324 (a) provides, in pertinent part:

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[14] Appellant also argues that there was no evidence of his motive, or how he "could have planned this shooting in advance." He cites no case, however, stating that such proof is necessary to support a conviction.

> A defendant may move for judgment of acquittal on one or more counts, or on one or more degrees of an offense which by law is divided into degrees, at the close of the evidence offered by the State and, in a jury trial, at the close of all the evidence. The defendant shall state with particularity all reasons why the motion should be granted. . . .
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> The Court of Appeals has explained:
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> [A]ppellate review of sufficiency of evidence is available only when the defendant moves for judgment of acquittal at the close of all the evidence and argues precisely the ways in which the evidence is lacking. The issue of sufficiency of the evidence is not preserved when [the defendant]'s motion for judgment of acquittal is on a ground different than that set forth on appeal.

Hobby v. State, 436 Md. 526, 540 (2014) (quoting *Anthony v. State*, 117 Md. App. 119, 126, *cert. denied*, 348 Md. 205 (1997)). Thus, "[a] defendant may not argue in the trial court that the evidence was insufficient for one reason, then urge a different reason for the insufficiency on appeal in challenging the denial of a motion for judgment of acquittal." *Hobby*, 436 Md. at 540 (quoting *Tetso v. State*, 205 Md. App. 334, 384, *cert. denied*, 428 Md. 545 (2012) (citation omitted)); *see also Arthur v. State*, 420 Md. 512, 524 (2011) ("Maryland Rule 4-324(a) is not satisfied by merely reciting a conclusory statement and proclaiming that the State failed to prove its case[.]"); *Garrison v. State*, 88 Md. App. 475, 478 (1991) (holding that choosing to "submit" without articulating reasons amounts to a waiver), *cert. denied*, 325 Md. 249 (1992).

Here, appellant's counsel argued at the end of the State's case-in-chief that there was no evidence that anyone saw him pull the trigger or saw him with a firearm, and there was insufficient evidence that appellant had the requisite intent to commit premeditated first-degree murder. Counsel generally submitted on the remaining charges.

After hearing from the State, the court ruled as follows:

> With regard to first-degree murder, the State has satisfied that very minimal burden at this point, a burden of production in that Mr. Wells does testify, and I looked at my notes again, he does say he was trying to take care of his business, shooting at a dark-colored car, taking care of business, shooting a gun, firing in the car. So while he was asked on cross, "Could you specifically -- could you identify the gun in his hand," all that's fair game for argument, but he does specifically provide that testimony. I think there's enough to then link Mr. Boykin as the shooter at that point based on Mr. Wells' testimony.
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> With regard to deliberate and premeditation, 13 shots into a car, 13 strikes, clearly there's enough time between any one of those shots to have made a conscious decision and had time to deliberate. So I do find that the evidence, in the light most favorable to the State, is sufficient for the first-degree murder charge.
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> All the charges, as Counsel submits, we don't need to address.

The next day, after appellant elected not to testify, and after the defense presented evidence by moving to admit the 911 tapes into evidence, appellant renewed his motion for judgment of acquittal incorporating the prior arguments and adding that appellant's identification was suspect because the voice on the 911 tape indicated that the shooter was wearing black shorts. The court denied the motion, stating that a rational trier of fact could find the elements of the offense, even with the evidence admitted from the 911 call.

We construe appellant's argument on appeal to be that the evidence was insufficient to support the jury's finding that he was the shooter. This contention was raised below, and it is preserved for this Court's review.

In considering a challenge to the sufficiency of the evidence, we ask "whether after viewing the evidence in the light most favorable to the prosecution, any rational trier of fact could have found the essential elements of the crime beyond a reasonable doubt." *Grimm v. State*, 447 Md. 482, 494–95 (2016) (quoting *Cox v. State*, 421 Md. 630, 656–57

(2011)). *Accord Jackson v. Virginia*, 443 U.S. 307, 319 (1979). Further, "[w]e 'must give deference to all reasonable inferences [that] the fact-finder draws, regardless of whether [the appellate court] would have chosen a different reasonable inference.'" *Cox*, 421 Md. at 657 (quoting *Bible v. State*, 411 Md. 138, 156 (2009)). This applies to cases based upon both direct and/or circumstantial evidence because, as the Court of Appeals has explained, "[a] valid conviction may be based solely on circumstantial evidence." *State v. Smith*, 374 Md. 527, 534 (2003).

Here, testimony from the State's witnesses established that appellant was in the neighborhood prior to the shooting. The shooter was wearing clothing similar to that worn by appellant that same day. Witnesses indicated that the shooter was wearing a black ski mask. DNA consistent with appellant's profile was found on a ski mask left near the scene of the shooting. Gunshot residue was found on appellant's leg, near his "dip," which a witness explained was a location where individuals sometimes concealed a weapon. The shooter left the area quickly immediately after the incident, as did appellant, who had a friend drive him to his mother's house shortly after the shooting. *See State v. Coleman*, 423 Md. 666, 674 (2011) (flight may be considered as circumstantial evidence of consciousness of guilt).

From this evidence, a rational fact finder could determine that appellant killed the victim. The evidence was sufficient to sustain appellant's convictions.

JUDGMENTS OF THE CIRCUIT COURT FOR ANNE ARUNDEL COUNTY AFFIRMED. COSTS TO BE PAID BY APPELLANT.