

1 sworn in, Judge.

2 THE COURT: Sir, come forward to the  
3 witness stand. I'll swear you in.

4 (Whereupon the witness is sworn by the  
5 Court.)

6 **DR. WILLIAM DAVIS,**

7 having been first duly sworn, testified as follows:

8 **DIRECT EXAMINATION**

9 BY MS. FLADER:

10 Q. Would you please introduce yourself to the  
11 ladies and gentlemen of the jury?

12 A. Sure. Certainly. Good afternoon. My name is  
13 William Davis. I'm the director of physical evidence at  
14 the Harris County Institute of Forensic Sciences.

15 Q. What do you do in your employment at the Harris  
16 County Institute of Forensic Sciences?

17 A. I oversee two sections of our crime laboratory  
18 service; one is the trace evidence section, and the other  
19 is the firearms section.

20 Q. In regards to the trace evidence section, what  
21 is your responsibility? Wait, let me stop you. Can you  
22 tell the jury what is trace evidence?

23 A. Our trace evidence section handles primarily  
24 residues that are left behind; one residue is found in  
25 gunshots and the other residue is from what we call

1 ignitable liquids.

2 Q. In regards to the firearms section, what are  
3 your responsibilities?

4 A. I oversee -- they recently came under our  
5 organization. So, I have scientific control over their  
6 procedures.

7 Q. In regards to trace evidence, do you -- do you  
8 know what gunshot residue is?

9 A. Yes, I do.

10 Q. Can you tell the jury what that is?

11 A. For the purposes of our analysis, the gunshot  
12 residue we speak of arises from the explosion of the  
13 primer portion of ammunition. Primer is -- it provides a  
14 spark that ignites the gunpowder. These primers contain  
15 heavy elements for the most part. They contain lead,  
16 barium, and another called antimony. So, we look for  
17 residues that have those elements and combinations of  
18 those elements in them.

19 Q. Do you have education and training in order to  
20 do your job?

21 A. Yes, I do.

22 Q. And what is that?

23 A. My education is I have degrees in chemistry, a  
24 bachelor degree from Syracuse University, and a Ph.D. from  
25 Columbia University. The training for gunshot residue I

1 received at the Institute of Forensic Sciences, and I also  
2 attended courses at Lehigh University for the primer  
3 instrumentation that we use.

4 Q. When you try to determine gunshot, do you have  
5 initials that you use for gunshot residue?

6 A. Yes.

7 Q. What is that?

8 A. GSR.

9 Q. I think it's a little easier to say GSR rather  
10 than gunshot residue all the time. With GSR, do you have  
11 tests that are able to pick up those remnants of -- those  
12 elements that are left when the primer is sparked?

13 A. Yes.

14 Q. And how do you do that?

15 A. Well, the way it's done is it's collected from  
16 a surface of interest. This residue is invisible to the  
17 naked eye. So, the surface is sort of -- it's an  
18 intuition on the part of whoever is collecting the  
19 evidence. If it's on -- if it's a surface upon which it  
20 is suspected to reside, it's, essentially, a tape lift.  
21 It's a special piece of tape that we use for our  
22 instrumentation, and you would just dab the surface of  
23 interest. It could be this tabletop, it could be  
24 someone's hands, the interior of a vehicle, clothing.

25 Q. After you get those tape -- what do you call

1 the instruments that the GSR is put on?

2 A. It's called a stub.

3 Q. A stub. After you get the stub, what do you do  
4 with the stub in order to test it to determine if gunshot  
5 residue is present?

6 A. The stub is placed inside a special microscope  
7 we call a scanning electron microscope that allows us to  
8 see very small features. And these features I'm talking,  
9 these residues are on the order of one micron in diameter.  
10 The scanning electron microscope allows us to look at the  
11 shape of the residue. Shape is critical to this. As the  
12 residue briefly -- the way it forms, it's briefly a  
13 liquid. So, that means that when it cools off and becomes  
14 a solid again, it should have round characteristics. So,  
15 its shape should be roundish.

16 Additionally, the nice thing about this scanning  
17 electron microscope is that it gives us information about  
18 what elements are in each particle that we find. So, it's  
19 an all-encompassing technique.

20 Q. In terms of when you would expect GSR to be  
21 present and when you would not, what are the conditions  
22 that are important in making that determination?

23 A. There are number -- the most important is  
24 activity. Any surface -- if a surface has GSR, and that  
25 surface is active, the GSR will dissipate. It will fall

1 off. It doesn't go away like an ice cube melting and  
2 changing its shape or evaporating, it just falls off. It  
3 will wash off. So, activities such as washing, or rubbing  
4 a surface, other things are -- are there any barriers  
5 intervening? The GSR, essentially, resides in a cloud, an  
6 expanding cloud that comes out of every breach in a  
7 weapon. This cloud could reach quite far, tens of feet --  
8 up to about 10 to 15 feet off to the sides, or tens of  
9 feet out front. If there's a barrier -- say this surface,  
10 while protecting my hand from that cloud, my hand would  
11 have nothing on it; it would all be on the surface. So,  
12 intervening surfaces are also an important thing to  
13 consider.

14       There are types of ammunition that don't possess  
15 these types of primers. They are generally very small  
16 caliber rim fire. That's just the configuration of where  
17 the primer resides in the base of the bullet; time, as  
18 well.

19       Q.     Okay. What about movement in regards to  
20 someone moving while they're shooting; could that affect  
21 whether GSR is present or not?

22       A.     Yes, it could. An analogy of that would be  
23 like spray paint. It escapes from the can. So, if you're  
24 stationary, it's pretty easy to see where it goes, but if  
25 you're moving, the spray -- it comes out the nozzle, but

1 now you're over here.

2 Q. So, for example, I had a gun and I shot the gun  
3 right here in the courtroom, and immediately after my,  
4 hands were bagged and a test was done on my hands right  
5 after, would you expect there to be GSR?

6 A. Yes.

7 Q. Say that I shot a gun, and then I went and  
8 washed my hands; would you expect GSR to be present?

9 A. The probability of finding significant  
10 quantities of GSR are diminished.

11 Q. All right. What if I shot a gun and I wiped my  
12 hand on my pants really hard several times; would you then  
13 be able to find GSR on my hands?

14 A. It's not nearly as diminished as washing. Just  
15 like if you transfer it to a surface and then touch that  
16 surface, the surface can transfer it back to you. So,  
17 it's a conservation of GSR.

18 Q. Okay. If I'm shooting out a window while the  
19 car is moving, is there less likelihood that there's going  
20 to be GSR on my hands in that circumstance?

21 A. Yes.

22 Q. Why is that?

23 A. Because that's the spray paint analogy. You  
24 are moving, so there's this -- you have a leading wind,  
25 and that wind is creating activity at the surface of

1 interest. So, it could diminish the amount of GSR found.

2 Q. Now, you also mentioned time. You said that  
3 time creates an issue as to whether GSR is going to be  
4 found. What do you mean by that?

5 A. Well, time -- it's simply gravity. If the  
6 surface is immobile, then nothing will disturb it. All  
7 right. So, it's immobile, inside, no holes in the roof,  
8 and the windows are closed and all that, no drafts, it's  
9 there forever, essentially, but the minute you introduce a  
10 variable, it will start to dissipate.

11 Q. Now, let me ask you this. If there is GSR on  
12 my hands, does that automatically mean that I have shot a  
13 gun?

14 A. No.

15 Q. What do you mean by that?

16 A. Again, as I mentioned, these particles expand  
17 out to every breach in the weapon. So, if you're off to  
18 the side, you're likely to pick up some GSR. It may not  
19 be on your hands, it could be somewhere else on you. But  
20 there is a good possibility that you will find some there.  
21 If you are out front and you are not necessarily intended  
22 to be a target, you could get it because it's coming out  
23 and it's going out as a cone at that point. So, if you're  
24 off to the side, but not down the line, you could have it,  
25 too. If you're down the line, you're definitely going to

1 have some GSR, including the bullet.

2 Q. Okay. Now, if I'm driving a car and someone is  
3 in my passenger seat shooting a gun outside the window, is  
4 that GSR going to also come into the car compartment and  
5 possibly get on the driver's hands, as well?

6 A. It could.

7 Q. That's a possibility?

8 A. Yes.

9 Q. And there could be GSR in the car. So, if I'm  
10 in the car, I could pick up some of the GSR from just  
11 being in the car?

12 A. Yes.

13 Q. All right. Now, I want to show you what has  
14 previously been admitted as State's Exhibits 117, 120 and  
15 123. Do you recognize those items?

16 A. Yes, I do.

17 Q. Okay. And how do you recognize them?

18 A. They've been sealed with my initials and date.

19 Q. Now, let me back you up just a little bit.  
20 Since these items were originally tested, did the person  
21 that did the original testing leave your office?

22 A. Yes.

23 Q. Because they left your office, were you asked  
24 to reexamine this evidence?

25 A. Yes, I was.

1 Q. Now, the fact that the evidence had been tested  
2 before you were able to test it, does that in any way  
3 diminish your testing?

4 A. No.

5 Q. And, ultimately, were you able to look at that  
6 prior individual's results?

7 A. After the fact, yes, I did.

8 Q. What do you mean by "after the fact"?

9 A. I did not consult the reports prior to  
10 reanalysis.

11 Q. So, you did the reanalysis, you came to your  
12 conclusion, you made your report, then you looked at the  
13 old reports?

14 A. Correct.

15 Q. And were they consistent?

16 A. Yes, they were.

17 Q. All right. I'm going to show you what has been  
18 previously marked as State's Exhibits 106, 109, 112, 115,  
19 118, 121, 124 and 126. Do you recognize these items?

20 A. Yes, I do.

21 Q. Okay. And are these the reports that you  
22 created from the evidence that you were given in this case  
23 to evaluate?

24 A. Yes.

25 Q. And do they -- are they fair and accurate

1 depictions of your findings?

2 A. Yes, they are.

3 MS. FLADER: Your Honor, at this time, the  
4 State would offer State's Exhibits 106, 109, 112,  
5 115, 118, 121, 124, and 126 into evidence. Tendering  
6 to opposing counsel for any objections.

7 MR. DUARTE: Can I go through these?

8 THE COURT: Yes, sir.

9 MR. DUARTE: There's no objection, Judge,  
10 to 106, 109, 112, 115, 118, 121, 124, 126, Judge.

11 THE COURT: What's the last one you said?

12 MR. DUARTE: 126.

13 THE COURT: They are admitted.

14 (Whereupon State's Exhibit Nos. 106,  
15 109, 112, 115, 118, 121, 124, 126 are  
16 admitted into evidence.)

17 MS. FLADER: May I publish them to the  
18 jury?

19 THE COURT: Yes, ma'am.

20 Q. (By Ms. Flader) Okay, showing you what has been  
21 admitted into evidence as State's Exhibit 106. In this we  
22 see this is the gunshot residue kit from Nicole Hernandez,  
23 and in that your findings are, "No particles confirmed as  
24 having a composite characteristic with GSR were detected  
25 on this item"; is that correct?

1 A. Yes, ma'am.

2 Q. What does that mean?

3 A. That means that -- actually, if we could put  
4 that back up.

5 Q. I'm sorry.

6 A. This table up here is what -- that's where we  
7 look at. It's this first column that is the  
8 characteristic part of GSR. As I mentioned, there are  
9 three elements of interest. These three elements of  
10 interest get caught up in a gas that are liquid. They are  
11 allowed to mingle, commingle, then they cool off and  
12 deposit. So, essentially, I have three cans of spray  
13 paint, I've got a red, a blue, and a yellow. If I were  
14 to go into a hardware store and spray three cans of spray  
15 paint that I just mentioned, you would see the original  
16 three colors. You would see four new colors. Three of  
17 those colors are where two of them have mixed. So, you  
18 would see orange, green, and purple, then you would say  
19 gray where all three are mixed.

20 Small round particles that have lead, barium and  
21 antimony are characteristic of gunshot residue, and  
22 gunshot residue only; it's those primers. It's not a  
23 mineral that can be mined anywhere that would be put on a  
24 break pad, for instance. It comes from the detonation of  
25 that primer.

1           So, when we find particles occupying -- or non-zero  
2 values in that column right here, that's when we have to  
3 start thinking about there's gunshot residue and what does  
4 it mean. So, in this case, we didn't find gunshot  
5 residue, and that's what it means, we didn't find it.

6           Q.       Now, I'm showing you what's been marked as  
7 State's Exhibit 109, and this is the gunshot residue kit  
8 for Sarah-Kathryn Bafford.

9           A.       Yes.

10          Q.       And the results of that GSR is the same thing  
11 as the one before, correct?

12          A.       That's correct.

13          Q.       And in State's Exhibit 112, this is the gunshot  
14 residue kit for Carolyn Bocanegra?

15          A.       Correct.

16          Q.       This is a little bit different. It says,  
17 "Right hand had one particle confirmed as having a  
18 composition characteristic which could have resulted from  
19 activities such as firing a weapon, being in close  
20 proximity of a firearm during discharge, handling a  
21 firearm, firing cartridge, or some surface-bearing GSR.  
22 The results of this examination are termed inconclusive."  
23 What does that mean?

24          A.       It's a little lengthier. Gunshot residue was  
25 found; there was no question about that. The key is that

1 there was one particle. Our lab has a language trigger  
2 based on the number of particles. If it's less than  
3 three, we have this language where it could have resulted  
4 from those activities, could have. But there's a  
5 statistical probability that we are not comfortable in  
6 pushing aside that this might be transfer from another  
7 source.

8       There is GSR in our environment. There is GSR in the  
9 police environment, and small amounts of that GSR can get  
10 onto surfaces unintentionally. This has been studied.  
11 That's why we have this trigger of three. At three, we  
12 loose the inconclusive and we say most likely resulted  
13 from these activities. But we just say it could have been  
14 from firing a weapon, or handling a weapon, being near a  
15 weapon when it went off, it could have. There's still  
16 this possibility of a transfer.

17       Q.     So, it could also have been from being in the  
18 police car, or being around other police officers that  
19 often have GSR on and about their persons and cars?

20       A.     Could, yes.

21       Q.     So, that's why you say it's not conclusive and  
22 it really -- you can't say anything based on this?

23       A.     That's correct.

24       Q.     All right. State's Exhibit 115, this is for  
25 Sherri White.

1 A. Okay.

2 Q. And this one, no particles?

3 A. That's correct.

4 Q. Kendell Davis, State's Exhibit 118. Again, no  
5 particles?

6 A. That's correct.

7 Q. State's Exhibit 121, this is for Juan Ybarra.

8 And this one, again, it's the same language about it being  
9 inconclusive?

10 A. That's correct.

11 Q. So --

12 A. One particle.

13 Q. One particle. You can't say anything about  
14 where he got that GSR?

15 A. That's correct.

16 Q. Just that there was some present?

17 A. Yes.

18 Q. And 124, Fredrick Johnson. Again, no  
19 particles?

20 A. Correct.

21 Q. And 126, a gunshot residue from clothing, no  
22 particles?

23 A. Correct.

24 Q. Now, what if I told you that one of the  
25 individuals that had no particles is alleged to have shot

1 a gun; and let me further say that in this hypothetical,  
2 that the person shot a gun while the car was moving,  
3 wasn't arrested for approximately four hours, and had  
4 climbed a tree before being detained. Would it surprise  
5 you that there are no particles on that individual's hand?

6 A. If there had been particles on that hand, I  
7 would not be surprised that they are no longer there.

8 Q. Okay. So, that means nothing to you? The fact  
9 that there were no particles found, that doesn't mean that  
10 that individual didn't fire a gun under those  
11 circumstances?

12 A. Correct.

13 Q. Would you actually be surprised if there were  
14 particles found under those circumstances?

15 A. If I were -- you will be in the realm of the  
16 inconclusive.

17 Q. So, very, very, very, unlikely?

18 A. Yes.

19 MS. FLADER: I pass the witness.

20 THE COURT: Cross?

21 MR. DUARTE: Yes, sir. Thank you.

22 **CROSS-EXAMINATION**

23 BY MR. DUARTE:

24 Q. Good afternoon, Dr. Davis.

25 A. Good afternoon.

1 Q. I wasn't very good in science, so you have to  
2 kind of explain again to me. I'm pretty sure the jurors  
3 are much more intelligent in science than I am. So, in a  
4 GSR gunshot residue, the lead, the barium, and the  
5 antimony are actually elements; is that correct, that you  
6 are looking for?

7 A. Elements that we look for, yes.

8 Q. And every gunshot residue contains -- should  
9 contain lead, barium, or antimony, correct?

10 A. The wide prevalence of primers that are used in  
11 ammunition contain those components.

12 Q. And you mentioned that when you or  
13 investigative police agencies are looking or trying to  
14 preserve evidence regarding whether someone fired or  
15 didn't fire a weapon, they do the GSR test, correct, to  
16 see if the person may have fired a weapon, or was around a  
17 weapon that was fired; they try to preserve those people's  
18 hands, correct?

19 A. Yes, sir.

20 Q. And they preserve that evidence by usually  
21 putting little bags over their hands, correct?

22 A. Yes, sir.

23 Q. And the sooner you get the bags over their  
24 hands, the better you are able to determine, once the test  
25 is done, as to whether there are any of these elements,

1 the lead, the barium, or the antimony is on the GSR test  
2 that you get from that individual, correct?

3 A. It serves two purposes.

4 Q. Go ahead, what's the other purpose?

5 A. One purpose is to make sure if the GSR is  
6 there, it's contained and it's not lost because you can  
7 always test the bags; the second is to protect the hand  
8 from picking up anything further. So, if there is  
9 detention in the back of a police vehicle where there  
10 could be GSR, you don't want the hands to be exposed to  
11 that. So, it serves two purposes.

12 Q. So, that's why an officer, or a CSU officer  
13 that is going to administer a GSR test, he takes, you  
14 know, a lot of care in first preparing his hands with,  
15 maybe, a plastic glove to make sure any GSR that may be on  
16 his hands doesn't get transferred to the people that he's  
17 going to administer a GSR test to; that's one example,  
18 correct?

19 A. Yes, sir.

20 Q. So, you mentioned surfaces of interest, and  
21 that would be just places you can find GSR, correct?

22 A. Well, it depend -- depending on the scenario  
23 you're looking at.

24 Q. So, a surface of interest you gave an example.  
25 It could be -- a surface of interest in a particular case

1 could be the interior of a car?

2 A. Could be, yes.

3 Q. It could be a person's clothing?

4 A. Yes.

5 Q. Could be the top there in front of you where  
6 you're testifying, a marble counter?

7 A. Yes, sir.

8 Q. It could be this desk? Just wherever you have  
9 information that a gun was discharged in that particular  
10 area. So, there may be GSR on that particular surface of  
11 interest, correct?

12 A. Yes.

13 Q. So, I mentioned clothing. You can get GSR on  
14 clothing, correct?

15 A. Yes, sir.

16 Q. And, in fact, you can test for the existence of  
17 GSR on clothing, correct?

18 A. You can.

19 Q. And have you done that before in the past?

20 A. Yes, sir.

21 Q. And it's pretty common for the Harris County  
22 Institute of Forensic Sciences to do that in cases; is  
23 that correct?

24 A. In the past we have, yes.

25 Q. In the past. Now, I learn something a little

1 bit every day seems like. It's a good thing.

2 The actual GSR, when there's an explosion from a  
3 firearm, it is kind of liquefied at first, correct?

4 A. Yes, sir.

5 Q. And it's not all -- we think it's a form of  
6 powder, but it's more liquid and then it dries pretty  
7 fast. And those give you the kind of round  
8 characteristics, when it's dry, of the stuff you can maybe  
9 see at times with the naked eye. But most times you have  
10 to use either tape or the GSR test to find the particles  
11 that you're looking for, correct?

12 A. Yes, sir. I should point out, if you can see  
13 it, it's probably not primer residue.

14 Q. If you can see it, what might it be then?

15 A. It could be unexploded gunpowder.

16 Q. Okay. So, that's more visible. So, what  
17 you're looking for is something that's beyond -- most  
18 times beyond the naked eye?

19 A. Correct.

20 Q. Now, regarding the test that you-all ran, or  
21 the Institute of Forensic Sciences, you had -- there was  
22 one, two, three, four, five, six, seven -- seven different  
23 tests, it looks like, on results for these individuals.  
24 Now, you mentioned one for a Kendell Davis. That  
25 particular one, you found that there was no GSR particles

1 that existed on his test, correct?

2 A. May I --

3 Q. Yes, sir, absolutely. Yes, sir.

4 A. The individual was Kendell Davis?

5 Q. Yes, sir, his name is Kendell Davis.

6 A. Yes, I have that. There's no GSR.

7 Q. Now, do your records indicate that the  
8 Institute of Forensic Sciences also tested his jeans,  
9 T-shirt, belt, his clothing also?

10 A. There were clothing. Items submitted, I can't  
11 tell you to whom they belonged.

12 Q. Is there anything in there, in that testing  
13 package that you had, that would indicate that Kendell  
14 Davis' jeans, T-shirt, belt also found -- someone from the  
15 Institute of Forensic Sciences found that there was no GSR  
16 particles on his clothing?

17 A. On the clothing that we received, a pair of  
18 jeans, a T-shirt, and a belt, there was no GSR.

19 Q. Now, do you have who that clothing belonged to?  
20 Does your report there show your notes?

21 A. No.

22 Q. Now, regarding the GSR test -- inconclusive to  
23 me means -- inconclusive means could be shooting, or could  
24 have been from firearm transfer; is that about right? The  
25 inconclusive test, what does inconclusive mean to you?

1           A.       To me it's a distinction between primary  
2 association and secondary, or tertiary, down the road.

3           Q.       So, you have this numerical point which is  
4 what, a three you said?

5           A.       Three, yes.

6           Q.       So, at three we're not sure that inconclusive  
7 could be a person shot the gun, or it could have been if  
8 he had GSR or a particle, that was GSR that could have  
9 been transferred from somewhere else; we can't say?

10          A.       Correct.

11          Q.       Could have been shooting, could have been near  
12 someone that was shooting?

13          A.       Or something unrelated.

14          Q.       We live in an atmosphere of GSR?

15          A.       Well, it's --

16          Q.       That's a hyperbole, I know. But it's out  
17 there, and we can pick it up walking out and we put our  
18 hand down, and for all we know someone had a gun and it  
19 came down?

20          A.       Yes, probability.

21          Q.       But as far as the test that you did on Mr. --  
22 or confirmed on Mr. Juan Ybarra, on his right hand, you  
23 did find some GSR particles, correct?

24          A.       Yes, there was one.

25          Q.       There was one GSR particle. And would that be

1 the lead, the barium, or the antimony; do you know?

2 A. It was the combination of all three.

3 Q. The combination of all three?

4 A. When I say "GSR particle," I mean all three.

5 Q. All three were existent. On the left hand of  
6 Mr. Ybarra, there was no GSR?

7 A. Correct.

8 Q. Now, am I correct in saying that the bigger the  
9 weapon, the more likelihood there is to leave GSR, as  
10 opposed to a smaller weapon?

11 A. No, sir.

12 Q. Not really?

13 A. No, sir. The primers are fairly consistent.

14 Q. The primers are consistent with exactly what is  
15 going to come out. The elements are always going to come  
16 out. Those are always going to exist?

17 A. And the size of the primer, too. There's not  
18 much primer. Manufacturers tend to have the same primer  
19 package.

20 Q. It doesn't matter if it was a .22 rifle or a  
21 12-gauge shotgun. It doesn't matter as far as -- the GSR  
22 is going to be the same as far as the primer is concerned?

23 A. Right.

24 Q. And if one were to discharge -- oh, let me ask  
25 you this. As far as -- can the interior of automobiles be

1 processed for the existence of GSR?

2 A. True.

3 Q. You've done it before, haven't you?

4 A. I've never processed a vehicle.

5 Q. You've looked at tests that have -- that  
6 they've submitted to from vehicles that have been  
7 processed for GSR?

8 A. Yes.

9 Q. So, that is commonly done; is that correct?

10 A. I don't know if I can say it's common. I know  
11 that we receive them.

12 Q. In this case you did not receive any type of  
13 GSR packets, or any GSR swabs from the interior of a white  
14 Cadillac; is that correct?

15 A. That's correct, sir.

16 Q. Now --

17 MR. DUARTE: If I can have just a moment,  
18 Judge.

19 THE COURT: Yes, sir.

20 (Brief pause.)

21 MR. DUARTE: I pass this witness.

22 MS. FLADER: No more questions.

23 THE COURT: Thank you. You may step down.  
24 Let's take an afternoon break.

25 (Whereupon the Court stood in a brief