

DISTRICT COURT, ARAPAHOE COUNTY, STATE OF COLORADO 7325 S. Potomac St. Centennial, Colorado 80112	▲ COURT USE ONLY ▲
PEOPLE OF THE STATE OF COLORADO v. JAMES EAGAN HOLMES, Defendant	Case No. 12CR1522 Division: 202
<p style="text-align: center;">ORDER REGARDING DEFENDANT’S MOTION TO PRECLUDE FINGERPRINT COMPARISON TESTIMONY, PURSUANT TO CRE 702 AND 403, DUE PROCESS, AND <i>PEOPLE V. SHRECK</i>, 22 P.3D 68 (COLO. 2001) (D-107)</p>	

INTRODUCTION

In Motion D-107, the defendant “objects to the admission of any and all opinion testimony concerning fingerprint comparisons that the prosecution intends to introduce at trial.” Motion at p. 1. The prosecution opposes the motion. *See generally* Response. At the defendant’s request, and over the prosecution’s objection, the Court held an evidentiary hearing on August 25, 2014.¹ For the reasons articulated in this Order, the Court finds that the proffered expert testimony identified in Motion D-107 is admissible under CRE 702 and the standard set forth

¹ The Court initially denied the defendant’s request for an evidentiary hearing. *See* Order C-51. However, after further consideration, the Court asked the parties to schedule a hearing. Order C-101 at p. 1.

by the Colorado Supreme Court in *People v. Shreck*, 22 P.3d 68 (Colo. 2001). Accordingly, the defendant's motion is denied.

CREDIBILITY DETERMINATIONS

At the August 25 hearing, the prosecution presented testimony from Melissa Gische, Stacy Furman, and Sandra Wiese. The defendant did not present any testimony.

The Court observed each witness's manner, demeanor, and body language while on the stand, and considered each witness's means of knowledge, strength of memory, and opportunity for observation. With respect to each witness, the Court assessed the reasonableness or unreasonableness of the testimony, the consistency or lack of consistency of the testimony, and whether the testimony was contradicted or supported by other evidence. The Court examined whether the witnesses had a motive to lie, as well as whether bias, prejudice, or interest in the case affected their testimony. Finally, the Court took into account all other facts and circumstances shown by the evidence which affected the credibility of any of the witnesses.

The Court found the prosecutions' witnesses credible. This credibility determination is reflected in the Analysis section of this Order.

ANALYSIS

I. Standard of Review Governing the Admissibility of Expert Testimony in Colorado: CRE 702 and *People v. Shreck*

The admissibility of expert testimony in Colorado is governed by Rule 702 of the Colorado Rules of Evidence and the Colorado Supreme Court's analysis and application of that rule in *People v. Shreck*, 22 P.3d 68 (Colo. 2001). Rule 702 provides:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

CRE 702. To be admissible under Rule 702, expert testimony must be both reliable and relevant. *People v. Ramirez*, 155 P.3d 371, 378 (Colo. 2007).

In determining whether expert testimony is reliable, the Court must consider: (1) whether the scientific principles underlying the witness's testimony are reasonably reliable; and (2) whether the witness is qualified to render an opinion on such matters. *Shreck*, 22 P.3d at 77 (citation omitted). The Court's inquiry "should be broad in nature" and take into consideration "the totality of the circumstances of each specific case." *Id.* (citations omitted). The Court may consider "a wide range of factors" that may be pertinent to the evidence at issue, including: (1) whether the scientific principles or techniques have been tested; (2) whether the theories or techniques have been peer reviewed and published;

(3) whether there are standards controlling a technique's operation and its known or potential rate of error; (4) whether a technique has been generally accepted by the relevant scientific community; (5) the relationship of the proposed techniques to more established methods of scientific analysis; and (6) the non-judicial uses to which the techniques are put, if any. *Id.* at 77-79 (citing *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 593-94, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993) and *United States v. Downing*, 753 F.2d 1224, 1238-39 (3rd Cir. 1985)).

The Court is not required to consider any particular set of factors. *Id.* at 78. Rather, it may “consider [any] factors . . . to the extent that it finds them helpful in determining the reliability of the proffered evidence.” *Id.*; *see also Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 150, 119 S.Ct. 1167, 143 L.Ed.2d 238 (1999) (noting that “[t]he factors identified in *Daubert* may or may not be pertinent in assessing reliability, depending on the nature of the issue, the expert’s particular expertise, [] the subject of his testimony,” and the particular circumstances of the case) (quotation omitted); *Brooks v. People*, 975 P.2d 1105, 1114 (Colo. 1999) (declining to “give any special significance” to the factors listed in *Daubert*, and directing trial courts to “focus instead on whether the evidence is reasonably reliable information that will assist the trier of fact”).

In deciding whether expert testimony is relevant, the Court must consider its usefulness to the jury. *Shreck*, 22 P.3d at 77 (citing *Brooks*, 975 P.2d at 1114).

Testimony is “useful” for purposes of Rule 702 if it will assist the jury to either understand other evidence or determine a fact at issue. *Ramirez*, 155 P.3d at 379 (citation omitted). There must be “a logical relation between the [expert] testimony and [a] factual issue involved in the case.” *Id.* (citation omitted).

A number of factors are pertinent to a determination regarding the usefulness of proffered expert testimony. *Id.* Specifically, the Court should consider: (1) the elements of the particular offense; (2) the nature and extent of other evidence in the case; (3) the witness’s expertise; (4) “the sufficiency and extent of the foundational evidence” upon which the witness’s ultimate opinion is to be based; and (5) the scope and the content of the opinion itself. *Id.*; *Masters v. People*, 58 P.3d 979, 990 (Colo. 2002) (citing *Lanari v. People*, 827 P.2d 495, 504 (Colo. 1992)).

Even if an expert’s testimony is reliable and relevant, before admitting it, the Court must apply CRE 403. *Ramirez*, 155 P.3d at 379. The Court must ensure that the probative value of the evidence is not “substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.” *Id.* (quoting CRE 403). Expert testimony that “has an undue tendency to suggest a decision on an improper basis” should be excluded. *Id.* (citation omitted).

Shreck requires the Court to make “specific findings on the record” regarding the reliability and relevance of proposed expert testimony. *Shreck*, 22 P.3d at 78 (citations omitted). “The [Court] must also issue specific findings as to its consideration under CRE 403 as to whether the probative value of the evidence is substantially outweighed by its prejudicial effect.” *Id.* (citations omitted). While the Court may hold an evidentiary hearing if appropriate, it is not required to do so, “provided it has before it sufficient information to make specific findings . . . about the reliability of the scientific principles involved, the expert’s qualification to testify to such matters, the helpfulness to the jury, and potential prejudice.” *People v. Rector*, 248 P.3d 1196, 1201 (Colo. 2011) (citations omitted); *see also People v. Whitman*, 205 P.3d 371, 383 (Colo. App. 2007) (“*Shreck* does not require trial courts to hold hearings to inquire into the reliability of evidence . . . Rather, *Shreck* requires the trial court to receive sufficient information to make specific findings about the reliability of the scientific principles involved and the expert’s qualification to testify to such matters”) (citations omitted).

II. Request to Preclude

A. Reliability

1. Underlying Scientific Principles and Techniques

First, the Court considers whether the scientific principles and techniques underlying the proffered testimony are reasonably reliable. The Court concludes that they are.

“Fingerprints are left by the depositing of oil upon contact between a surface and the friction ridges of fingers.” *United States v. Mitchell*, 365 F.3d 215, 221 (3d Cir. 2004). “Friction ridges” refer to skin surfaces with ridges that are evolutionarily adapted to increase friction for gripping. *Id.* For purposes of fingerprint comparison and identification, friction ridges are deemed to have three levels of increasing detail. *Id.* The first level is known as the “ridge flow,” where the examiner observes the pattern of the ridges. *United States v. Baines*, 573 F.3d 979, 982 (10th Cir. 2009). There are three basic ridge patterns: arch, loop, and whirl. *Id.* The second level is the “the ridge path.” *Id.* At this level of detail, the examiner “chooses ridges on the print, follows them, and makes observations.” *Id.* “For example, the examiner may note points where a ridge ends or divides into two ridges.” *Id.* At the final level of detail, the examiner studies the microscopic variations and details in the ridges themselves, “such as the slight meanders of the ridges . . . and the locations of sweat pores.” *Mitchell*, 365 F.3d at 221.

A fingerprint examiner cannot make a positive identification based only on the first level of detail, although a decision to exclude can be made at that level. *Baines*, 573 F.3d at 982. Rather, a fingerprint examiner can only make a positive identification at the second or third level of detail. *Id.*

The prevailing method for latent fingerprint comparison and identification is the ACE-V method.² ACE-V is an acronym for “analysis, comparison, evaluation, and verification.” *Mitchell*, 365 F.3d at 221. In the analysis step, the examiner “looks at the latent and the known print separately . . . to discern characteristics at all three levels of detail and to evaluate the quality and quantity of information on each print.” *Baines*, 573 F.3d at 983. If the examiner determines that the latent print is of sufficient quality to make a reliable identification and that there are no disparities between the latent and known print that preclude the possibility of a match, the examiner moves to the second step: comparison. *Id.* At this step, the examiner does a “side-by-side examination of the latent and the known print” and “looks for reasons to exclude the known print and for similarities between the two.” *Id.* If it appears to the examiner that the prints could be a match, the examiner proceeds to the third step, evaluation, and tries to reach a conclusion. *Id.*

² “Latent prints” are fingerprints inadvertently left behind when a person touches a surface. *Mitchell*, 365 F.3d at 220-21. They are usually “not visible to the naked eye until dusted or otherwise revealed.” *Id.* at 221. Latent prints are often distorted or marred by dirt, grease, or other “artifacts.” *Id.* 221 n.1. “Full prints,” by contrast, are fingerprints made by “rolling the full surface of the fingertip on a fingerprint card,” commonly referred to as a “ten-print card,” or on an “electronic fingerprint capture device.” *Id.* at 221. Typically, a latent print is only a fraction of a full print. *Id.*

Once the examiner has reached a conclusion, his work is reviewed by a second examiner. *Id.* This is the fourth and final step: verification. *Id.* The second examiner may conduct a “blind” verification, where the reviewing examiner does an independent examination without knowing beforehand what conclusion the first examiner reached. Once the reviewing examiner has reached his own opinion regarding whether a latent and exemplar print are a match, he compares his findings with those of the first fingerprint examiner. Gische and Furman testified that the FBI requires blind verification for all “single conclusions,” meaning that the conclusion is the only one of its kind in that particular case. This is true whether the single conclusion is a positive identification, an exclusion, or an inconclusive decision.³

The defendant asserts that the prosecution’s proposed fingerprint comparison evidence should be excluded because “[f]ingerprint evidence does not meet the standards required by the Colorado Supreme Court in *Shreck* or CRE 702 and 403.” Motion at p. 3. Specifically, the defendant contends that fingerprint comparison evidence fails to satisfy *Shreck*’s reliability requirement because: (1) there are no known error rates for fingerprint comparison evidence; (2) no studies have been conducted to assess the validity of the scientific basis for

³ For instance, Furman opined that her findings in this case were subjected to blind verification because she “had one identification to an individual in this case.” She explained that if “there [had been] ten identifications to a single individual, that would [have been] ten results of that kind,” and those results would not have been subject to blind verification.

fingerprint comparison evidence; and (3) there are no objective standards governing when examiners can make a positive identification. *Id.* at pp. 3-5. The Court addresses each of these contentions in turn.⁴

At the outset, the Court notes that fingerprint comparison and identification has been deemed “reliable evidence in criminal trials in this country since at least 1911.” *United States v. Crisp*, 324 F.3d 261, 266 (4th Cir. 2003) (citations omitted); *see also United States v. Scott*, 403 F. App’x 392, 398 (11th Cir. 2010) (noting that “federal courts routinely have upheld the admissibility of fingerprint evidence under *Daubert*” and that the “[t]he ACE-V method has been in use for over 20 years, and is generally accepted within the community of fingerprint experts”); *Crisp*, 324 F.3d at 268 (“While the principles underlying fingerprint identification have not attained the status of scientific law, they nonetheless bear the imprimatur of a strong general acceptance, not only in the expert community, but in the courts as well”). Indeed, the Colorado Court of Appeals observed last year that fingerprint comparison testimony “clearly falls within the category of ordinary cases where the reliability on an expert’s methods is properly taken for

⁴ The prosecution contends that Wiese’s testimony related to identifying the victims falls outside the scope of the defendant’s motion because her work involved the comparison of inked prints, not latent prints. Response at p. 13. The Court agrees. Nevertheless, to the extent that the comparison of inked prints involves the application of many, if not all, of the techniques required to analyze and identify latent prints, the Court is satisfied the Wiese’s testimony is based on sufficiently reliable techniques.

granted.” *People v. Wilson*, 318 P.3d 538, 545 (Colo. App. 2013) (quotation and citations omitted).

a) Error Rates

The defendant avers that the proposed expert testimony should be excluded because “there are no known error rates for either the techniques used in performing fingerprint analysis or the labs and technicians conducting the testing.” Motion at p. 3. He emphasizes that a technique’s known or potential rate of error was “a key consideration” identified by the United States Supreme Court in *Daubert* for assessing the reliability of scientific evidence. *Id.* at p. 4. Thus, posits the defendant, without statistical testing “demonstrat[ing] that following the stated procedures allows analysts to produce correct results with acceptable error rates,” fingerprint comparison cannot be deemed reliable. *Id.* at pp. 3-4 (citing National Institute of Justice, *Solicitation: Forensic Ridge (Fingerprint) Examination Validation Studies* (March 2000)). The Court is unpersuaded.

It is undisputed that there is no single error rate that can be applied to all fingerprint comparisons. At the hearing, Gische testified that it is impossible to determine a single error rate for fingerprint comparison as a technique “because there[] [are] so many different variables involved—from the complexity of the comparison itself, to the training of the examiner, to the quality assurance measures at the agency in which those examinations are being conducted.”

Nevertheless, according to Gische, error rates have been generated in different research studies. For example, Gische discussed a 2011 National Academy of Sciences study (“NAS study”) that was designed to assess the “accuracy and reliability of latent print examiners’ decisions.” Response Ex. 10 at p. 7333. In the NAS study, 169 latent print examiners were given the task of comparing approximately 100 pairs of latent and exemplar prints from a pool of 744 pairs of fingerprints. *Id.* At the conclusion of the study, it was determined that only five examiners made a false positive identification, for an overall false positive error rate of 0.1%. *Id.*⁵ Although 85 percent of examiners erroneously failed to make an identification, for an overall false negative error rate of 7.5%, the study concluded that all false positive identifications would have been detected by blind verification. *Id.*

Gische also discussed a study by Dr. Glenn Langenburg in which six fingerprint analysts were asked to participate in a series of 60 ACE and ACE-V trials. *See* Response Ex. 9. According to this study, the participants in the ACE-V

⁵ “[F]alse positives are incorrect affirmative identifications,” while “false negatives are incorrect findings of dissimilarity.” *Mitchell*, 365 F.3d at 239. The more relevant error rate for the purposes of Motion D-107 is the false positive error rate. “While a system of identification with a high false negative rate may be unsatisfactory as a matter of law enforcement policy,” false negative error rates are “immaterial to the [] admissibility of latent fingerprint identification offered to prove positive identification because [they are] not probative of the reliability of the testimony *for the purpose for which it is offered* (i.e., for its ability to effect a positive identification)”. *Id.* (emphasis in original).

trials had 100% accuracy with respect to positive identifications and made accurate exclusions 67% of the time. *Id.* at p. 219.

Courts that have considered challenges to the reliability of fingerprint comparison evidence based on the lack of known error rates have consistently rejected such challenges. In *United States v. Baines*, for example, the defendant challenged the reliability of fingerprint comparison evidence based on the fact that there are no established error rates. 573 F.3d at 984. The prosecution's expert testified that the error rate for latent fingerprint identification is one per every 11 million cases. *Id.* at 990-91. Since the defendant did not put on any evidence contradicting the expert's testimony, the Court accepted that such was the actual rate of error. *Id.* However, it noted:

[E]ven allowing for the likelihood that the actual error rate for FBI examiners may be higher than reflected in [the expert's] testimony, the known error rate remains impressively low. We are not aware of any attempt to quantify the maximum error rate that could meet *Daubert* standards, but surely a rate considerable higher than one per 11 million could still pass the test.

Id. at 991. The Court further observed that “[v]ery few mistakes are reported in testing [] trainees must complete before progressing to actual casework.” *Id.* at 990. While the Court recognized that such testing was not an “accurate facsimile[] of the tasks undertaken by fingerprint analysts in actual cases,” it found the “accumulated data” regarding the lack of errors by trainees “impressive.” *Id.* Ultimately, the Court found that the evidence in the record regarding the error rate

for latent fingerprint comparison “strongly supported” the admissibility of fingerprint evidence. *Id.* at 991.

Similarly, in *United States v. Mitchell*, the defendant raised numerous challenges to the reliability of fingerprint comparison evidence, including “whether a known error exists for latent fingerprint identification.” 365 F.3d at 239. In preparation for a *Daubert* hearing, the government conducted two experiments which it hoped would demonstrate the reliability of its latent fingerprint comparison evidence. *Id.* at 223. In the first experiment, the government’s expert sent a survey packet to all the principal law enforcement agencies in each state, the District of Columbia, Canada’s Royal Mounted Police, and the United Kingdom’s Scotland Yard. *Id.* The survey consisted of three parts. *Id.* In the first part, each surveyed agency was asked whether it accepted fingerprint comparison as a means of making an identification and whether it regarded fingerprints as unique and permanent. *Id.* Every agency responded in the affirmative to both questions. *Id.* at 223-24. In another part of the survey, the agencies were asked whether they had ever found two individuals with the same fingerprint. *Id.* at 224. Again, the agencies’ response was unanimous: no. *Id.*

The remaining part of the survey was designed to test the reliability of the ACE-V method. *Id.* The government’s expert sent each agency photographs of two latent prints the government intended to demonstrate belonged to the

defendant as well as the defendant's ten-print card. *Id.* The agencies were asked to first identify the ten-print card using their own computerized fingerprint databases. *Id.* The agencies were specifically asked not to filter their databases to allow for the maximum possible number of comparisons. *Id.* Of the forty-seven agencies that responded to this portion of the survey, only one reported a positive identification—an agency in Pennsylvania where the defendant's ten-print record was already on its computer database. *Id.*

Next, the agencies were asked to match the photographs of the two latent prints to their existing records. *Id.* This time, two agencies made a positive identification, both of which had inputted the ten-print card provided by the expert into their computerized system.⁶ *Id.* Lastly, the agencies were asked to do a manual comparison of the latent prints to the ten-print card provided by the government's expert. *Id.* The agencies were not told that the latent prints had been matched to the defendant or that the ten-print card belonged to the defendant. *Id.* Over 75% of the agencies that responded to this portion of the survey matched both latent prints to the defendant's ten-print card. *Id.* Of those that did not match both prints, half matched one print consistent with the FBI's identification. *Id.* It was later determined that those agencies that failed to match both latent prints did

⁶ The Pennsylvania agency that had successfully matched the defendant's ten-print card to its computerized database was unable to complete this part of the survey due to equipment issues. *Mitchell*, 365 F.3d at 224. However, it represented that it would have positively matched the latent prints had its system been fully operational. *Id.*

not do so because either the examiner determined the latent prints were of insufficient quality or the comparison was performed by an inexperienced examiner and, on review, a more experienced examiner was able to match both prints. *Id.*

The salient point of the government's survey in *Mitchell* is that no participating agency made a false positive identification. *Id.* No agency matched the defendant's ten-print card to someone else's ten-print card, matched the latent prints to anyone other than the defendant, or matched a latent print to any finger other than the one to which the FBI had matched the latent print. *Id.* As the Third Circuit noted, "[a]ssuming that every record [searched by the agencies] had 10 fingerprints, . . . the test of the two latent prints against these records implies something on the order of 1.4 billion comparisons resulting in no false positives." *Id.* at 240. Based on the survey, as well as the "absence of significant numbers of false positives in practice (despite the enormous incentive to discover them)," the Court was satisfied that "the error rate [for fingerprint identification] has been sufficiently identified to count this factor as strongly favoring admission of the evidence." *Id.* at 241. While the Court recognized that "the error rate has not been precisely quantified," it nevertheless concluded that "the various methods of estimating the error rate all suggest that it is very low." *Id.*

This Court is convinced that, whatever error rate exists for fingerprint comparison evidence, it is extremely low. *See id.* at 239-40 (“the government can [] draw support from the very limited number of reports of false positive identifications throughout the many decades that [fingerprint comparison] has been in use” to establish that, whatever error rate exists, “it is surely a low rate of error”); *Crisp*, 324 F.3d at 269 (upholding the admission of fingerprint identification evidence based, in part, on testimony by the prosecution’s expert that the error rate for fingerprint identifications was “negligible”); *United States v. Havvard*, 260 F.3d 597, 599, 601 (7th Cir. 2001) (finding the district court’s conclusion that the error rate for fingerprint identification “is exceptionally low” was supported by expert testimony that “the error rate for fingerprint comparison is essentially zero,” although “a small margin of error exists because of differences in individual examiners”). Contrary to the defendant’s contention, the Court is not required to exclude fingerprint comparison evidence as unreliable based on the prosecution’s inability to establish a precise quantified error rate. The list of factors identified in *Daubert* and *Shreck* are nonexclusive. *See Kumho Tire Co.*, 526 U.S. at 150, 119 S.Ct. 1167; *Shreck*, 22 P.3d at 77. Thus, “the proponent of the expert testimony need not satisfy each factor.” *United States v. John*, 597 F.3d 263, 274 (5th Cir. 2010).

The defendant's anecdotal evidence—comprised of instances in which fingerprint examiners have made erroneous positive identifications—is unpersuasive. Motion at p. 4. For instance, the defendant cites a 1995 study by David L. Grieve, which examined the results of testing conducted by an independent agency to evaluate the proficiency of various crime labs. *Id.* According to that study, of the 156 fingerprint examiners tested, only 44% were able to correctly recognize the five latent prints to be identified and 22% of the examiners made at least one false identification. *Id.* at p. 4 n.2. He also cites the highly-publicized Brandon Mayfield case where the FBI erroneously identified a Portland lawyer as being the source of a latent print from the bombing of a train station in Madrid. *Id.* at p. 4.

All three experts who testified at the August 25 hearing acknowledged that there have been instances in which fingerprint examiners made erroneous identifications. However, the fact that fingerprint examiners sometimes make false positive identifications is more directly related to the competency of those practitioners, not to the reliability of fingerprint comparison as a methodology. *Mitchell*, 365 F.3d at 240 n.20. Moreover, “even if every false positive identification signified a problem with the identification method itself [], the overall error rate still appears to be microscopic.” *Id.* Indeed, Gische testified that she is only aware of “between 10 and 20” false identifications that have been

documented and publicized out of the “thousands, if not millions, of comparisons [] done annually.”

b) Validation Studies

The defendant maintains that fingerprint comparison evidence is unreliable because no studies have been performed to test the validity of the underlying premise for all fingerprint comparisons: that no two fingerprints are alike. Motion at p. 4. According to the defendant, this underlying premise cannot be tested because “[t]here is no database and no way to determine population frequency.” *Id.*

The defendant does not explain what he means by “population frequency” or how it bears on the issue of whether fingerprint comparison is a reliable technique. *See id.* The Court declines to speculate about arguments, such as this one, that the defendant chose not to properly develop.⁷

The defendant’s implicit assertion that large databases of exemplar fingerprints do not exist is mistaken. *Id.* Such databases do exist, and are commonly used by examiners to identify potential matches to latent prints. *See Mitchell*, 365 F.3d at 224. As Gische testified, the FBI’s automated fingerprint

⁷ To the extent that the defendant’s point is that no studies have been conducted to determine how frequently certain ridge arrangements appear in different populations, he is incorrect. Gische testified that such studies have in fact been conducted and, “thus far, all of these . . . studies [] support that [] friction ridge arrangements are unique from individual to individual.”

database, the Next Generation Identification system, currently has exemplar prints for over 110 million individuals.

The defendant's argument that "there is no way to verify . . . that no two people have the same fingerprint," Motion at p. 4, also lacks merit. "'Testability' has been described as 'falsifiability.'" *Mitchell*, 365 F.3d at 235 (citing *Daubert*, 509 U.S. at 593, 113 S.Ct. 2786). "A proposition is 'falsifiable' if it is capable of being proved false." *Id.* (quotation omitted). The premise challenged by the defendant is testable (or verifiable) because it could be proved false by "the production of two identical friction ridge arrangements taken from different fingers (either from different fingers on the same person, or from two different people)." *Id.* at 236. As the Court noted in *Mitchell*, "in the course of routine fingerprint examination, there are certainly opportunities to encounter identical fingerprints." *Id.* However, despite the fact that the discovery of identical fingerprints from different fingers "would be very notable and would spread quickly throughout the fingerprint examiner community," no such discovery has ever been reported. *Id.* In *Baines*, the Tenth Circuit observed:

[T]he core proposition—that reliable identifications may be made from comparison of latent prints with known prints—is testable. And unquestionably the technique has been subject to testing, albeit less rigorous than a scientific ideal, in the world of criminal investigation, court proceedings, and other practical applications, such as identification of victims of disasters.

Thus, while . . . the technique has [not] been subject to testing that would meet all of the standards of science, it would be unrealistic in the extreme . . . to ignore the countervailing evidence. Fingerprint identification has been used extensively by law enforcement agencies all over the world for almost a century.

573 F.3d at 990.

Further, at the hearing, Gische testified that fingerprint comparison can be used as a reliable means of identification because friction ridge skin is known to be unique and persistent. She explained that friction ridge skin develops in utero and “the arrangements [of friction ridges] are subjected to different genetic and environmental influences that make those arrangements unique from person to person as well as from finger to finger.” According to Gische, the validity of the premise of uniqueness has been tested through studies of identical twins. These studies have shown that even identical twins, who share the same DNA, have different fingerprints. Researchers have also done statistical modeling of the frequency of different friction ridge arrangements and features, and the results of these studies support the proposition “that the friction ridge arrangements are unique from individual to individual.” Gische opined that fingerprints are persistent because they “are formed in their . . . final arrangement prior to birth” and that arrangement remains the same throughout an individual’s life.

Additionally, Gische informed the Court that the results of an individual fingerprint comparison can be validated. In actual casework, an examiner’s

conclusion can be reproduced and validated through the verification step if the reviewing examiner is able to reproduce the same comparison and reach the same conclusion as the first examiner. Performance studies, such as the NAS study and the study by Dr. Langenburg, have also shown that different examiners who are given the same fingerprint comparisons can reach the same conclusions regarding an identification. Gische noted that in the NAS study “[examiners’] decisions were reproduced approximately 90 percent of the time.”

In sum, the Court finds that the premise that no two fingerprints are alike has been sufficiently validated. The Court likewise finds that the methodology for performing a fingerprint comparison has been sufficiently validated to be deemed reliable.

c) Lack of Objective or Uniform Standards

The defendant claims that fingerprint comparison evidence cannot be deemed reliable because there are no uniform standards governing when a fingerprint examiner can make a positive identification; rather, the identification of fingerprints is “left entirely to the subjective judgment of the individual examiner.” Motion at p. 5. For instance, complains the defendant, there is no standard regarding the minimum number of corresponding points that a latent fingerprint must have in common with an exemplar print in order to make a positive identification. *Id.* The defendant also alleges that, in practice, examiners often

disregard the “one dissimilarity doctrine,” which holds that a fingerprint examiner cannot make a positive identification if two fingerprints contain one single point of dissimilarity. *Id.* Again, the Court is not persuaded.

As an initial matter, the Court notes that “subjectivity does not, in itself, preclude a finding of reliability.” *Baines*, 573 F.3d at 991. Thus, the fact that fingerprint examiners may use their subjective judgment to make identifications is not dispositive of whether fingerprint comparison evidence is reliable. Further, contrary to the defendant’s assertion, there are standards for controlling the fingerprint comparison technique. “[W]hile different agencies may require different degrees of correlation before permitting a positive identification, fingerprint analysts are held to a consistent ‘points and characteristic’ approach to identification.” *Crisp*, 324 F.3d at 269. These standards have been established “through professional training, peer review, presentation of conflicting evidence and double checking.” *Id.* (citations omitted); *see also United States v. Pena*, 586 F.3d 105, 110-11 (1st Cir. 2009) (“Though acknowledging the lack of minimum points and relative subjectivity of certain ACE-V protocols, . . . courts have nonetheless found that most of the *Daubert* factors support admitting latent fingerprint identification evidence obtained pursuant to the ACE-V method;” therefore, “against such a backdrop,” the Court could not discern any abuse of discretion in admitting expert testimony based on the ACE-V method); *United*

States v. Llera Plaza, 188 F. Supp. 2d 549, 571 (E.D. Pa. 2002) (“the standards which control the opining of a competent fingerprint examiner are sufficiently widely agreed upon to satisfy *Daubert’s* requirements”).

Gische testified that it is no longer the recommended practice to use the one dissimilarity doctrine. However, Furman opined that in order to make a positive identification, “the latent print and the known print both have to be of value, meaning there’s a sufficient amount of clarity and quantity of information in order to effect an identification, . . . [and] all available information has to be in agreement between the latent print and the known print.” This means that the latent print has to have the “same type of characteristics, it has to flow in the same direction, [and] has to have the same spatial relationship to the other characteristics in the print.”

Gische also testified that requiring an examiner to find a minimum number of points in common in order to make a positive identification would not increase the reliability of the examiner’s ultimate conclusion:

So one of the things that, as fingerprint examiners, we get asked is how many points, how many characteristics do you need to reach an identification? And it’s not as simple as just providing a number, because there are so many different pieces of information associated with each point or with each characteristic. So, for example, the characteristic is going to have a specific location in the print; perhaps the ending ridge is in the core area or perhaps the dividing ridge is above the delta. The characteristics are also going to have a specific type. Is it an ending ridge, is it a dividing ridge, or is it a dot? As well as its direction. So the ending ridge may end pointing up and to

the right, or the dividing ridge may open slightly to the left, as well as spatial relationships to all of the other characteristics in the print. And so for every point or every characteristic that exists in a friction ridge arrangement, all of this information is associated with that and all of that information is taken into account during the comparison process.

Moreover, Gische stated that there is no scientific or statistical basis for requiring a minimum number of points.

2. Qualifications of the Prosecution's Experts

In addition to finding that the anticipated expert opinions are grounded in scientifically reliable techniques, the Court also concludes that the prosecution's endorsed witnesses are qualified by education, training, experience, and knowledge to offer those opinions. The Court reviews each witness's qualifications separately.

a) Sandra Wiese

The People have endorsed Sandra Wiese from the Aurora Police Department as an expert in the field of fingerprint identification. People's Notice of Endorsement (P-58) at p. 2. Wiese examined fingerprints taken from the bodies of the twelve deceased victims and compared them with known fingerprints to confirm the victims' identities. Response at p. 13. She also examined fingerprints recovered from the emergency door to Theater 9, the outside of the defendant's vehicle, the radio found next to the dumpster at the defendant's apartment, and a CD removed from the radio. *Id.* at p. 14.