

STATE OF MARYLAND \* IN THE  
v. \* CIRCUIT COURT  
BRYAN ROSE \* FOR  
\* BALTIMORE COUNTY  
\* Case No.: K06-0545

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**MEMORANDUM DECISION**

Pending before the Court is Defendant’s Motion to Exclude Testimony of Forensic Fingerprint Examiner and Request for a *Frye* Hearing (paper 100000, “Motion to Exclude”). The State opposed the Motion. The Court granted the request to have a *Frye* hearing and the hearing was held May 29 and 30, 2007. Each side presented testimony of one expert to support its position. For the reasons set forth herein, the Court will grant the Motion because the State did not prove in this case that opinion testimony by experts regarding the ACE-V method of latent print identification rests on a reliable factual foundation as required by MD Rule 5-702.

**“Death is Different”**

The State of Maryland has requested that this Defendant be put to death if convicted in this armed carjacking homicide case. A unique jurisprudence has developed especially for cases where the State seeks the death penalty. In short, a case involving the death penalty is prepared and tried differently than other criminal cases, even other murders, in which the death penalty is not sought. In short, “death is different.” *Zant v. Stephens*, 462 U.S. 862, 884-85

(1983); *Woodson v. North Carolina*, 428 U.S. 280, 305 (1976); *Gardner v. Florida*, 430 U.S. 349, 357 (1977); *Ring v. Arizona*, 536 U.S. 584, 605-06 (2002); *California v. Ramos*, 463 U.S. 992, 998-99 (1983); *Lockett v. Ohio*, 438 U.S. 586, 604-05 (1978); *Ford v. Wainwright*, 477 U.S. 399, 411 (1986) (plurality opinion); *Enmund v. Florida*, 458 U.S. 782, 827-28 (1982) (quoting *Lockett v. Ohio*, 438 U.S. 586, 605 (1978)); *Doering v. Fader*, 316 Md. 351, 360 (1989) (quoting *Woodson v. North Carolina*, 420 U.S. 280, 305 (1976)); see *Gilmore v. Taylor*, 508 U.S. 333, 342 (1993) (in capital case, “the Eighth Amendment requires a greater degree of accuracy and fact finding than would be true in a non-capital case”); *Sawyer v. Smith*, 497 U.S. 227, 243 (1990) (stating that “[a]ll of [the Court’s] Eighth Amendment jurisprudence concerning capital sentencing is directed toward the enhancement of reliability and accuracy in some sense”); *Spaziano v. Florida*, 468 U.S. 447, 456 (1984) (“we reaffirm our commitment to the demands of reliability in decisions involving death”). See also *Miller v. State*, 380 Md. 1, 78 (2004) (Raker, J., concurring and dissenting); *Evans v. State*, 304 Md. 487, 552 (1985) (McAuliffe, J., concurring and dissenting).

In every case, evidence is not admissible without certain assurances of reliability. Evidence includes opinion testimony. This Motion concerns whether the State’s Crime Lab technicians will be permitted to offer their expert opinions regarding certain latent fingerprint identification. The precedents cited advise this court that in a case where the death penalty is sought, the court must be even more careful to determine whether the opinions which a party seeks to present at trial will be permitted.

## Case Summary

The instant case is very briefly described as follows based on the State's summary of certain proffered evidence in connection with another motion. A college student parked his car one day. Some days later, the student cannot find his silver Dodge Intrepid and reported it stolen. The Intrepid was listed on a "hot sheet" of stolen cars sought by the Regional Auto Theft ("RAT") police detectives.

On Tuesday, January 5, 2006 at approximately 10:00 a.m., two RAT detectives spotted the Intrepid. They attempted to stop the Intrepid; a chase ensued. The Intrepid got away. The driver and passenger in the Intrepid cannot be identified except as black males.

At approximately 10:30 a.m. the same day, the Intrepid was seen in the Security Square Mall parking lot next to the Victim's Mercedes. A struggle ensued. The Victim was shot by a black man who got into the Intrepid which sped away. No one can identify the driver or passenger except as black males. The abandoned Intrepid was eventually located at the Owings Mills Metro.

At first, no latent fingerprints were identified by the Crime Lab. Homicide detectives suggested names of suspects to the Crime Lab. The known prints of the suspects were compared to the latent prints recovered. Eventually, a couple of latent prints on the cars were identified as those of the Defendant. The identification by one Crime Lab Technician was provided to a second Crime Lab Technician to "verify." She agreed with the identification of her co-worker. These opinions, that the latent print(s) on the cars match Defendant's prints, appear to be the heart of the State's case.

Such a summary cannot do justice to the full presentation of evidence by the State, nor to the cross-examination or presentation of adverse evidence by the Defense. No facts concerning this case have been determined by the Court.

Both sides have requested that the Court determine the issue of reliability of the ACE-V methodology, and consequent admission *vel non* of the latent fingerprints, without reference to the specific fingerprint evidence in this case. Despite having held a hearing on the case specific fingerprint evidence, the Court has acquiesced in the parties' requests that the Court determine the admissibility of latent fingerprint identification opinions without consideration of the case specific information presented.

#### Issue Presented

Whether ACE-V is a methodology which establishes the reliability of the general practice of latent fingerprint identification.

#### Parties' Positions

Defendant contends that ACE-V is not a methodology which has been subjected to scientific testing. As a result, the error rate in latent print identifications is unknown. Absent an error rate, reliability of the methodology is unproven. A fundamental problem, according to Defendant, is that the subjective comparisons in ACE-V involve psychological phenomena known as "confirmation bias." Further, Defendant argues that the "standards" for latent fingerprint identification are inadequate.

The State principally relies on the history of acceptance of fingerprint identification evidence. Maryland courts have found fingerprint identification to

be admissible in the past. Recent court challenges to fingerprint identification evidence have been rejected. Finally, the State claims that the ACE-V methodology is generally accepted in the relevant technical community.

#### Background re Fingerprints

As with any expert testimony, some background in the field and an introduction to the terminology is helpful. From time to time, there have been isolated reports of erroneous fingerprint identifications. It was not until the infamous erroneous fingerprint identification of Brandon Mayfield in 2004 by top FBI latent print examiners, however, that deficiencies in the latent print field received serious attention.

At the May 29-30, 2007 *Frye-Reed* hearing on the Motion to Exclude, without objection by the State, Defendant submitted into evidence the 220 page “A Review of the FBI’s Handling of the Brandon Mayfield Case” (hereafter “Review”) by the U.S. Department of Justice Office of the Inspector General Oversight and Review Division (March 2006), hereafter “OIG.” The OIG Review provides a unique and comprehensive analysis of defects in current latent fingerprint methodology.

Briefly, on March 11, 2004, terrorists detonated bombs on several commuter trains in Madrid, Spain. The Spanish National Police recovered latent fingerprints on a plastic bag containing explosive detonators. The fingerprints were submitted to the FBI for identification on March 13, 2004.<sup>1</sup> On that same day, the Latent Print Unit of the FBI initiated an Automated Fingerprint Identification System (“AFIS”) search in an attempt to match the latent prints

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<sup>1</sup> OIG Review p. 1; *Mayfield v. United States*, WL 2792447 (D. Or. Sept. 26, 2007).

received from Spain with known prints in the FBI computer system. The FBI was unable to locate a fingerprint match.<sup>2</sup> The FBI requested and received from Spain higher resolution digital photographs of eight latent prints. Another AFIS search was performed. The FBI technicians programmed the computer to return 20 candidates whose known prints had features in common with what was identified as Latent Finger Print # 17 (LFP # 17).

The computer produced 20 candidates, each of which was identified by an AFIS “score” that reflected how closely the computer determined each candidate’s fingerprints matched certain features of LFP # 17. Also included was an identification number for each candidate that allowed the FBI to retrieve the names, original fingerprint cards, and demographic information of each candidate on the list. That information allowed the FBI to perform background checks on each of the 20 candidates.

Mayfield’s AFIS “score” ranked # 4 on the list of 20 candidates. Reared in Kansas, Mayfield is an American citizen living with his wife and three children in Oregon. He was 38 years old, a former Army officer with an honorable discharge, and a practicing lawyer. Prior to his arrest, he had not traveled outside the United States since 1994. Mayfield had never been arrested for a crime.<sup>3</sup> FBI examiners were aware of Mayfield’s Muslim faith.<sup>4</sup> The OIG found that this knowledge likely influenced the FBI examiners.<sup>5</sup>

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<sup>2</sup> *Mayfield, supra.*

<sup>3</sup> *Mayfield, supra.*

<sup>4</sup> *Mayfield, supra.*

<sup>5</sup> OIG Review p. 193.

On March 19, 2004, the FBI's Latent Print Unit identified Mayfield as the source of one of the fingerprints.<sup>6</sup> One FBI examiner's conclusion that it was Mayfield's fingerprint was verified by a second FBI examiner. The second examiner knew of the first examiner's conclusion. The misidentification was then reviewed by a supervisor who concurred with the identification.<sup>7</sup>

On April 13, 2004, the FBI learned that the Spanish National Police disagreed that Mayfield was the source of the fingerprints. Nevertheless, Mayfield was arrested in Portland, Oregon as a material witness.<sup>8</sup>

On May 17, 2004, the United States District Court in Oregon appointed an independent expert to review the FBI's fingerprint identification.<sup>9</sup> This expert concurred with the FBI's identification of Mayfield's fingerprint.<sup>10</sup> All three FBI examiners considered their conclusions a "100% positive identification."<sup>11</sup>

On the same day, the Spanish National Police informed the FBI that it had previously identified the fingerprint in question as the fingerprint of a different person, an Algerian national named Ouhnane Daoud.<sup>12</sup> After reviewing Daoud's prints, the FBI withdrew its identification of Mayfield; and, he was released.<sup>13</sup>

Thereafter, the FBI convened an International Panel of experts to determine how the erroneous fingerprint identification occurred. They opined:

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<sup>6</sup> *Id.*

<sup>7</sup> OIG Review p. 2. The supervisor knew of the Mayfield conclusions of the first and second examiners.

<sup>8</sup> *See Mayfield, supra.*

<sup>9</sup> This independent expert was also aware of the Mayfield identification.

<sup>10</sup> OIG Review p. 3.

<sup>11</sup> *Mayfield, supra.*

<sup>12</sup> OIG Review p. 3.

<sup>13</sup> *Id.*

- The first examiner failed to conduct a complete analysis before conducting the computer search;
- The first examiner disregarded important differences in appearance between the latent print and Mayfield's known prints;
- Examiners are overconfident in the power of AFIS;
- Examiners were pressured by the high-profile of the case;
- Verification was "tainted" by knowledge of the first examiner's conclusion.<sup>14</sup>

Recommendations for changes were made including expanded documentation requirements and modified verification procedures. In October 2004, attorneys for the Mayfield family filed a *Bivens* action in connection with the FBI's investigation and arrest of Mayfield.

The Office of Inspector General examined the FBI's conduct in the *Mayfield* case and specifically investigated the causes of the fingerprint misidentification among other objectives. The OIG interviewed 70 individuals, reviewed thousands of pages of documents, and consulted with distinguished latent print examiners outside the FBI.<sup>15</sup>

Several factors caused the FBI's misidentification of the fingerprint. Testimony in the instant case demonstrated that most of the factors are not unique to the *Mayfield* case. The unusual similarity between the latent print and Mayfield's known print was a major factor in the misidentification that confused three experienced FBI examiners and a court appointed expert. Ten of the

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<sup>14</sup> OIG Review pp. 3-4.

<sup>15</sup> OIG Review p. 5.



points in the latent print that were used to identify Mayfield were also later used by different FBI examiners to identify Daoud as the source of the print.<sup>16</sup>

Nevertheless, Mayfield and Daoud did not have identical fingerprints.

The OIG Review of the Mayfield case provides an excellent overview of the latent fingerprint examination process including the ACE-V process and the Integrated Automated Fingerprint Identification System (AFIS). The State's expert in this case, Stephen Meagher, a top FBI latent print examiner, was extremely familiar with the OIG Review. Indeed, he was involved in the withdrawal of the FBI's identification of Mayfield.

The Office of Inspector General's Review of the fingerprint procedures was comprehensive and helpful to an understanding of this practice. As a result, the Court has liberally quoted from, and summarized, the material background information.

#### Fingerprints Generally

Mr. Meagher testified about fingerprints generally as well as about latent print examinations. The science which has produced knowledge of fingerprints was not contested by the Defendant. The biological science concerning fingerprints is different than the "science" or practice of latent fingerprint examinations.

A fingerprint is a reproduction of the pattern of friction ridge formations of the surface of a finger, made as a result of the transfer of oil or other matter during contact between the finger and an object. Friction ridges are the ridges on

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<sup>16</sup> OIG Review pp. 6-7.

the skin of the fingers, palms and feet which produce increased friction for gripping. Friction ridges form prior to birth.<sup>17</sup>

Friction ridge patterns in fingerprints are frequently described in terms of three “levels of detail.” Level 1 detail refers to ridge flow, encompassing familiar patterns such as loops, whorls and arches.<sup>18</sup>

Level 2 detail refers to the details that occur on individual ridge paths, including the turns that each ridge takes, the size and shape of each ridge, and the places where ridges terminate or split, also known as ridge path deviations. Ridge path deviations include features such as ending ridges (where a single ridge comes to an end); bifurcations (where a single ridge splits to form two adjacent, roughly parallel ridges); and dots (extremely short ridges).<sup>19</sup>

A human fingerprint may contain 75-175 ridge path deviations. As a major ridge path deviation develops in the friction skin, other ridge formations develop around it. Ridge path deviations, sometimes called “points” or “minutiae,” are a major focus of latent print examination. The evaluation of Level 2 details also considers ridge paths and the absence of deviations (continuous ridges).<sup>20</sup>

Level 3 detail refers to extremely tiny features of the friction ridges, such as the shape of ridge edges, the width of ridges, and the shape and relative location of pores along the ridges.<sup>21</sup> Each ridge is made of “ridge units.” Each

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<sup>17</sup> OIG Review at p.98 citing David R. Ashbaugh, *Quantitative – Qualitative Friction Ridge Analysis, An Introduction to Basic and Advanced Ridgology* (CRC Press 1999).

<sup>18</sup> *Id.*

<sup>19</sup> *Id.*

<sup>20</sup> *Id.*

<sup>21</sup> Studies designed to evaluate permanence have focused on Level 1 and Level 2 detail. Because examiners also use Level 3 features, additional testing of the “hypothesis of permanence” has been recommended. *Forensic Sci. Comm.* Jan. 2006, vol. 8, No. 1, p. 2. Following the Mayfield misidentification, the FBI tasked 3 of its scientists to recommend

ridge unit includes one sweat gland and one pore opening. Level 3 features may be the result of differential growth or random damage (such as from scarring) at the ridge unit level.<sup>22</sup>

One premise of fingerprint identification is that friction ridge formations persist throughout life except for (1) changes associated with growth, (2) temporary damage to the skin surface, and (3) permanent damage due to scarring of the underlying tissues. A second premise is that friction ridges and their formations are unique to each individual. These premises are commonly referred to as “permanence” and “uniqueness.” The State’s evidence regarding permanence and uniqueness was not contested.

#### Latent Fingerprints

The term “latent fingerprint” is commonly used to describe a fingerprint left at a crime scene. Forensic laboratories use a variety of physical and chemical processing techniques to enhance the visibility of latent prints and to photograph them for comparison purposes.<sup>23</sup>

Latent fingerprints are typically assessed in terms of both the quantity and quality of friction detail that is reproduced. “Quantity” refers generally to the amount of detail available and is affected by many factors. In many latent prints, only a small fraction of the friction ridge detail on a complete finger is reproduced. OIG at p. 99 n.58 citing *United States v. Mitchell*, 365 F.3d. 215, 221, 225 n.5 (3<sup>rd</sup>

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research to test the hypotheses that form the basis of the latent print discipline. Many research projects were recommended.

<sup>22</sup> *Id.*

<sup>23</sup> OIG Review p.99.

Cir. 2004) (testimony suggested that the typical latent print is perhaps 1/5 the size of a full fingerprint).

“Quality” is used interchangeably with “clarity” and is defined as how well the details from three-dimensional ridges are reproduced in a two-dimensional fingerprint.<sup>24</sup> Numerous factors may affect the transfer of detail from the friction ridges of a finger to an object. One factor affecting clarity of a latent fingerprint is the surface or “substrate” upon which the latent fingerprint is deposited.

Distortion can be introduced by sweat, sebaceous oils, blood, or mud on the finger or substrate. Deposition pressure “refers to downward pressure as a print is deposited, or left on a substrate. “ Lateral pressure “refers to sideways or lateral force that may result in sliding of the friction ridges. Both types of pressure can distort the appearance of a latent print.<sup>25</sup>

There are many different development media used to enhance the visibility of latent fingerprints, such as fingerprint powder and various chemicals. The development media can affect the appearance of a latent print and the accuracy with which details are reproduced.<sup>26</sup> Once developed, latent prints are often photographed for purposes of dissemination and/or comparison. Photographic processes and digital imaging can also affect the appearance of a latent print.<sup>27</sup>

Each of the foregoing factors may affect the clarity of a latent print. Because of these factors, latent fingerprints are not perfect reproductions

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<sup>24</sup> OIG Review p. 103.

<sup>25</sup> OIG Review p. 103.

<sup>26</sup> OIG Review p. 104 citing *Ashbaugh*, pp.120-122. The State’s expert witness, Stephen Meagher, acknowledged the expertise of *Ashbaugh*.

<sup>27</sup> OIG Review p. 104 citing *Ashbaugh*, p.93.

of the friction ridges, even over a small area.

### Known or Exemplar Prints

The identification of a latent fingerprint is established through the agreement of friction ridge formations between the latent print and the known print of a particular candidate. “Known” or “exemplar” fingerprints are friction ridge impressions known to be those of a particular person, taken under controlled circumstances, such as during an arrest. In many cases when a subject is fingerprinted, a record is made of both individual rolled prints<sup>28</sup> plus flat prints for all 10 fingerprints.<sup>29</sup>

Because known prints are taken under controlled conditions, the quantity and quality of detail captured in known prints is typically greater than is available in the latent print of interest.<sup>30</sup>

### ACE-V Process for Latent Print Identification

The Baltimore County Crime Lab, the Maryland State Police, the FBI and many other crime laboratories utilize the “ACE-V” method for inspecting latent fingerprints. ACE-V is an acronym for the four steps of the method:

Analysis  
Comparison  
Evaluation  
Verification

The ACE-V method “includes both qualitative and quantitative analysis” according to The Scientific Working Group for Friction Ridge Analysis, Study and

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<sup>28</sup> *Id.* n a “rolled print,” the image is made by rolling the surface of the finger from nail edge to nail edge in an effort to capture as much detail as possible. Electronic fingerprint capture devices are becoming more commonplace.

<sup>29</sup> OIG Review p. 104.

<sup>30</sup> OIG Review p. 104.

Technology hereafter referred to (“SWGFAST”).

## 1. Analysis

“Analysis” is the subjective assessment of a friction ridge impression to determine suitability for comparison. Various factors to be considered include the quality (clarity) of detail at all three levels and the various factors described above that may affect the appearance and reliability of details reproduced in a latent print.<sup>31</sup>

According to Mr. Meagher, the analysis should be performed before consideration of any available known prints to be compared to “limit or try to restrict any bias in terms of what appears in the known exemplar.” The respected expert David Ashbaugh describes<sup>32</sup> the concern this way:

During forensic comparison one must maintain an objective state of mind to guard against seeing things that are not there.

The OIG noted that examiners have described Analysis as a repetitive process in which an examiner’s initial interpretation of a latent fingerprint may be adjusted during the comparison phase as it is “informed by features in the known print.”<sup>33</sup> The ACE-V methodology does not require the examiner to create a written record of the analysis even though preparing a written Analysis prior to Comparison promotes, objectivity and removes the opportunity for anyone to suggest that one is seeing friction ridge details where none exist.<sup>34</sup>

## Comparison

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<sup>31</sup> OIG Review p. 105.

<sup>32</sup> OIG Review quoting *Ashbaugh*, p.105.

<sup>33</sup> *Id.*

<sup>34</sup> OIG Review p. 107.

The Comparison phase of ACE-V is “the direct side-by-side observation of friction ridge detail in the latent and known prints to determine whether the detail in two impressions is in agreement based on similarity, sequence and partial relationship.” There are no standards or protocols that a comparison be conducted on a particular scale.<sup>35</sup>

Differences in ridge flow, such as a whorl pattern in the latent versus an arch pattern in the known exemplar may enable an examiner to exclude the exemplar without further comparison. Assuming the latent is deemed sufficiently similar to the latent to merit further comparison, the examiner compares the prints on a ridge-by-ridge basis, looking for similarity and dissimilarity at all three levels of detail.<sup>36</sup>

Matching Level 2 ridge deviations in the latent and known prints are sometimes referred to as “points of similarity,” and are often used in enlargements to demonstrate identifications.<sup>37</sup>

Level 3 details are sometimes used to support identifications, but the reliability of these very small details in latent prints is the subject of continuing debate within the fingerprint community. One SWGFAST member and former California Department of Justice examiner has written:

There is such a degree of variation in appearance in the 3<sup>rd</sup> Level detail due to pressure, distortion, over or under processing, foreign or excessive residue on the fingers, surface debris and surface irregularity, to name a few. The repeatability of finite detail that is utilized in the comparison process has never been subjected to a definitive

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<sup>35</sup> OIG Review pp. 107-108.

<sup>36</sup> OIG Review p. 108.

<sup>37</sup> OIG Review p. 108.

study to demonstrate that what is visible is actually a true 3<sup>rd</sup> level detail or an anomaly.<sup>38</sup>

## Evaluation

The Evaluation phase of the ACE-V process is defined as “the formulation of a conclusion based upon analysis and comparison of friction ridge impressions”. There are three possible conclusions: individualization (identification), exclusion, and inconclusive.<sup>39</sup>

Individualization is a determination that two friction ridge impressions, for example, the latent print and the exemplar(s) originated from the same source, to the exclusion of all others. The individualization is the result when the compared impressions contain “sufficient quality (clarity) and quantity of friction ridge detail in agreement.” There is no elaboration of “sufficient.” There is no scientific basis for requiring that a predetermined number of corresponding friction ridge details be present to effectuate individualization.<sup>40</sup> Nevertheless, various crime labs require certain minimum points of friction ridge detail similarities.<sup>41</sup> There is a vigorous debate within the discipline regarding the need for objective minimum criteria for declaring an identification.

The second permissible conclusion is “exclusion” which is a determination that “two friction ridge impressions originated from different sources.” The standard for exclusions is “disagreement of friction ridge details.” The standards require the absence of any “discrepancy” as a condition of individualization.

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<sup>38</sup> OIG Review pp. 108-109 citing Dusty Clark, “What is the Point,” [http://www.latent.prints.com/id\\_criteria\\_jdc.htm](http://www.latent.prints.com/id_criteria_jdc.htm). December 15, 1999.

<sup>39</sup> OIG Review p. 109.

<sup>40</sup> OIG Review p. 109 citing SWGFAST Standards.

<sup>41</sup> The testimony of the two Baltimore County Crime Lab Technicians in the case specific hearing was inconsistent as to what the Crime Lab required standards were, for example.



The third permissible conclusion in latent print examination is “inconclusive.” “Inconclusive” is defined as a determination that the latent examiner is “unable to individualize or exclude the source of an impression.”

#### Verification

“Verification” is defined as examination by another qualified examiner resulting in the same conclusion.<sup>42</sup> Although Mr. Meagher described the process as “independent,” he was not credible on this point. “Verifiers” consult with first examiners. Moreover, verifiers are advised of the first examiner’s identification. A refused verification is unusual.<sup>43</sup> Even in the event the first verifier declines to confirm the identification, a second verifier can be selected. In that instance, there is no policy requiring that the first verifier’s disagreement be documented in the case file.<sup>44</sup>

#### Lack of Objective Standards for Identification

Countries other than the United States, utilize a Numerical Standard for identification based on a specific number of minutiae or “points” in correspondence as to type, orientation, and relative position. The premise of establishing such a standard is that the probability of encountering two different fingers that share that number of minutiae in common is infinitesimal and can be disregarded.<sup>45</sup> There is vigorous debate among fingerprint examiners, other forensic scientists, academics, and lawyers regarding the comparative merits of

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<sup>42</sup> Labeling the step “verification” seems to preordain the result.

<sup>43</sup> Statistics are not maintained. OIG Review p.115.

<sup>44</sup> OIG Review p. 115.

<sup>45</sup> OIG Review p. 117.

the Numerical Standard, and an alternative, the Ridgeology Standard.<sup>46</sup>

Automated Fingerprint Identification System (“AFIS”) is a system for conducting computerized searches of databases containing the known fingerprints of tens of millions individuals.<sup>47</sup> Latent print examiners use AFIS to attempt to identify latent fingerprints in cases lacking known suspects. AFIS contains prints taken pursuant to arrests, for military service or government employment, and other sources.<sup>48</sup> Most AFIS searches do not result in identifications.<sup>49</sup>

### Documentation Requirements

Generally a fingerprint identification report is required to contain the following sections:

- (1) administrative information about the request for examination
- (2) a listing and description of the evidence submitted to, or examined
- (3) remarks
- (4) results of examination

There is no requirement that the different phases of the ACE-V examination process be described or explained in any way.<sup>50</sup>

### Errors

There are two kinds of errors that an examiner can make in reaching a conclusion about a latent fingerprints: an erroneous individualization (“false

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<sup>46</sup> OIG Review p. 117.

<sup>47</sup> OIG Review p. 118.

<sup>48</sup> OIG Review p. 118.

<sup>49</sup> OIG Review p. 120.

<sup>50</sup> OIG Review p. 122.

positive”) or a missed identification (“false negative”). An erroneous identification is the most serious error a latent print examiner can make in case work.<sup>51</sup>

Latent print examiners concede that two experts with different levels of training, experience, and ability may differ in their conclusions between inconclusive and identification, or between inconclusive or exclusion, without either of them having committed an error.<sup>52</sup> However, conflicting opinions of identification and exclusion denotes an error on the part of one examiner.<sup>53</sup> .  
Indeed, Mr. Meagher testified in this case that he is able to make identifications today that he would not have been able to do thirty (30) years ago.

### Discussion

MD Rule 5-702 addresses the testimony of expert witnesses at trial. The Rule provides that expert testimony, in the form of an opinion or otherwise, may be admitted 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 Rule requires the court to consider

whether the witness is qualified as an expert by knowledge, skill, experience, training, or education . . . the appropriateness of the expert testimony on the particular subject, and . . . whether a sufficient factual basis exists to support the expert testimony.

In short, the court must determine whether the opinion testimony of the expert rests on a reliable foundation.

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<sup>51</sup> A missed identification may be the result of applying a conservative approach to identification to prevent false positives.

<sup>52</sup> OIG Review p. 124.

<sup>53</sup> *Id.*

Maryland adheres to the standard set forth in *Frye v. United States*, 293 F. 1013 (D.C.Cir. 1923), overruled by *Daubert v. Merrell Dow*, 509 U.S. 579 (1993), for determining the admissibility of scientific evidence and expert scientific testimony. *Reed v. State*, 283 Md. 374, 389 (1978). Under the *Frye – Reed* test, a party must establish first that a technical or scientific method is reliable and accepted generally in the scientific community<sup>54</sup> before the court will admit expert testimony based upon the application of the questioned technique. *Montgomery Mutual Ins. Co. v. Chesson*, 399 Md.314, 327 (2007), citing *Wilson v. State*, 370 Md. 191, 201 (2002).

Maryland appellate courts have noted that before the testimony based on the questioned technique may be admitted into evidence, the reliability must be demonstrated. *Wilson*, 370 Md. at 201. The basic “gate-keeping” obligations imposed by the appellate courts on trial courts applies not only to “scientific” testimony, but all expert testimony. *Conaway v. Deane*, \_\_\_ Md. \_\_\_, n.57 (Sept. 18, 2007) (citing *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 147-49 (1999)). *Kumho* extended *Daubert* to non-scientific fields. In this category, for example, are the fields that are based on observations, such as latent fingerprint suspicion not traditional sciences such as land valuation, drug terms, agricultural practices. *United States v. Hines*, 55 F.Supp.2d 62, 66 (D. Mass. 1999) (concluding that expert can testify to similarities or dissimilarities between handwriting samples but not render identification).

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<sup>54</sup> The State’s witness, Stephen Meagher, did not testify that latent print examination is a “science.” Perhaps, it is a discipline. The State argues that the relevant community is the “latent print examination “ community.

While the most common practice will include witness testimony, a court may take judicial notice of journal articles from reliable sources and other publications which may shed light on the degree of acceptance *vel non* by recognized experts of a particular process or view. *Reed*, 283 Md. at 380. The opinion of an “expert” witness should be admitted only if the court finds that “the basis of the opinion is generally accepted as reliable within the expert’s particular scientific field.” *Montgomery Mutual Ins. Co., v. Chesson*, 399 Md. at 327 citing *Wilson*, 370 Md. at 201.

From time to time Maryland courts have rejected expert opinion testimony for failing to meet the *Frye-Reed* Standard. In *Wilson*, the Court of Appeals found that the trial court erred in permitting the State to use statistical data and a product rule computation to prove the improbability of two Sudden Infant Death Syndrome deaths in a single family. *Wilson*, 370 Md. at 195. In *Montgomery Mutual Ins. Co., supra*, the expert witness offered a medical opinion that was based on an underlying scientific principle. The Court of Appeals found that the trial court was clearly erroneous in refusing to hold a *Frye – Reed* hearing concerning the doctor’s opinions regarding mold exposure and illness. The case was remanded for an evidentiary hearing to ascertain whether the doctor’s methodologies used for diagnosis and theories regarding the causal connection between human health effects were generally accepted in the scientific community.

Based on new information including erroneous identifications questioning whether ACE-V leads to reliable latent fingerprint identifications, the Court

agreed to the Defendant's request in the instant case for a hearing. At the hearing, the State sought to demonstrate that ACE-V is a methodology which establishes the reliability of general latent fingerprint identification practices.

In utilizing the *Frye* test, the burden is on the proponent of the evidence to prove the reliability of the general acceptance of both the underlying scientific principle(s) and the testing procedures used to apply that principle(s) to the facts of the case at hand. The trial judge has the sole responsibility to determine this question. The general acceptance under the *Frye-Reed* test must be established by a preponderance of the evidence.<sup>55</sup> The *Frye-Reed* test has been applied to determine the admissibility of various types of evidence.<sup>56</sup>

The State's primary argument is that history favors acceptance of latent print identifications. Indeed, such identifications have been admitted for nearly one hundred years. So established is such evidence that the State opposed the Defendant's request for a *Frye-Reed* hearing. Moreover, the State requested that the Court take judicial notice of the reliability of latent print identification evidence. Indeed, in *Reed v. State*, 283 Md. at 380, cited by the State, the Court stated:

On 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. Such is commonly the case **today** with regard to ballistics tests, fingerprint identification, blood tests, and the like.

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<sup>55</sup> See *Ramirez v. State*, 810 So.2d 836, 844 (Fla.2001).

<sup>56</sup> See *Ramirez, supra*, at 845 n.18, for example, barring evidence based on hypnotically refreshed memory, child abuse syndrome, polygraph examinations and approving evidence of blood alcohol tests, battered woman syndrome (citations omitted).

(citation omitted) (emphasis added). The inclusion of the word “today” in the quote, referring to 1978, is significant. Due process considerations require trial courts to act, as guided by legal precedent, where science reveals that previously accepted methods are not proved reliable. See *Armstead v. State*, 342 Md. 38 (1996) (considering statute governing admissibility of DNA).<sup>57</sup>

Part of the due process guaranty is that an individual will not suffer punitive action as a result of an inaccurate or unproven scientific or technical procedure. *Armstead, supra* at 82. Test results need not be infallible to meet the standard for due process. Rather, the test results must be of such a quality as not to prevent a fair trial. *Id.* In *Armstead*, the jury was fully informed of the laboratory error rate concerning statistical evidence of probability of a DNA match; and, the defendant had a full opportunity to address the error rate on cross-examination.

Like Maryland, Florida applies the *Frye* standard to expert opinion testimony. In *Ramirez v. State*, the Supreme Court of Florida reversed the trial court’s admission of opinion testimony from the prosecution expert that a knife found in the defendant’s car was **the** murder weapon to the exclusion of every other knife in the world. 810 So.2d 836 (Fla.2001) The defendant, convicted on first-degree murder, armed robbery and armed burglary, was sentenced to death. Ramirez contended that the identification method – comparing cut cartilage to the

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<sup>57</sup> Since the publication of the OIG Review, the trend toward admissibility of latent print identification may be changing. See *State v. Rockingham*, Docket No. 05-5-1129, Sup. Ct. N.H., Jan. 19, 2007 finding that application of ACE-V was unreliable as a result of incomplete documentation and possibly biased verification.

knife edge was untested. Finding the State failed to present sufficient proof of reliability, the Florida Supreme Court noted that:

- the determination was subjective
- there are no minimum number of matching prints or other objective criteria
- no notes are required and so there is no documentation of the expert's work
- matches are made with absolute certainty, exceeding the certainty of DNA testing
- no testing or verification by independent means
- no meaningful peer review
- no error rate quantified

Since independent and impartial proof of general scientific acceptability is required to provide a foundation under *Frye*, the opinion testimony was inadmissible. *Ramirez, supra*. The *Ramirez* court noted that the claim of absolute certainty, which is also made in the instant case, warrants careful scrutiny, especially in a capital proceeding. *Ramirez, supra*, at 850.

The State is correct that fingerprint evidence has been used in criminal cases for almost a century. While that fact is worthy of consideration, it does not prove reliability. For many centuries, perhaps for millennia, humans thought that the earth was flat. The idea has a certain intuitive appeal. Indeed, there still exists a Flat Earth Society for people who cling to the idea the earth is not an orb. *Armstead, supra* at n.26. But science has proved that the earth is not flat; and, it is the type of fact of which a court can take judicial notice.

Maryland cases accepting latent print identifications in the past were not presented with proof of erroneous identifications which refute the infallibility claimed by the State's expert in this case. Mr. Meagher has stated that the FBI



testifies to “a 100 percent certainty that we have an identification.”<sup>58</sup> By that, he meant that FBI agents do not go in court and say “I believe it’s a match with 80 percent certainty or 90 percent certainty.”<sup>59</sup> Mr. Meagher claimed that there is no error rate for ACE-V. This testimony was not credible.

The 100 percent certainty expressed by Mr. Meagher in this case, as well as in other forum, and others has been persuasively questioned by some academics and defense counsel. The absolute certainty has been proved to be wrong in the past. The Mayfield case is not the only erroneous identification. See *Cooper v. Dupnik*, 963 F.2d 1220 (9<sup>th</sup> Cir. 1992) and incidents mentioned in Defendant’s motion.

The Court does not by this conclusion suggest that latent fingerprint identification could never be admissible in another case. Future admissibility particularly may occur since the ACE-V methodology is changing, and as technology continues to improve.

The long history of use of fingerprint identification does not by itself support the decision to admit it. Courts began admitting fingerprint evidence early last century with relatively little scrutiny. Relying on precedent, later courts simply followed. The precedent of prior admission, rather than exacting scientific scrutiny, led to its universal acceptance. *United States v. Crisp*, 324 F. 3d 261 (4<sup>th</sup> Cir. 2003) Michael, Jr. dissenting, citing *Cole* (noting that fingerprint evidence became widely accepted although “latent fingerprint identification was...not

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<sup>58</sup> OIG Review p. 111 n.78.

<sup>59</sup> *Id.*

based on scientific research at all [] [but] [i]nstead...was based on anecdote, experience, and nineteenth century statistics”) (citations omitted).<sup>60</sup>

Other forms of evidence in vogue when fingerprinting began to be commonly used were generally believed to be *more* credible.<sup>61</sup> For example, experts in the Bertillon technique took minute measurements of the human body to identify criminals. The Bertillon technique is considered absurd today. See *People v. King*, 266 Cal.App.2d 437 (1968) (noting that we should heed the “tragic lessons of the Bertillon system”).

Fingerprinting rose in popularity because prints could be taken and analyzed quickly by those with little training or experience. It emerged as a method of identification not superior to anthropometry (the Bertillon technique), but quicker and cheaper. *Crisp, supra*. The long history of use does not itself establish its reliability.

While the ACE-V methodology appears amenable to testing, such tests have not yet been performed. *United States v. Sullivan*, 246 F.Supp.2d 700, 704 (E.D. Ky 2003) (finding expert’s testimony sufficiently reliable under *Daubert*). The principles underlying ACE-V, that is the uniqueness and permanence of fingerprints, cannot substitute for testing of ACE-V. There have been *no* studies to establish how likely it is that partial prints taken from a crime scene will be a match for only one set of fingerprints in the world. *Id.*

The issue is not the finding of two fingerprints that are alike, but

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<sup>60</sup> The Court has cited to the dissenting opinion in *Crisp* for the historical context of judicial acceptance of fingerprint identification opinion testimony. The majority in *Crisp* determined that admission of expert testimony regarding fingerprint evidence was not an abuse of discretion. *United State v. Crisp*, 324 F.3d 261 (4<sup>th</sup> Cir.2003).

<sup>61</sup> *Id.*

rather the finding of prints from two different fingers that can be mistakenly judged to be alike by a fingerprint examination.

David A. Stoney, *Fingerprint Identification: The Scientific Basis of Expert Testimony on Fingerprint* in 3 *Modern Scientific Evidence: The Law and Science of Expert Testimony* § 27-2.0, § 27-2.1.2[6] (David L. Faigman *et al.*, eds., 2002) cited in *Crisp, supra*.

The State also points to “general acceptance” of fingerprint identification outside of law enforcement in the areas of:

Military and Disaster Identification  
Hospitals: Infant Identification  
Security: Biometrics  
Civil Service  
Immigration

In this case, the State failed to prove how fingerprints taken in the areas listed above relate to **latent** fingerprint identification as described in this case. The Comparison of known exemplars is not at issue. In any event, while Defendant has argued a number of reasons why general acceptance should be discounted, Defendant has not challenged the notion that latent fingerprint identifications have been generally accepted. Rather, Defendant’s contention is that the reliability of such identifications have not been proved since they have not been subjected to scientific testing.

In this case, as in others, the State introduced evidence that fingerprint experts take and pass proficiency tests. There is no basis for a conclusion that these tests reflect real world conditions. *Crisp, supra* (citations omitted).

Mr. Meagher incredibly testified that there is no error rate in ACE-V as it is an infallible methodology. He attributed all erroneous identifications to examiner

error in applying the methodology. Mr. Meagher was neither credible nor persuasive in this regard. Without impartial testing, however, whether or not the methodology is infallible is unknown.

An error rate, or lack thereof, must be demonstrated by reliable scientific studies, not by assumption. Where tests have attempted to imitate actual conditions, error rates by fingerprint examiners have been alarmingly high.

*Crisp, supra*, citing Epstein:

In a 1995 test conducted by a commercial testing service, less than half of the fingerprint examiners were able to identify correctly all of the matches and eliminate the non-matches. On a similar test in 1998, less than sixty percent of the examiners were able to make all identifications and eliminations. An error rate that runs remarkably close to chance can hardly be viewed as acceptable under *Daubert*.

*Crisp, supra*, at 275. *Frye-Reed* is a more stringent standard than *Daubert*.

The lack of critical testing might not be so disturbing were it not for the ACE-V methodology's use of entirely subjective judgments.<sup>62</sup>

In the *Mayfield* case, the initial interest in the Mayfield print according to the OIG was attributable to the close similarity to LFP #17. Once the similarity was noticed, the process of "circular reasoning" began to infect the examiner's mental process, particularly in the absence of standards or safeguards to require the examiner to document which features were observed in the latent print during the analysis and which were only suggested during the comparison phase.

These errors occurred in the Level 2 details.<sup>63</sup>

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<sup>62</sup> While experts may opine based on their subjective judgments, for example in psychiatry, the criteria on which such judgments are based must be based on scientific or technical research. Such research is absent in the field of latent print identification.

<sup>63</sup> OIG Review p.150.

The errors in the Level 3 details portion of the Mayfield examination were fundamentally different. None of the Level 3 features utilized by the FBI examiners to identify Mayfield had any correspondence to any points in the latent print.<sup>64</sup> Mr. Meagher found no useable Level 3 detail in the latent print when he identified that print to Daoud. *Id.*

In trying to refute the findings of deficiencies in the FBI's use of the ACE-V methodology by the Office of the Inspector General, the State's witness, Mr. Meagher, again was neither credible nor persuasive. The OIG recommended that examiners be required to document features to be used in the analysis phase before comparison begins to avoid the detrimental effect of "confirmation bias" or context effect.<sup>65</sup>

The State did not establish in this case that there are any objective or universal standards that govern the application of the ACE-V technique that would establish its reliability. Mr. Meagher asserted that there were standards, but the degree of similarity required to individualize prints is left up to each individual examiner. Forensic experts argue: "[a]ny unbiased intelligent assessment of fingerprint identification practices today reveals that there are, in reality, no standards." *Crisp* citing *Stoney, supra.*

Mr. Meagher testified that there are no minimum number of points required for a match. The trend away from a minimum-point requirement may not be unreasonable because the requirement is not based on scientific study. Epstein (quoting a fingerprint expert as saying that the point system is based on

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<sup>64</sup> OIG Review p.151.

<sup>65</sup> OIG Review p.191 see also OIG Review p.144..

“educated conjecture”). The criteria for absolute identification are ill-defined and little more than “the product of probabilistic intuitions widely shared among fingerprint examiners, not of scientific research.” Stoney; see also Cole.

Examiners are supposed to reject as matching a pair of prints that contain even one dissimilarity according to Mr. Meagher. Yet the OIG Review described how the experts in *Mayfield* believed the prints matched and so they explained away the differences rather than discounting the match. See also Epstein, *supra* at 640, cited in *Crisp* at 275. Nor is *Mayfield* the only proven case of an erroneous identification. See, e.g., *Cooper v. Dupnik*, 963 F.2d 1220 (9<sup>th</sup> Cir. 1992) and other incidents of erroneous identifications cited in Defendant’s Motion to Exclude.

The safety check in ACE-V is supposed to be the Verification phase. Any verification which does take place is not truly independent, since the reviewer is usually a colleague or supervisor in the same Forensic lab who is told of the first examiner’s identification. Moreover, the reviewer is provided only the latent and the exemplar, that is the “match” to consider. Mr. Meagher’s testimony that this procedure is adequate to avoid erroneous identification was neither credible nor persuasive.

In the only case to cited by either side to have considered the OIG Review, the trial court determined that ACE-V is a reliable method; but, its accuracy is dependent on accurate application by the practitioner. *State v. Rockingham, supra*. In that case, the New Hampshire trial court held that there was an insufficient basis for the court to find that ACE-V principles were reliably

applied. Consequently, the court refused to allow the State's expert to testify to her opinion regarding a single latent print recovered because she had not documented her examination and there had been no "blind" verification.

Conclusion

In conclusion, the proof presented by the State in this case regarding the ACE-V methodology of latent fingerprint identification showed that it was more likely so, than not so, that ACE-V was the type of procedure *Frye* was intended to banish, that is, a subjective, untested, unverifiable identification procedure that purports to be infallible. After impartial scientific testing, the establishment of an error rate and of objective criteria which when applied, are documented and can be verified, it may be that latent print identification opinion testimony as offered in this capital case will qualify for admission under *Frye-Reed*. The State did not meet that burden in this case and, consequently, shall not offer testimony that any latent fingerprint in this case is that of the Defendant. In this case, the State did not show by a preponderance of evidence that a fingerprint examiner can reliably identify a fingerprint to an individual to the exclusion of all others using the ACE-V method.

Date: \_\_\_\_\_

\_\_\_\_\_  
Judge Susan Souder

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