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**IN THE UNITED STATES DISTRICT COURT**  
**DISTRICT OF UTAH, CENTRAL DIVISION**

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UNITED STATES OF AMERICA,	/	<b>AMENDED MEMORANDUM IN</b>
		<b>SUPPORT OF MOTION TO EXCLUDE</b>
Plaintiff,	/	<b>TESTIMONY OF GOVERNMENT</b>
		<b>FINGERPRINT EXPERTS</b>
vs.	/	
THOMAS JAMES ZAJAC,	/	
		Case No. 2:06-CR-811CW
Defendant.	/	

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Comes now the Defendant, by and through his attorneys of record, and submits this Memorandum setting forth the reasons why the government should be precluded from its intention to use fingerprint evidence, and to call at trial, fingerprint examiners from Alcohol, Tobacco, Firearms & Explosives (ATF&E), and the Salt Lake City Police Department (SLCPD), to testify that a latent fingerprint which was recovered from the remnants of a bomb explosion at the Salt Lake City Library was left, with absolute certainty and to the exclusion of every other finger in the world, by Mr. Tom Zajac.

A Daubert hearing began on March 1, 2010. Both the Government and the Defendant called expert witnesses to testify.

*A. Ms. Bonnie Stewart:*

Bonnie Stewart (Stewart), is a crime lab supervisor for the Salt Lake City Police Department (hereinafter SLCPD). (Tr. 6) Stewart has been a supervisor at SLCPD for approximately one year, and prior to that a crime lab technician for seven years. (Tr.7, 8)

Stewart holds a bachelor's degree from Weber State University in Criminalistics. (Tr. 8) When she was hired by SLCPD, Stewart attended a 120-hour fingerprint training at the FBI academy in Quantico, VA, a 40-hour class taught by David Ashbaugh on Ridgeology, and a palm print class at the American Institute of Applied Science Course on fingerprints. (Tr. 9, 35, 36, 37)

Stewart is an adjunct professor for Salt Lake Community College. She teaches Introduction to Forensic Science, wherein a portion of the class is devoted to fingerprint analysis and comparison processing. (Tr. 9, 10)

Stewart is a member of the Utah Division of International Association for Identification, and has served as president of that organization. (Tr. 10) She was certified as a fingerprint examiner by SLCPD in 2003. (Tr. 37) However, she is not certified by the International Association of Identification (IAI). (Tr. 37, 38) Nor is the SLCPD crime lab ASCLD certified. (Tr 41)

Stewart's duties include supervising other technicians, overseeing day-to-day operations of the lab, reviewing reports, photographs, overseeing documentation of major crime scenes, making case assignments and overseeing those assigned to the tasks. (Tr. 6, 7)

As it relates to the Defendant's matter, Stewart found a piece of cardstock in the bomb debris, wherein a latent print with potential comparable value was found. Ninhydrin was used to process the latent print. (Tr. 21, 22, 25) Stewart did not conduct a fingerprint comparison. (Tr. 20)

Stewart testified in general, about the procedures involved in fingerprint comparison. (Tr. 12) She described the ACE-V methodology, which is what is used in the SLCPD crime lab. (Tr 45, 46, 47, 48)

*B. Mr. Jeff Lewis:*

Jeff Lewis (Lewis) is the chief of the Identification Section for the Forensic Science Laboratory for the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF&E) in San Francisco, CA and has been for a year and a half. (Tr. 334-335) Lewis is a Certified Latent Print Examiner through the International Association for Identification (IAI). (Tr. 337)

Lewis' specialized training includes a degree in criminal justice, over 500 hours of formalized training in areas of fingerprint analysis, comparison, evaluation and development, courses for analyzing latent prints for the purposes of entering them into AFIS systems, and analysis of palm prints for the purposes of comparison. (Tr. 335-336)

In addition, Lewis is a member of the International Association for Identification, California State Division, and the Southern California Association of Fingerprint Officers. He also teaches fingerprint examination for the regional occupational program for Orange County, CA. (Tr. 336-337)

Lewis has testified in court at least 25 times and during his career has made approximately 85,000 comparisons. (Tr. 337-338)

*C. Dr. Simon Cole:*

Dr. Simon Cole holds a bachelor's degree in history from Princeton University. He holds a PhD in science and technology studies from Cornell University. This is an interdisciplinary field of social science that uses the tools of social science drawn from sociology, anthropology, history, and philosophy, to study the social phenomenon of science and technology in society. (Tr. 598)

Dr. Cole's general area of research is the science and technology in law and criminal justice. Within that, he focuses on forensic science in criminal law. (Tr. 599) And from there, focuses mainly of on latent print identification. He has published numerous books and articles in that area. (Tr. 599) One is titled "The History of Fingerprint Identification and Other Identification Techniques," published in 2001; another, "Truth Machine," published in 2008 wherein he is a co-author. He has also published at least 18 journal articles and eight more book chapters in academic books and other publications. (Tr. 599)

Dr. Cole is an associate professor and the Chair in the Department of Criminology Law and Society at the University of California at Irvine. (Tr. 599)

## **POINT I**

### **THE EXPERT TESTIMONY ELICITED FROM THE GOVERNMENT WITNESSES DOES NOT SATISFY ANY OF THE DAUBERT REQUIREMENTS, THUS THEY SHOULD NOT BE ALLOWED TO TESTIFY AT DEFENDANT'S TRIAL**

#### **1. The Standard:**

Under Federal Rule of Evidence 702, the proponent, in this case the government, of expert testimony must establish, among other things, that the witnesses's "testimony is the product of reliable principles and methods, and . . . that the witness has applied the principles and methods

reliably to the facts of the case.”

The Supreme Court has made clear that federal trial judges, pursuant to Fed. R. Evid. 702, have a special “gate keeping” obligation to insure that only “reliable” expert testimony be presented to jurors. Kumho Tire v. Carmichael, 526 U.S. 137, 147 (1999) (“In Daubert, this Court held that Federal Rule of Evidence 702 imposes a special obligation upon a trial judge to ensure that any and all [expert] testimony . . . is not only relevant, but reliable.”) (quoting Daubert v. Merrell Dow Pharmaceuticals, 509 U.S. 579, 589 (1993)).

The Daubert Court suggested five factors that trial courts should ordinarily consider in determining whether proffered expert testimony is sufficiently reliable. The first and most critical factor is whether the “theory or technique . . . can be (and has been) tested.” Id. at 593. As the Court recognized, testing of a technique is critical for an assessment of its reliability. Id.

A second closely related factor that the Daubert Court suggested is “whether the theory or technique has been subjected to peer review and publication.” Id. at 593. The Court recognized “submission to the scrutiny of the scientific community is a component of ‘good science,’ in part because it increases the likelihood that substantive flaws in methodology will be detected.” Id. Accordingly, “[t]he fact of publication (or lack thereof) in a peer reviewed journal . . . [is] a relevant, though not dispositive, consideration in assessing the scientific validity of a particular technique or methodology on which an opinion is premised.” Id. at 594.

A third factor is the “existence and maintenance of standards controlling the technique’s operation.” Daubert, 509 U.S. at 594. As an example, the Supreme Court cited the Second Circuit’s opinion in United States v. Williams, 583 F.2d 1194, 1198 (2d Cir. 1978), in which the Second

Circuit observed that the “International Association of Voice Identification . . . requires that ten matches be found before a positive identification can be made.” Id.

The fourth factor that should “ordinarily” be considered is the “known or potential rate of error” of the particular technique. Id. at 594. In this regard, the Court cited the Seventh Circuit’s decision in United States v. Smith, 869 F.2d 348, 353-354 (7th Cir. 1989), in which the Seventh Circuit surveyed studies concerning the error rate of spectrographic voice identification techniques. Id.

Finally, the Daubert Court held that “general acceptance can . . . have a bearing on the inquiry.” Id. “A reliability assessment does not require, although it does permit, explicit identification of a relevant scientific community and an express determination of a particular degree of acceptance within that community.” Id. (quoting United States v. Downing, 753 F.2d 1224, 1242 (3d Cir. 1985)). The Court recognized that, “widespread acceptance can be an important factor in ruling particular evidence admissible and a ‘known technique which has been able to attract only minimal support within the community’ . . . may properly be viewed with skepticism.” Id. (quoting Downing, 753 F.2d at 1238).

As will be demonstrated below, the government’s proposed expert testimony fails with respect to *each and every factor* that has been identified by the Supreme Court. The opinions offered by the government’s witnesses should not be admissible in the Defendant’s upcoming trial. Their testimony did not establish the reliability of latent fingerprint identification. The government did not meet its burden by establishing that the reasoning and methodology underlying latent print

evidence is scientifically valid. United States v. Rodriguez-Feliz, 450 F. 3d 1117, 1120 (10<sup>th</sup> Cir. 2006)

## **2. Discussion:**

Stewart described a latent print as a print that is hidden or not easily seen. It is made when the top of the raised ridges of skin, when the small sweat pores that exude perspiration, sweat or oils adhere to the top of the ridge, so when an item is touched, the impression left behind is a copy of the ridge detail of the finger. (Tr.15) A partial print is a portion of the ridge detail that is recorded when touching a surface.(Tr. 16)

Stewart testified that fingerprints are unique to each individual. “No two persons have ever been found to have the same fingerprints with the same ridges in relationship to each other.” (Tr. 44, 73). Individualization means that the print was made by one person to the elimination or exclusion of everyone else. (Tr. 85) In fact, to the exclusion of who has ever lived, or will ever live. (Tr. 85)

Stewart testified about ACE-V methodology. It is an acronym that stands for Analysis, Comparison, Evaluation and Verification. (Tr. 12, 13, 42, 45)

Stewart was unaware of any specific error rate of the (ACE-V) technique. (Tr. 32) She admitted that it could be subject to human error if the instructions weren’t followed and (the fingerprint) not processed correctly (Tr. 33) Stewart has never taken a test to determine her error rate, and in fact, she knows of no efficiency tests. (Tr. 40, 41) There is no proficiency testing at SLCPD, there is no policy in place to do proficiency testing. (Tr 41)

Stewart also admitted that SLCPD crime laboratory has no standards as to how many points are needed for a verification of a latent to a known print. It is left up to the discretion of the

examiner, based on their training and experience in their evaluation of how much detail and information is present within the print to make the determination. (Tr. 80, 81, 86, 87) It would be speculative to say how many points are needed and how many are not, to make a comparison. (Tr. 83)

She agreed that since no two examiners have exactly the same training and experience, there could be differences between one examiner and the other. For instances, one may feel that there is enough information available (in the print) to make a comparison, while the other may not. (Tr. 58, 59, 60)

There are no standards as to the clarity of the print. In fact, there is no quality of the print that must exist before a comparison is made. (Tr. 57, 58, 81)

If there are discrepancies between examiners, although there are no records keeping track of such, the examiners are sent back for more training. (Tr. 93, 94, 101)

Lewis made the assertion that fingerprints are specific and unique to each individual. (Tr. 340) There are distinguishing characteristics for each individual fingerprint. (Tr. 338) Lewis said that it has been established through peer review journals, books written by scientists that establish through study and research, that finger prints are permanent from prior to birth until a period of time after death. In a hundred years, no two people have been found to have the same fingerprint or fingerprints. (Tr. 340)

Lewis worked on the Defendant's case. In August of 2007 Lewis received a previously developed latent print from another ATF&E laboratory. He ran it through IAFIAS to search the data base for a candidate to compare a known set of prints to the latent (Tr. 341) He saw one in particular

he thought was suitable for comparison. (Tr. 348)

In his testimony, Lewis described the ACE-V methodology, and testified that he followed that process to evaluate this latent fingerprint. (Tr. 342, 343, 344, 350, 351)

Lewis claims that The ACE-V methodology is generally accepted in the fingerprint community because it is the same method employed everyday by thousands of examiners. It has been established through books that fingerprints are a reliable means of identification based upon permanence and uniqueness And, the methodology considers those two factors. (Tr. 359)

Lewis claims that the ACE-V methodology is subject to peer review, as it has been scrutinized by fingerprint associations, [and] the forensic fingerprint science discipline. (Tr. 355, 356)

Lewis claims as well, that the methodology in itself is a standard, because of peer review. (Tr. 356, 357) Lewis claimed that ACE-V methodology is a “standard” in itself. (Tr. 358) If there is a difference of opinion, it normally would be attributed to a person’s training and experience, or lack thereof. (Tr. 365, 366, 369) There is a large scale of quality and quantity in terms of information when talking about fingerprints. (Tr. 369)

There is no definition however, in the ATF & E guidelines of what constitutes a print suitable for comparison. It is up to the individual examiner as to whether it is suitable or not. (Tr. 396, 397, 398)

Lewis admits that critiques have addressed the fact that the methodology has no error rate. (Tr. 411)

Lewis believes it would be easy to measure the individual for error rate, as the examiner

himself would know whether he made an error or not. (Tr. 356)

As for the discipline, Lewis opined that it would be difficult to quantify based on the millions of comparisons that are done over the course of a year around the world (Tr. 357) Lewis agreed that it would be useful to know if it could be done as “anybody would be interested in that information,” but at the present, nothing has been established. (Tr. 357)

Lewis acknowledged that some countries and agencies have a minimum standard of characteristics that need to be present in the latent print and in the fingerprint to which it is being matched. Id. ATF & E, does not employ a minimum standard point system (Tr. 352, 353)

Lewis says that it has been recognized and studied that there is no reason to have a minimum point standard as the term points is just one aspect to look to when comparing a latent print to a known print. (Tr. 353)

Dr. Cole testified that individualization, as put forward by latent print examiners is not a technique that has been validated. There is no scientific data showing how accurate or how reliable it is. (Tr. 601) Further, the uniqueness of the friction ridge skin is an assumption that has not been proven and probably could not be. (Tr. 602)

The assumption that friction ridge skin is unique, does not tell the accuracy of latent print identification. It is irrelevant to the question of how accurate latent print identification actually is. (Tr. 602) Although it is a necessary, but not a sufficient, condition. Uniqueness does not establish accuracy. (Tr. 602, 603)

“Latent print identification is claimed to be infallible, in that it is purported to have an error rate of zero, however this claim has clearly shown to be false.” Dr. Cole’s assertion is supported by

a report issued by the National Academy of Science called “Strengthening Forensic Science,” (NAS Report) published in 2009. (Tr. 602) (Defendant’s Exhibit 9 (Tr. 633))

A conclusion of individualization is that one piece of friction ridge skin made a latent print to the exclusion of all other pieces of friction ridge skin anywhere in the universe. (Tr. 608) Dr. Cole testified that this claim, that the rarity of the finger ridge detail is one in the entire population of the world is a very strong and ambitious conclusion. (Tr. 611-612) It is also an illegitimate scientific conclusion to say that you know the rarity of this is only one in the world population when you haven’t amassed data talking a sample of the population and made an estimate of the rarity of what you are looking at in the population.(Tr. 612, 613)

What fingerprint examiners do, is intuit, based on their training and experience when the rarity is one. The inferiority of this thinking should be clear, that of having an examiner intuit the rarity of the configuration of details in a world population versus doing so with data that is taken from a sample population and estimating the extrapolation of that sample population to a larger population. (Tr. 613)

It is a conclusion that even forensic DNA scientists won’t make. (Tr. 612) DNA examiners will be able to testify that they found a DNA sample consistent with that of a Defendant, and the rarity of the match would be one in a million in the Caucasian population. (Tr. 612) Fingerprint examiners do not offer the second step. They say they found the latent print consistent with the ink print of the Defendant, but they do not have the data to make the second statement, that being the rarity of the details and that consistency with the population of the world. (Tr. 612)

In terms of validation research, there is no validation study. What would be accepted is a

study that measures industry-wide how often fingerprint individualization is correct and how often incorrect. (Tr. 610)

Dr. Cole testified that initial studies to determine rarity are underway. These studies will most likely not support conclusions of individualization, but conclusions of those like forensic DNA analysis. (Tr. 613)

Dr. Cole testified about the Brandon Mayfield case, a recent well-known latent print error of which Stewart and Lewis were also aware. He is familiar with the Mayfield case, as he has authored articles on the subject. (Tr. 604) Dr. Cole testified that the Mayfield case is not viewed as an erroneous latent print identification as the identification was made by three highly qualified FBI examiners and then corroborated by an independent examiner appointed by the court on behalf of Mayfield. (Tr. 605)

Further, there was nothing about the process (ACE-V), that any external observer could have identified that would have been an indicator that the methodology was not being used properly. (Tr. 606) For example, if the case had gone to court, and the examiners had testified that they used the ACE-V methodology, and that Mayfield made the print, there is nothing in the documentation that could have been elicited through cross examination that would have indicated to anyone that this wasn't proper Ace-V methodology. (Tr. 606)

In the Mayfield case, it was a misidentification that occurred. This misidentification was not caused by two individuals walking around with identical friction ridge skin on their fingerprints, so it was not caused by failure of the uniqueness. What happened is that there were two individuals who

have unique friction ridge skin and their skin is similar enough that a latent print made by one of them was attributed to the other. (Tr. 604)

**I. Daubert reliability, has the technique been tested?**

The government failed to establish that fingerprint identification has been scientifically tested and in itself reliable. At the hearing, the government failed to offer any evidence as to the *scientific* basis for the actual comparison of the latent fingerprint.

Although Stewart testified that the techniques used at the SLCPD lab have been tested, she did not indicate how they had been tested. Because the FBI or the Utah Bureau of Identification or other law enforcement agencies use the methodology is not a basis to say it has been tested. (Tr. 30)

In United States v. Crisp, 324 F 3d 261 (4<sup>th</sup> Circuit 2003) the Court noted, that with respect to forensic fingerprint examination, there have “not been any studies to establish how likely it is that partial prints taken from a crime scene will be a match for only one set of finger prints in the world.” Crisp at 273.

Daubert requires that evidence be relevant and reliable, and that is understood to be valid and accurate. (Tr. 628)

Dr. Cole testified that the National Academy of Science Report says that the ACE-V methodology is not a validated method. (Tr. 626) So, regardless of the portions of the ACE-V process, there is now a report from the most prestigious scientific institution in the United States, the National Academy of Science, that says the ACE-V is not a validated method. (Tr. 626)

“While fingerprint examiners have long claimed the mantle of science so as to bolster the credibility of their profession, the reality is that the fingerprint community has never conducted any

scientific testing to validate the premises upon which the field is based.” Robert Epstein, Fingerprints Meet Daubert: The Myth of Fingerprint “Science” Is Revealed, 75 S. Cal. L. Rev. 605, 622, 636 (March 2002).

The government failed to establish any “standards controlling the technique’s operation.” In fact, both Stewart and Lewis emphasized that their respective labs *do not use any objective standard* for the number of similarities between a latent print and a known print needed to establish an identification. They not only concede, but they are comfortable with the fact that it is the subjective impressions of each individual examiner that plays the significant role in the identification process.

Stewart admits that there are no standards as to the clarity of the print, other than the training and experience of each examiner. (Tr. 58, 59) And at the ATF & E laboratory, the term “suitable for comparison” is not defined anywhere in the regulations. “They do not have standards for what is considered suitable for comparison as that would be dependant upon the actual latent prints that are developed and analyzed.” (Tr. 396) “There isn’t one criteria that you label every fingerprint as being identifiable, and why it is identifiable.” Id. Lewis could not explain what his criteria was for “suitable for comparison” and where he felt “the boundary lies between insufficient and sufficient correspondences.” There is not even an objective standard for determining when the quantity or quality is *so low* that an identification cannot be made. (Tr. 397)

The government’s experts confirmed the fact that latent fingerprint examiners in the United States currently operate in the absence of any uniform objective standards. . . . [T]he determination of whether there is a sufficient basis for an identification is left to the subjective judgment of the particular examiner.” Epstein at 636.

In United States v Mitchell, 365 F. 3d 215 (3<sup>rd</sup> Cir. 2004), a holding that allowed a lower court’s admission of fingerprint testimony after a lengthy Daubert, hearing, concluded that “the FBI’s method [ACE-V] lacks a significant yardstick of standard-based objectivity,” and that the standards that do exist “are insubstantial in comparison to the elaborate and exhaustively refined standards found in many scientific and technical disciplines.” Mitchell, 365 F. 3d at 241 (emphasis added)

The Mitchell Court concluded “that this factor does not favor admitting the evidence.” Id.; Crisp at 275 (Michael. C.J., dissenting) (concluding that absence of universal standards weighed against admission).

Simply put, there was no testimony offered by the government proving that the ACE-V method used by their fingerprint examiners was reliable. There was no testimony that it had been tested to prove the reliability. The defense in fact, offered testimony to show it had not been tested and the government witnesses verified that they knew of no reliability testing. Under Daubert, a court may only permit the government to introduce expert testimony about latent fingerprint identification if the government proves the expert’s opinion is based on reliable methodology. Obviously, in this case there was no reliable methodology presented.

The Defendant urges this Court to consider the critical role the individual examiner’s subjective judgements played in this identification process, and find that the subjectivity inherent in latent fingerprint identification methodology as testified to by Stewart and Lewis in this case. As the Supreme Court recognized in Daubert, the absence of objective standard—and hence the predominance of subjectivity—suggests that a methodology is unreliable. Thus, the lack of objective standards weigh heavily against the admission of the expert testimony of either Lewis or Stewart.

It is clear from the NAS Report that the government is lacking scientific testing to put forth the ACE-V methodology. The government did not offer as evidence, at the hearing, any studies, statistical data, or even surveys, such as what was offered in the Mitchell case, to establish that latent fingerprint examination is reliable. There is no empirical reliability. It follows that this weighs against admitting the evidence.

## **II. Is the method subject to peer review?**

The government failed to establish either through its witnesses, by learned text, or any other means, that the latent fingerprint identification they seek to offer has been subject to any serious scrutiny by peer review and publication.

### a. peer review:

The Supreme Court identified peer review as a means of “assessing the scientific validity of a particular technique or methodology on which an opinion is premised.” Daubert at 595.

Stewart claimed that the techniques used by SLCPD are subject to peer review. “Another technician reviews what was done to make sure that the methods used, the processes that were applied were done correctly.” (Tr 31)

Both Stewart and Lewis felt that the verification step in the ACE-V method is a sort of peer review. For instance, Lewis testified that the ACE-V comprises the methodology of determining the fingerprint match. If somebody deviates from that methodology, then testing it in a peer review process the same way would reveal something that wouldn’t come out right, conflict of conclusion, a disagreement somewhere. So the peer review process and the one employed at ATF & E is very thorough and independent in terms of performing the comparison itself. (Tr. 356)

When Lewis claimed that the verification is the independent peer reviewed process-he is wrong. First, to claim that the above procedures, in essence the “verification” step in the ACE-V process, constitutes the sort of peer review the Supreme Court described in Daubert as incorrect. Instead, what peer review is, is a means of assessing the scientific validity of a particular technique or methodology on which an opinion is premised. Daubert at 594.

Verification of a single identification opinion does not constitute independent peer review of the methods or techniques used to make the identification. The government’s fingerprint examiners seem to employ all the same methods: Having one examiner apply those methods to a latent print and a known print and then having another examiner apply those very same methods to the very same prints, established only that the results are consistent, and does not necessarily establish that the methods are reliable. Unreliable methods could produce consistent—but incorrect—results.

Both Lewis’ and Stewart’s testimony as to the verification process, seems to be merely a simple quality assurance mechanism. An identification is simply verified by another qualified examiner. Neither Lewis or Stewart ever explained what exactly the information was, that the verifier received or what exactly the verification process is. Yet, both claimed it was a “peer-reviewed” process.

In addition, surely these *verifications* of one opinion did not constitute anything that was truly “independent.” In a truly independent verification process, the verifying examiner would not know that another examiner had already made an identification. Mitchell 365 F.3d at 238, (explaining a type of verification by “merely confirming the match found by the initial examiner.)

b. publication:

Stewart claims that the “publications” are the guidebooks published by the FBI as to how to fingerprint, as well as text books and manuals. (Tr. 32)

Fingerprint analysis has never withstood any serious scrutiny through peer review or publication. The Mitchell court noted “a significant fraction of the *publications* in the field concern articles on technique—for example, best practices for preserving latent prints—and such materials say little about the field’s reliability.” Mitchell, 365 F.3d at 239. (Emphasis added) The dissent in Crisp, also observed that “unlike typical scientific journals, the fingerprint publications do not run articles that include or prompt critique or re-analysis by other scientists. Crisp 324 F.3d at 274.

In this Defendant’s case, the latent fingerprint identification has not undergone critical analysis through publication or independent peer review, and it calls its reliability into question. This is another factor that weighs against admitting the proffered testimony.

**III. Are there standards controlling the techniques used?**

Stewart testified that the SLCPD Crime Laboratory has no standards as to how many points are needed for verification. It is left up to the discretion of the examiner, based on their training and experience in their evaluation of how much detail and information is present within the print to make that determination (Tr. 80, 81, 86, 87)

Lewis acknowledged that some countries and agencies have a minimum standard of characteristics [points] that need to be present in the latent print and the fingerprint it is being identified prior to comparison. ATF & E does not employ a minimum standard of point system. (Tr. 352-353)

Lewis claimed that it has been recognized and studied, that there is no reason to have a minimum standard, as the term “points” is just one aspect they look to when comparing a latent print to a known print. (Tr. 353)

Dr. Cole explained the reasons that the numbers [of points] vary in different jurisdictions, is because there was simply a policy decision on the part of the agency or county as to how many consistent points it would take to deem it a match. However, there was no empirical research to determine that whatever number was chosen, this many individualizations on the prints were always correct. (Tr. 607) It is the examiner’s or agency’s intuitive sense of when they thought individualizations were correct. As such, point standards were abandoned (Tr. 607)

And, Dr. Cole continued, the standard of points in the United States was gotten rid of, due to no empirical research conducted. (Tr. 609) This, in a sense, was scientific thought as to how they were making a defensible scientific argument, that since these numbers were made up and didn’t correspond to any sort of empirical data, it was unscientific to use them. (Tr. 608)

Under that assumption, the defensible impulse to get rid of the standards which, in reality, became the standard of having no standard, as it was up to the individual examiner in each case to determine how much consistent detail was necessary to warrant a conclusion of individualization. (Tr. 608)

This individualization was to the exclusion of all other cases of friction ridge skin in the universe, and it became the claim that no other piece of friction ridge skin anywhere in the universe could be the source of that latent print. It is an incredibly strong claim, either when trying to warrant it with point thresholds, or in the case of the United States, a lack of point thresholds. (Tr. 608)

They got rid of unscientific point standards, to no standards at all, and that is a problem. It was a reasonable impulse to get rid of the point standards, but to replace them with nothing is problematic. This is problematic because it is not a standard. There is some merit to having a standard, even if it is arbitrary. (Tr. 609)

The government fingerprint examiners operate in the absence of any uniform objective standard. It is clear from their testimony that the determination of whether there is a sufficient basis for an identification is left to the subjective judgment of the particular examiner. See: Epstein at 636. Indeed, even the Mitchell court concluded that “the FBI’s method lacks a significant yardstick of standard-based objectivity,” and the standards that do exist “are in comparison to the elaborate and exhaustively refined standards found in many scientific and technical disciplines.” Mitchell at 241. The court concluded, “this factor does not favor admitting the evidence.” Id.

The Defendant requests that this court find what the Mitchell court observed: The critical role an individual examiner’s subjective judgement *plays in the identification process*. From there, the logical conclusion is that the absence of objective standards suggests that a methodology is unreliable, Daubert, Id. In this case, it is the ACE-V method, and the government should not be allowed the evidence it seeks to admit.

#### **IV. What is the known error rate?**

Because reliability is the touchstone under Daubert, courts must consider all actual error and must not allow finger print examiners to use sleight of hand to make real error vanish.

Stewart claims that the error rate is zero for their fingerprint methodology. If the methodology is followed correctly, then there should be zero error as to an examination and

comparison being done correctly. (Tr. 76)

Stewart understands from SWGFAST, the Scientific Working Group made up of latent fingerprint examiners around the country, [and] is part of the organization sponsored by the International Association for Identification, that the guidelines they put out indicate that they have determined that the error rate in the methodology [ACE-V] is zero. (Tr. 76)

At the same time, Stewart acknowledges being aware that there have been erroneous identifications made, and innocent people being convicted, such as Brandon Mayfield. But, she says the error falls on the practitioner who doesn't follow the methodology correctly, and not in methodology itself. (Tr. 75)

Undeniably, the claim of zero error rate has clearly shown to be false, not only by the Mayfield misidentification, but by other misidentifications. ( Tr 604) Dr. Cole testified that the National Academy of Science (NAS) Report (NAS Report) (Defendant's Exhibit 9; See Point II ) indicates that claims of infallibility are not plausible. Therefore, the assertions made by the government's witnesses regarding error rate are wrong.

In an attempt to reconcile these known cases of error with the claim of zero error, the government tries to distinguish between "practitioner error and methodology error." Presumably, by attributing all error to individual practitioners, the government feels that it can claim that the error rate for the methodology is zero.

The Defendant contends that this distinction the government's witnesses are trying to make between methodological error rate and practitioner error rate suffers from two fatal flaws. First, it is a false distinction. As one scholar has explained:

In a misguided effort to salvage the strange and misleading "zero error rate" claim, some in the forensic science community have suggested that there are two broad classes of errors: those that arise due to method and those that arise due to the humans who employ those methods. According to this view~ the method never has and never will err. When mistakes occur, they are due to incompetent and/or poorly trained people.... [W]here a method depends as heavily on subjective human judgment as does fingerprint examination~ the method literally is the people who employ it.

Jonathan J. Koehler, Fingerprint Error Rates and Proficiency Tests: What They Are And Why They Matter, 59 Hastings L. J. 1077, 1090 (May 2008) (footnotes omitted). The bottom line being, that there is no meaningful distinction between methodological error and practitioner error.

Second, the distinction between methodological error and practitioner error is irrelevant under Daubert. The reason for the error-whether it is attributed to the individual examiner or unreliable methods-does not matter. What matters is the overall rate of error. “[J]udges, who are responsible for ensuring that relevant and reliable information is put before the fact finder, should be concerned with the rate at which the process or technique in question provides accurate conclusions to the fact finder, which is given by the overall error rate.” Simon A Cole, More Than Zero; Accounting For Error in Latent Fingerprint Identification, 95 J. Crim. L. & Criminology 985, 1039-40 (Spring 2005)

To make matters worse, the fingerprint examiners’ efforts “to create an error-free aura around fingerprint identification ... has the potential to dangerously mislead finders of fact.” Cole, More Than Zero at 991. Daubert requires courts to ensure that such misleading evidence never reaches juries. “Th[e] potential for using the aura of science to inflate the fact-finder’s credence in expert testimony is precisely the sort of thing that an admissibility standard like Daubert/Kumho, is

designed to mitigate.” Id.

Lewis testified that they do not record in his ATF & E laboratory, any error rates. It is not logged anywhere. (Tr. 370, 371) He insists, as Stewart does, that if a misidentification occurs, it is because of a deviation from the methodology. (Tr. 409)

In fact, if an error appears in either laboratory, the results are discussed, and presumably one or the other examiner is persuaded to think the other way, or the “error” is remedied by that examiner going back to school!

The distinction between methodological error rate and practitioner error is the fundamental premise of the zero-rate claim made by fingerprint examiners. This distinction is false and irrelevant because, “pseudo-scientific claims of absolute certainty must no longer fool us into thinking that the risk of error is negligible or nonexistent.” Koehler, at 1098.

The government does not appear to have grasped that fingerprint identification *is purely subjective*. There can be no objective truth or easy verification, because fingerprint examiners do not have the benefit of knowing whether the defendant actually left his fingerprint on a piece of evidence. The subjectivity of fingerprint identification—one that both government witnesses not only acknowledged but embrace, erases the line between methodological error and practitioner error. They are one in the same.

In addition to actual error rate in actual cases, the government has even failed to offer any error rates based on proficiency tests. In fact, neither witnesses knows what their proficiency rate is, and neither has taken a proficiency test based upon their performances working with real latent prints in real cases.

It follows then, as it must, since errors are obviously made, (just ask Brandon Mayfield), that there is an error rate for latent fingerprint identification. So the government must show, though it has not, error rates to reveal how well-or how poorly—its examiners perform when attempting to determine who left a latent print on a piece of evidence. Error rates such as these however, are of little use in determining reliability. Even if it had shown the proficiency of their witnesses, proficiency tests “fall far short of offering convincing scientific proof of the rates at which error occur.” Koehler, at 1092.

The error rate for latent fingerprint identification is not zero. And, the government failed to establish an actual error rate. This factor weighs against admitting fingerprint evidence.

**V. What is the general acceptance in the scientific community?**

The government failed to establish that latent fingerprint identification has been generally accepted in any unbiased scientific or technical community.

Stewart testified that the fingerprinting techniques are generally accepted in the relevant scientific community, but admitted that it was the community of fingerprint examiners. (Tr. 33)

It is true that the admission of fingerprint evidence has generally been assumed in that an “analysis of the state of general acceptance of latent print individualization evidence is something of a “no-brainer,” as the “relevant scientific community” is latent print examiners. Therefore, it stands that all latent print examiners “accept latent print evidence.” It is due to this mind set, that many courts have concluded that latent print evidence easily satisfies the general acceptance requirement, even in view of evincing skepticism about its ability to satisfy some of the other Daubert criteria. United States v. Sullivan, 246 F.Supp.2d, 700, 702 (E.D. KY 2003) (“The ACE-V

Methodology easily satisfies the general acceptance factor of Daubert.”) (See Dr. Cole’s testimony regarding Judicial Certification. (Tr. 632, 632)

This lack of success in keeping fingerprint analysis evidence out of the courtroom has been at odds with the weight of opinion in legal scholarship, nearly all of which concludes that latent print individualization evidence as currently constituted, does not satisfy the Daubert standard for admissibility. Therefore, that fact that much of the legal community has accepted fingerprint evidence should get the government nowhere.

Whether lawyers and judges have accepted a technique is not the question under Daubert. The Daubert court did not suggest that acceptance by a legal rather than a scientific community, would suffice." United States v. Starzecpyzel 880 F. Supp. 1027, 1038 (S.D.N.Y. 1995); and accordingly United States v. Frabizio, 445 F. Supp. 2d 152, 168 n. 36 (D. Mass. 2006).

The evidence produced by the government does not show that latent fingerprint identification is generally accepted in “the relevant scientific community.” Daubert, 509 U.S. at 594 Because the relevant question is, whether the technique is generally accepted by people who have the scientific or technical knowledge to evaluate the technique, but who do not have a vested interest in finding it reliable. See Williamson v. Reynolds, 904 F. Supp. 1529, 1558 (E.D. Okla. 1995) (concluding that “not even the ‘general acceptance’ standard is met, since any general acceptance seems to be among hair experts who are generally technicians testifying for the prosecution, not scientists who can objectively evaluate evidence.” [rev’d in part on other grounds, 110 F.3d 1508.]; (Starzecpyzel, 880 F. Supp. at 1038 noting that forensic document examiners “certainly find ‘general acceptance’ within their own community, but this community is devoid of financially disinterested parties such as

academics.”) The government never answered this question in the affirmative by proving that it was.

The Defendant, on the other hand, offered evidence by way of Exhibit 9, and in addition Dr. Cole’s testimony, that to the extent that any one can speak for the scientific community, the National Academy of Science Report is about as close as you can get to the voice of the scientific community. It is a prestigious organization. (Tr. 627, 628) That Report says that we don’t have information about the accuracy or reliability of latent print individualization. It says that ACE-V is not a validated method. And it says, that latent print analysis is not capable of individualization. To that end, the conclusion that the government wishes to offer in court, individualization, the National Academy of Science says that they can’t support it. (Tr. 628)

Second, the government did not carry its burden by demonstrating that law enforcement agencies and other organizations that rely on latent fingerprint identification generally accept latent fingerprint identification. Such circular justifications are meaningless. It is neither surprising nor helpful, for Daubert purposes, to know those who use the technique believe it is reliable.

The government failed to produce evidence that unbiased, disinterested scientists, academics, or technicians generally accept latent fingerprint identification as reliable. This factor weighs against admitting the evidence.

### **3. The Conclusion:**

Even under a cursory Daubert review, the government has not produced any testimony or other evidence to establish the reliability of the expert testimony it seeks to admit.

First, because there have been no objective standards for making a latent fingerprint identification, as it has been proven that the subjective impressions of the individual examiners are

what is controlling.

Second, the government has cited no empirical or any other kind of testing to support its claim that fingerprint identification is reliable.

Third, the government did not adduce any evidence that fingerprint identification has been subject to critical analysis in published papers or studies. By merely having one examiner look over another examiner's work does not constitute an independent review.

Fourth, contrary to the government's claim, the error rate for fingerprint identification is not zero, and the government failed to establish any meaningful error rate.

Fifth, the government failed to establish that latent fingerprint identification has been generally accepted in any unbiased scientific or technical community.

In that the government failed to establish that fingerprint identification methodology rests on sound science, the testimony of Bonnie Stewart from the SLCPD and that of Jeff Lewis from ATF&E should be not be admitted at the Defendants trial.

It is the Defendant's position that in his case, the fingerprint evidence should be excluded as novel challenges and significant new developments have come about since the Mitchell case, which he addresses as follows:

## **POINT II**

### **THE MISIDENTIFICATION OF BRANDON MAYFIELD CHANGES THE LANDSCAPE OF THE ACCEPTANCE OF TESTIMONY OF A FINGERPRINT EXAMINER**

Substantial new evidence has come to light calling into question the reliability of latent fingerprint analysis. That evidence is contained in a Congressionally mandated report, recently

issued by the nations leading scientific organization, the National Academy of Sciences (NAS). See Strengthening Forensic Science in the United States: A Path Forward, National Research Council, National Academy of Sciences (Feb. 2009) [hereinafter NAS Report] (Defendant's Exhibit 1). Congress directed the NAS to conduct an investigation, and issue a report, regarding fingerprint analysis, and various other forensic techniques, following a highly publicized case of fingerprint misidentification committed by the FBI, in which the FBI falsely connected a Portland lawyer, Brandon Mayfield, to a terrorist bombing in Madrid Spain.<sup>1</sup>

The NAS, having conducted an exhaustive and unprecedented examination of latent fingerprint analysis, has concluded that fingerprint examiners have yet to establish either the validity of their approach or the accuracy of their conclusions. (NAS Report, at 1-14) (Over the years the courts have admitted fingerprint evidence, even though this evidence has made its way into the courtroom without empirical validation of the underlying theory and/or its particular application.)

In reaching these conclusions, the NAS examined the standard methodology employed by fingerprint examiners, and found that it provides only a broadly stated framework for conducting [fingerprint] analyses, that is not specific enough to qualify as a validated method. (Id. at 5-12). The NAS concluded that there is no available scientific evidence of the validity of [the fingerprint analysis] method. Accordingly, the NAS, in no uncertain terms, concludes that fingerprint examiners are unjustified in claiming the ability to match a latent fingerprint to a particular finger to the

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<sup>1</sup> As discussed at length below, the FBI's misidentification in Mayfield was also the subject of an investigation and report by the Office of the Inspector General. See A Review of the FBI's handling of the Brandon Mayfield Case, Unclassified and Redacted, Office of the Inspector General, Oversight and Review Division (March 2006) [hereinafter OIG Report].

exclusion of all others in the world. Id. (recognizing that fingerprint analysis has not been shown to have the capacity of consistently, and with a high degree of certainty, demonstrat[ing] a connection between evidence [i.e, a latent print] and a specific individual or source.)

As also discussed below, the state and federal courts of this nation have a long history of treating the reports of the NAS as authoritative works for purposes of determining generally accepted standards within the scientific community. Com. v. Gaynor, 820 N.E. 2d 233, 250 (Mass 2005); United States v. Morrow, 374 F. Supp.2d 42, 49 (D.D.C. 2005). Accordingly, the instant NAS report constitutes virtually unassailable evidence that the reliability of latent fingerprint analysis is not generally accepted by the relevant scientific community and that fingerprint analysis fails the other factors of admissibility set forth by the Supreme Court in Daubert v. Merrell Dow Pharmaceuticals, 509 U.S. 579 (1993), i.e, testing, standards, error rates, publication/peer review and acceptance in the scientific community. (See Point I.)

In United States v. Mitchell, 365 F.3d 215 (3<sup>rd</sup> Cir. 2004) considered the admissibility of expert fingerprint testimony from the FBI. Mitchell, however, while affirming the district court's decision to permit the FBI examiners testimony, expressly stated that it was not announcing a categorical rule that latent fingerprint identification evidence is admissible in the Third Circuit. (Id. at 246)

Mitchell was decided before the Mayfield misidentification, and before the subsequent reports of the NAS and the OIG. The evidentiary landscape has thus significantly changed.

Accordingly, notwithstanding Mitchell, the government is unable to establish the reliability of the expert testimony it seeks to admit. The testimony of the Government's witnesses from

SLCPD and ATF & E should be excluded.

## **I. AN UNDERSTANDING OF LATENT FINGERPRINT ANALYSIS**

- A. Exemplar prints and the small distorted latent fragments from which identifications are made.

The fingerprint identification process involves the comparison of an exemplar print, a fingerprint or palm print taken from a known suspect or defendant, to a latent print, a print from an unknown source that has been left at a crime scene or on an object related to the crime. Lyn Haber, Ralph Haber, Challenges to Fingerprints 16 (Lawyers & Judges Pub. Co. 2009) [hereinafter Haber & Haber, Challenges to Fingerprints].

Exemplar or known prints are typically a full set of all ten prints, created when a law enforcement official rolls or presses the inked fingers and palms of the suspect or defendant onto a standard 10-print card. (Tr. 13); 4 Modern Scientific Evidence: The Law and Science of Expert Testimony [hereinafter Mod. Sci. Evid]. In contrast, latent prints are typically fractions of a print from a single finger, the average size of a latent fingerprint fragment is only one-fifth the size of a full fingerprint. (OIG Report, at 99.)

All prints, both inked and latent, are subject to various types of distortions and artifacts. David R. Ashbaugh, The Premises of Friction Ridge Identification, Clarity and the Identification Process, 44 J. Forensic Identification 494, 513 (1994) [hereinafter Ashbaugh, The Premises]. Accordingly, every print made by a particular finger differs from every other fingerprint of that same finger, and differs from the pattern on the finger or palm itself. Haber & Haber, Challenges to Fingerprints, at 26 (The impression left by a given finger will differ every time because of inevitable variations in pressure, which change the degree of contact between each part of the ridge structure

and the impression medium.)

Latent prints typically suffer from a considerable degree of smudging, blurring, and distortion because [c]rime scene prints are unintentional, chance prints for which there is no thought (or desire) to produce a clear reproduction. John P. Nielson, Rebutting the No Fingerprint Defense, 39-DEC Prosecutor 32, 34 (2005) [hereinafter Nielson];<sup>2</sup> see Andre Moenssens, *et al*, Scientific Evidence in Civil and Criminal Cases 8.08 (4th ed. 1995), at 514 Many latent impressions developed at crime scenes are badly blurred or smudged, or consist of partially superimposed impressions of different fingers.)

The distortions in latent prints stem from a number of sources: (1) the surface upon which the print is deposited can affect the quality of the print either because it is less receptive to the deposit of a print in the first place,<sup>3</sup> or because it makes the transfer of a print by law enforcement more complicated;<sup>4</sup> (2) the shape of the ridges can be distorted or blurred by the amount of pressure used to deposit the print;<sup>5</sup> (3) movement of the finger while the print was deposited can distort the

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<sup>2</sup> Jon Nielson served as a certified latent print examiner from 1981-1998 and is currently a forensic scientist supervisor with the Wisconsin State Crime Lab. *Id.* At 32 n.a1. The Prosecutor is published bimonthly by the National District Attorneys Association.

<sup>3</sup> David R. Ashbaugh, Quantative-Qualatative Friction Ridge Analysis: An Introduction to Basic and Advanced Ridgeology 124 (1999) [hereinafter Ashbaugh, Ridgeology] (various substrates [surfaces] can cause distortion or interfere with the deposition of a print, affecting its appearance and quality.); Nielson, at 34 ( Objects that are extremely porous or are made using course fibers prove to be poor receiving surfaces. ); OIG Report, at 103 ( One factor affecting the clarity of a latent fingerprint is the surface or substrate: upon which a latent fingerprint is deposited.)

<sup>4</sup> Nielson, at 34 ( If the surface is uneven, only partial transfer will result leaving a print that is of no real value for identification. If the surface is rough, fingerprint powder may become trapped in the recesses causing such a loss of contrast as to obscure latent impressions.)

<sup>5</sup> Nielson, at 34 ( Because blurring due to rotational, lateral or longitudinal movement, deformation of the finger as it presses firmly against a surface typically causes some distortion and edge blurring.; Ashbaugh, Ridgeology, at 123 ( Deposition pressure generally changes the shape of the friction

print, as movement of the finger by a distance equal to the width of one furrow between ridges (1 to 2/100ths of an inch) is sufficient to blur a print beyond use;<sup>6</sup> (4) overlapping or double tap prints can obscure details in each print;<sup>7</sup> (5) prints can be compromised by materials that are either on the surface where the print has been deposited, or on the finger or thumb of thumb itself;<sup>8</sup> and (6) fingerprints are developed and transferred by a variety of methods, all of which have the potential to cause distortions.<sup>9</sup> Because of these factors, latent fingerprints are not perfect reproductions of the friction skin, even over a small area. ( OIG Report, at 104.)

B. The lack of any agreement as to the features that examiners should compare.

Traditionally, examiners when comparing prints have looked for ridge characteristics, points along a particular ridge where something occurs: For example, a ridge might come to an end, a ridge ending or bifurcate into two ridges, a bifurcation. See Ashbaugh, Ridgeology, at 141.

It is commonly believed that an average human fingerprint contains between 75 and 175 ridge

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ridge by flattening or broadening each ridge.)

<sup>6</sup> Nielson, at 34 (citing problem of fingerprints deposited while the surface or hand was moving causing slippage and resulting in only partial clarity ); Ashbaugh, Ridgeology at 125 ( pressure distortion takes place on the lateral or horizontal place [and] is usually accompanied by sideways sliding of the friction ridges resulting in a smearing or ridge matrix. )

<sup>7</sup> Nielson, at 34; Ashbaugh, Ridgeology, at 114; OIG Report, at 103.

<sup>8</sup> Ashbaugh, Ridgeology, at 116 ( Dirty surstrates [surfaces] may not accept all of the matrix [substance deposited by the fingertip] available during deposition. The resulting print can appear blotchy, have areas missing, or generally lack details. ); Nielson, at 36 ( Depositing surface interferences include any contaminant on the friction ridges that hinders or prevents the deposit of fingerprint residue. For instance, dirt, grease and other foreign matter can obliterate the fine detail that must be present to effect an identification. )

<sup>9</sup> Ashbaugh, Ridgeology, at 117 ( Improper procedures, and especially efforts to correct those improper procedures, can cause various alterations in the lifted print. ); id. at 117-8 (describing incident where lifting tape caused alteration of several of the major ridge path deviations and error was only discovered because print had been photographed prior to lifting); OIG Report, at 103 ( Each development medium can affect the appearance of a latent print and the accuracy with which the details are reproduced. )

characteristics. Federal Bureau of Investigation, Law Enforcement Bulletin: An Analysis of Standards in Fingerprint Identification 1 (June 1972) [hereinafter FBI, Fingerprint Identification]. But there is no standard agreement among fingerprint examiners as to either the precise number or nomenclature of the different characteristics. James F. Cowger, Friction Ridge Skin: Comparison and Identification of Fingerprints 143 (1983) [hereinafter Cowger, Friction Ridge Skin] (The terms used to define and describe these characteristics vary markedly among writers in the field and differ even among examiners depending upon the organization in which they were trained.) As one latent print examiner has bemoaned: if you read more than one [fingerprint text], you risk complete confusion because the terminology is not all the same and the methods used to make an identification are not all the same. Sandra Wiese, From Galton Points to ACE-V: One Examiner's Journey, An Editorial Perspective Disguised as a Research Paper, available at <http://www.clpex.com/Articles/FromGaltonPointstoACEV.doc>. (OIG Report at 101.)

While some occasional research has been done with respect to the relative frequencies with which different ridge characteristics occur, no weighted measures of the characteristics have ever been adopted by fingerprint examiners on the basis of these studies. Research, moreover, has shown that different fingerprint examiners hold widely varying opinions regarding which characteristics appear most commonly. James W. Osterburg, An Inquiry Into the Nature of Proof, 9 J. of Forensic Sci. 413, 425 (1964) (Clearly subjective evaluation of the significance to be attached to a fingerprint characteristic is suspect.)

Given the typically small size of latent prints, and given the amount of distortion that many latent prints suffer, fingerprint examiners often are in the position of making identifications on the

basis of very limited information. ( OIG Report, at 99) (In many latent prints, only a small fraction of the friction ridge detail on a complete finger is reproduced.) In many published decisions, for example, identifications were made on less than fifteen common ridge characteristics, even though as discussed above, a full fingerprint is thought to have between 75 and 200.<sup>10</sup>

In addition to the fact that there is no standard agreement as to the type of ridge characteristics that should be compared, some latent print examiners look for additional features beyond the basic ridge characteristics, such as sweat pores and small edges on ridges. See Ashbaugh, Ridgeology, at 143. These features are sometimes referred to as Level 3 details. Id. (Level 2 detail is comprised of the traditional ridge characteristics, such as ridge endings and bifurcations. Level 1 consists of the overall pattern design of the fingerprint -- what is commonly referred to as loops, arches, or whorls).

There is considerable disagreement among fingerprint examiners as to the reliability of making identifications on the basis of Level 3 details. While the FBI was at one time critical of using features such as sweat pores, the FBI has more recently embraced this approach. Compare

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<sup>10</sup> United States v. Durant, 545 F.2d 823, 825 (2d Cir. 1976) (fourteen points); Garrison v. Smith, 413 F. Supp. 747, 761 (N.D. Miss. 1976) (twelve points); Magwood v. State, 494 So.2d 124, 145 (Ala. Crim. App. 1985) (eleven points); Ramirez v. State, 542 So.2d 352, 353 (Fla. 1989) (ten points); People v. Alexander, 571 N.E.2d 1075, 1078 (Ill. App. Ct. 1991) (eleven and fourteen points); People v. Garlin, 428 N.E.2d 697, 700 (Ill. App. Ct. 1981) (twelve points); State v. Murdock, 689 P.2d 814, 819 (Kan. 1984) (twelve points); State v. Starks, 471 So.2d 1029, 1032 (La. Ct. App. 1985) (twelve points); People v. Jones, 344 N.W.2d 46, 46 (Mich. Ct. App. 1983) (ten points); State v. Jones, 368 S.E.2d 844, 846 (N.C. 1988) (ten points); State v. Cepec, 1991 WL 57237, at \*1 (Ohio Ct. App. 1991) (eleven points); Commonwealth v. Ware, 329 A.2d 258, 276 (Pa. 1974) (nine points); Commonwealth v. Hunter, 338 A.2d 623, 624 (Pa. Super. Ct. 1975) (fourteen points); Commonwealth v. Walker, 116 A.2d 230, 234 (Pa. Super. Ct. 1955) (four points); State v. Awiis, 1999 WL 391372, at \*7 (Wash. Ct. App. 1999) (eight points).

FBI, Fingerprint Identification, at 3 (Writers on fingerprints quite frequently mention the value of poroscopy in effecting identifications where only a few characteristics are present. FBI technicians know of no case in the United States in which pores have been used in the identification of fragmentary impressions.) (OIG Report, at 150-153) (discussing FBI's faulty use of Level 3 detail in its mistaken identification of Brandon Mayfield). Many examiners outside of the FBI continue to be extremely skeptical of the use of Level 3 detail. See Cowger, Friction Ridge Skin, at 143 (Because prints of friction skin are rarely so well recorded . . . comparison of pores or edges is only rarely practical); John Thornton, Setting Standards in the Comparison and Identification, Presentation at the 84th Annual Training Conference of the California State Division of International Association for Identification 8 (May 9, 2000) (transcript available at <http://www.latent-prints.com/Thornton.htm>) [hereinafter Thornton, Setting Standards] (Identifications based on level three detail have yet to be rigorously tested either in a scientific venue or in court.)<sup>11</sup>

C. The lack of any agreement as to an appropriate identification standard.

There is considerable disagreement among latent fingerprint examiners as to how many common characteristics, either at Level 1, 2, or 3, should be found before an identification is made and indeed whether there should be any identification standard at all. (Tr. 80, 81, 83, 86, 87, 352,

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<sup>11</sup> See also Dusty Clark, What Is the Point, [http://www.latent-prints.com/id\\_criteria\\_jdc.htm](http://www.latent-prints.com/id_criteria_jdc.htm) [hereinafter Clark, What is the Point] ( There is such a degree of variation of appearance in the third 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 the finite detail that is utilized in the comparison process has never been subjected to a definitive study to demonstrate that what is visible is actually a true third level detail or an anomaly. ) (quoted in OIG Report, at 109). Dusty Clark is a latent fingerprint examiner, formerly with the California Department of Justice, currently with the Western Identification Network. Mr. Clark was retained by the OIG in connection with its investigation of the Mayfield case. OIG Report, at 24.

353, 607, 608, 609) Examiners historically have employed identification standards ranging from between 8 and 16 points of similarity in the Level 2 ridge characteristics. Christophe Champod, Numerical Standards and Probable Identifications, 45 J. of Forensic Identification 136, 138 (1995); (OIG Report, at 117) However, many examiners, including those of the FBI, currently believe that there should be no minimum point standard whatsoever and that the determination of whether there is a sufficient basis for an identification should be left entirely to the subjective judgment of the individual examiner. (OIG Report, at 116) (The FBI laboratory . . . currently rejects any requirement that a predetermined number of corresponding ridge details be in agreement . . . . Instead, the determination is committed to the judgment and expertise of the individual examiner.)

As recognized by investigators who have studied the fingerprint field, there is a vigorous debate within the discipline regarding the need for objective minimum criteria for declaring an identification. Id. at 111. The debate has frequently turned bitter. For example, David Ashbaugh, one of the worlds leading examiners, has written that [i]t is unacceptable to use the simplistic point philosophy in modern day forensic science. Ashbaugh, The Premises, at 513. As Ashbaugh has correctly recognized, the selection of any particular point standard has been based, not on scientifically conducted probability studies, but through what can best be described as an educated conjecture. Ashbaugh, Ridgeology, at 2; Ashbaugh, The Premises, at 512 (stating that [s]uperficial and unsubstantiated quips became the methodology of the point system.)

But other leading examiners have charged that, absent a minimum point standard, fingerprint analysis is no more reliable than astrology:

The non-point counters refuse to put a number on the quantitative portion of their comparison analysis opting for the rhetorical response of Show me the Print. There

has to be something to measure and count if the comparison process includes quantitative. If the analysts do not quantify their analysis then their opinion of identity is strictly subjective. A subjective analysis without quantification makes the identification process as reliable as astrology. If one does not quantify, is it an ID when a warm and fuzzy feeling overwhelms you? What happens if my warm and fuzzy feeling is different than yours?

Clark, What is the Point

Caught in the middle of this contentious debate are the thousands of rank and file fingerprint examiners, who do not know whether they should be counting points of similarity or not, and if not, what exactly it is they should be doing instead. John Thornton, a noted fingerprint examiner who has taught in the forensic science Ph.D. program at the University of California at Berkeley, has written that there is a type of professional schizophrenia in the fingerprint profession, with some examiners counting points of similarity, some examiners disavowing points, and some examiners being closet counters. Thornton, Setting Standards at 8.

D. The probability that fingerprints deposited by different people can have substantial similarity.

It has been well documented that different people can share a number of fingerprint ridge characteristics in common. See Y. Mark and D. Attias, What is the Minimum Standard of Characteristics for Fingerprint Identification, 22 Fingerprint World 148-150 (Oct. 1996) (discussing prints from different people with substantial similarity and recognizing that an expert with many years of experience behind him could make a false identification when comparing two such prints). See also James W. Osterburg, The Crime Laboratory: Case Studies of Scientific Criminal Investigation 132 (1967) (discussing fingerprints from different people with ten matching characteristics). There have been no scientific studies performed that can reasonably serve to predict

the probability of such events occurring.

During the course of the past century, about a dozen or so fingerprint probability models have been proposed. See 4 Mod. Sci. Evid. 21-2.3.1, at 72; David Stoney & John Thornton, A Critical Analysis of Quantitative Fingerprint Individuality Models, 31 J. Forensic Sci., 1187, 1193 (1986).

None of these [models] even approaches theoretical adequacy, however, and none has been subjected to empirical validations. Mod. Sci. Evid. 21-2.3.1, at 72. Accordingly, these models *occupy no role* in the routine professional practice of fingerprint examination. Id. (emphasis in original).

E. The claim of absolute certainty.

Given the absence of probability studies, latent print examiners do not offer opinions of identification in terms of probability. Indeed, latent print examiners are actually prohibited from doing so by the rules of their primary professional association, the International Association of Identification (the IAI). Instead, latent print examiners make the claim of absolute certainty for their identifications. Examiners provide an opinion that the latent print at issue was made by a particular finger to the exclusion of all other fingerprints in the world. (OIG Report, at 111) (FBI laboratory fingerprint examiners only express a conclusion of individualization in terms of absolute certainty with a zero likelihood that the latent fingerprint was made by a different person.) Such assertions of absolute certainty, however, are inherently unscientific. Here is what one leading law enforcement fingerprint examiner has had to say on this issue:

Imposing deductive conclusions of absolute certainty upon the results of an essentially inductive process is a futile attempt to force the square peg into the round hole. This categorical requirement of absolute certainty has no particular scientific principle but has evolved from a practice shaped more from allegiance to dogma than

a foundation in science. Once begun, the assumption of absolute certainty as the only possible conclusion has been maintained by a system of societal indoctrination, not reason, and has achieved such a ritualistic sanctity that even mild suggestions that its premise should be re-examined are instantly regarded as acts of blasphemy. Whatever this may be, it is not science.

David Grieve, Possession of Truth, 46 J. of Forensic Identification 521, 527-28 (1996).<sup>12</sup> As discussed further below, the National Academy of Sciences has similarly now concluded that such opinions of absolute certainty by fingerprint examiners are plainly unjustified. (NAS Report, at 5-12.)

F. The uniqueness fallacy.

The notion that a latent fingerprint fragment can be identified to the exclusion of all other fingers in the world stems from the fingerprint fields basic premise that no two people in the world have the same exact fingerprint. But, as discussed further below, this is a premise that, though fervently subscribed to by all fingerprint examiners, has never been scientifically established. (Tr. 19, 44, 73, 340, 341, 602, 603, 611, 612)

Even assuming, moreover, that it is true that no two people in the world have the same exact full fingerprint, this premise is logically flawed when it comes to the identification of latent fingerprint fragments. It simply does not follow from the premise -- that no two people have the same exact full fingerprint -- that a fingerprint examiner can reliably make an identification from a small distorted fingerprint fragment that might reveal only a limited number of ridge characteristics.

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<sup>12</sup> Mr. Grieve is currently employed by the Illinois State Police, Division of Forensic Services. He has worked as a latent fingerprint examiner for more than thirty years. He also served as the editor of the primary journal for fingerprint practitioners, the Journal of Forensic Identification, which is published by the examiners professional association, IAI.

Simon A. Cole, Suspect Identities: A History of Fingerprinting and Criminal Identification 260 (2001) [hereinafter Cole, Suspect Identities] (The contention that no two complete single fingerprint patterns are exactly alike did not address the issue fundamental to forensic identification; how great the likelihood that a latent fingerprint impression might mistakenly be matched to the wrong source finger.) Fingerprints from different people can have a number of characteristics that appear to match. Furthermore, fingerprint examiners in making their comparisons must rely on the naked eye . . . along with their judgment to decide when two things are alike or different. Michael J. Saks, Merlin and Solomon, Lessons from the Law's Formative Encounters with Forensic Identification Evidence, 49 *Hastings L.J.* 1069, 1087 n. 85 (1998). Thus, even if all fingerprints are in some sense unique, the indisputable reality remains that fingerprint examiners sometimes make false identifications. Accordingly, the fundamental question in fingerprint analysis is one of reliability, not uniqueness. Christophe Champod & Ian W. Evett, A Probabilistic Approach to Fingerprint Evidence, 51 (2) *J. Forensic Identification* 101, 115 (2001) (noting that the crux of the matter is not the individuality of the friction skin ridges but the ability of the examiner to recognize sufficient information for the disclosure of identity from a small distorted latent fingerprint fragment that may reveal only limited information in terms of quantity or quality.)

G. The One-Dissimilarity Rule.

Fingerprint examiners purport to apply a rule commonly referred to as the one dissimilarity rule. See John I. Thornton, The One-Dissimilarity Doctrine in Fingerprint Identification, 306 *Int'l Crim. Police Rev.* 89 (March 1977) [hereinafter Thornton, The One-Dissimilarity Doctrine]. Pursuant to this rule, if two fingerprints contain a single genuine dissimilarity then the prints cannot

be attributed to the same finger or individual. Id. However, while this doctrine is well recognized in the fingerprint community, (OIG Report, at 112), it is effectively ignored in practice. As Dr. Thornton has recognized, once a fingerprint examiner finds what he believes is a sufficient number of matching characteristics to make an identification, the examiner will typically explain away any observed dissimilarity as being a product of distortion or artifact:

Faced with an instance of many matching characteristics and one point of disagreement, the tendency on the part of the examiner is to rationalize away the dissimilarity on the basis of improper inking, uneven pressure resulting in the compression of a ridge, a dirty finger, a disease state, scarring, or super-imposition of the impression. How can he do otherwise? If he admits that he does not know the cause of the disagreement then he must immediately conclude that the impressions are not of the same digit in order to accommodate the one-dissimilarity doctrine. The fault here is that the nature of the impression may not suggest which of these factors, if any, is at play. The expert is then in an embarrassing position of having to speculate as to what caused the dissimilarity, and often the speculation is without any particular foundation.

The practical implication of this is that the one-dissimilarity doctrine will have to be ignored. It is, in fact, ignored anyway by virtue of the fact that fingerprint examiners will not refrain from effecting an identification when numerous matching characteristics are observed despite a point of disagreement. Actually, the one-dissimilarity doctrine has been treated rather shabbily. The fingerprint examiner adheres to it only until faced with an aberration, then discards it and conjures up some fanciful explanation for the dissimilarity.

Thornton, The One-Dissimilarity Doctrine, at 91.

As discussed further below, this common practice of disregarding dissimilarities, and conjuring up fanciful explanations was found to be a contributing factor in the FBI's misidentification of Brandon Mayfield. (OIG Report, at 153-166.)

#### H. The ACE-V methodology.

The FBI and other crime laboratories, such as SLCPD and ATF & E's laboratories, utilize

what they refer to as the ACE-V method for examining latent fingerprints. (OIG Report, at 105.) ACE-V is an acronym for the four steps of the method: analysis, comparison, evaluation and verification. (Tr. 12, 13, 42, 45) In the analysis phase, the examiner looks at the latent print and determines first whether the print is of sufficient value that it can be analyzed. There are no standards for this decision and the examiner is not required to document the reasons for his conclusion. The individual examiner simply makes his own subjective decision about whether there is enough to attempt a comparison. To do this, examiners subjectively trade off size of fragment and clarity of image, and subjectively conclude that there is or is not enough information in the fragment print to declare that the fragment would or would not match any other fingerprint fragment in the world. 4 Mod. Sci. Evidence 32:15. If the examiner decides there is not enough, the examiner classifies the print as of no value. (NAS Report, at 5-9.) If there is enough, the examiner then looks at the latent print and identifies the aspects of the print that he/she will use when comparing the latent print to the known print.

At the comparison stage, the examiner compares the latent print to the known print. Ashbaugh, Ridgeology, at 173. Again, there are no standards for what characteristics or features the prints should have in common, (NAS Report at 5-10), nor is the examiner required to record what he considers to be the similarities or differences between the prints. There are also no standards that dictate a comparison be conducted at a particular scale. (OIG Report, at 108.)

At the evaluation stage, the examiner makes a subjective decision about whether the prints are similar enough to be declared a match. Ashbaugh, Ridgeology, at 173-74. If the examiner determines in his subjective opinion that the prints do not match, it is classified as an exclusion.

Id. at 14. If he determines in his subjective opinion that the prints do match, it is classified as an identification or individualization. Id. If neither an identification nor an exclusion can be reached, the result of the comparison is inconclusive. ( NAS Report, at 5-9.)

In the final stage of the ACE-V process, verification, if the examiner has identified a match, he gives the latent and known prints to another examiner in the lab and asks the second examiner to agree or disagree with the identification. There are no standards governing the second examiners decision to verify the conclusion or not, the second examiner simply makes a subjective decision about whether he agrees with the first, and the second examiner is not required to record why he has verified the original decision. The second examiner is also aware of the conclusion the first examiner has reached; there is no attempt to blind the verifying examiner to the original decision. (Tr. 29, 30, 31, 354, 355, 356); 4 Mod. Sci. Evidence 32:32 (Usually a second examiner will know the result of the first examination. . . . ); (OIG Report, at 115.) In fact, the verifying examiner sometimes consults with the original examiner when conducting the verification. (OIG Report, at 115.) For this reason, the verification stage may be more accurately described as ratification.

I. The lack of minimum training, experience and licensing requirements fingerprint examiners.

The lack of standards in the fingerprint community extends to the training and experience requirements for latent print examiners. Put simply, no such requirements currently exist. As one leading fingerprint commentator has recognized,<sup>13</sup> people are being hired directly into latent print units without so much as having looked at a single fingerprint image.<sup>13</sup> Once hired, the training that

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<sup>13</sup> Pat Wertheim, The Ability Equation, 46 J. Forensic Identification 149, 152 (1996)

examiners receive is typically minimal. Consider what another leading law enforcement fingerprint examiner has stated on the subject of training:

The harsh reality is that latent print training as a structured, organized course of study is scarce. Traditionally, fingerprint training has centered around a type of apprenticeship, tutelage, or on-the-job training, in its best form, and essentially a type of self study, in its worst. Many training programs are the look and learn variety, and aside from some basic classroom instruction in pattern interpretation and classification methods, are often impromptu sessions dictated more by the schedule and duties of the trainer than the needs of the student. Such apprenticeship is most often expressed in terms of duration, not in specific goals and objectives, and often end with a subjective assessment that the trainee is ready.<sup>14</sup>

Thus, as the above quoted practitioner has recognized, fingerprint examiners are not required to take any kind of objective test before they start giving their expert opinions in court. There is not even any type of licensing requirement in the field. The fingerprint professional association, the IAI, did start a certification program back in 1980. But approximately half the examiners that have taken the certification test have failed it.<sup>15</sup> And since certification is not required, many, if not most, of the examiners who failed the test are still practicing.<sup>16</sup> Indeed, the vast majority of fingerprint examiners in this country are not board certified. (Tr. 38)<sup>17</sup>

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<sup>14</sup> David L. Grieve, The Identification Process: The Quest For Quality, 40 J. Forensic Identification 109, 110 (1990).

<sup>15</sup> Andy Newman, Fingerprinting's Reliability Draws Growing Court Challenges, N.Y. Times, April 7, 2001, at A8 (observing that while the International Association of Identification has a rigorous certifying test, about half the current or would-be examiners who take it fail, without apparent career consequences ).

<sup>16</sup> Id. (reporting There's very few employers who will terminate an employee for not passing the test, said Ken Smith, the associations certification chairman ).

<sup>17</sup> Id. (further noting that Mr. Smith added that most of the 5,000 examiners in the country have never taken the test).

## II THE MAYFIELD MISIDENTIFICATION, THE OIG INVESTIGATION AND THE LESSONS TO BE LEARNED

While there have been a significant number of documented fingerprint misidentifications over the years, perhaps the most stunning and revealing of these cases is the FBI misidentification of Portland lawyer Brandon Mayfield, a misidentification which was only discovered because fingerprint examiners in Spain fortuitously discovered a better match for the latent fingerprint at issue in that case. As discussed further below, the Mayfield case makes clear that even the most highly reputed examiners in the world, such as those who work at the FBI, can make misidentifications. It also makes clear that at present there is no way of knowing whether any given identification offered in any particular case might be an error that will go undetected unless miraculously caught by examiners in another country.

The Mayfield misidentification was the subject of a thorough investigation by the Department of Justice's Office of the Inspector General and the instant discussion of the case is largely gleaned from the OIG Report. As a trial judge in Maryland recently recognized in granting a defendant's motion to preclude the state's fingerprint evidence, effectively bringing to an end a capital prosecution, the OIG Review provides a unique and comprehensive analysis of defects in current latent fingerprint methodology. Maryland v. Bryan Rose, No. K06-0545 at 5 (Md. Cir. Ct. Oct. 2007).

### 1. The misidentification of Brandon Mayfield

The Mayfield case arose out of the March 11, 2004, terrorist attack on commuter trains in Madrid, Spain. (OIG Report, at 1.) The Spanish National Police recovered latent fingerprints from

a plastic bag containing explosive detonators and remnants of explosives. Id.<sup>21</sup> The latent prints that were considered to be of value were thereafter provided to the FBI. Id. at 29-30.

Terry Green a supervisor in one of the FBI's Latent Fingerprint Units (LPU) was selected by the FBI to conduct a computer search of the latent prints because Green had extensive experience and strong skills in conducting computer searches of latent fingerprints using the FBI's Integrated Automated Fingerprint Identification Systems (IAFIS). Id. at 30. IAFIS is an automated system that permits computer searches of FBI databases containing the fingerprints of over 47 million people. Id.<sup>18</sup>

The IAFIS searches by Green generated separate lists of up to 20 candidate fingerprints for each of the latent prints that were searched. The IAFIS ranked and scored each of the candidates reflecting how closely the computer determined each candidate fingerprint matched the particular latent fingerprint being searched. Id. at 30.

Mayfield's print, which was in the FBI's database as the result of his service in the United States Army, was ranked fourth on one of the IAFIS searches. Id. at 31-32. When Green compared one of Mayfield's prints with the latent print from the bag of explosives he determined that it was a match. Id. at 31. Green's identification was then verified by a second FBI fingerprint examiner, John Massey, who was specifically selected because of his skill and extensive experience. (Massey had worked as a fingerprint examiner for some thirty-five years). Id. at 32-33. The identification

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<sup>18</sup> Automated computer systems such as the FBI's do not make identifications, rather they are designed to search their databases for similar prints to the one being searched. Haber & Haber, Challenging Fingerprints, at 102. A human fingerprint examiner must compare the prints identified by the system with the print being searched to determine if a match can really be made.

was also verified by a third senior FBI fingerprint examiner, Michael Wieners, one of the three Unit Chiefs, in the FBI's LPU's. Id. at 30, 52.

On the basis of the fingerprint identification, and on that basis alone, Mayfield was arrested by the FBI on a material witness warrant. Id. at 67-68. An affidavit submitted by the government in support of its application for the arrest warrant stated that the three FBI examiners, Green, Massey and Wieners, were 100% positive of the identification and that they had identified in excess of 15 points of identification. Id. at 64.

Approximately two weeks after Mayfield's arrest, the FBI's identification was confirmed by a fingerprint examiner, Kenneth Moses, who was designated as a court expert. Id. at 80.<sup>19</sup> Moses, who had thirty years of experience as a fingerprint examiner, and who was certified by the fingerprint examiner's professional association, the IAI, was recommended to the court and the defense by the FBI laboratory and the United States Attorney's Office. Id.<sup>20</sup> After conducting an examination of the prints, Moses concluded that the latent print is the left index finger of Mr. Mayfield. Id. Moses stated that there were 16 minutiae in the latent print that corresponded to the minutiae on Mayfield's finger. Id. at 80-81.

Fortunately for Mayfield, the fingerprint examiners working for the Spanish National Police (the SNP) did not share Moses's view of the prints, nor that of the FBI. The SNP examiners looked

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<sup>19</sup> Mr. Moses was apparently designated as a court expert, rather than a defense expert, because of the government's concern of establishing a precedent of providing discovery to a grand jury witness. Id. at 80 n.45.

<sup>20</sup> As discussed above, while the IAI provides a certification program for latent fingerprint examiners, certification is not mandatory and the vast majority of practicing examiners are not certified. See supra at 19.

at Mayfield's print and the latent print from the bag of explosives and determined that they did not in fact match. Id. at 51-52. While the SNP immediately communicated these concerns to the FBI, the FBI dismissed them and went forward with Mayfield's arrest.

Unconvinced by the FBI's identification of Mayfield, the SNP continued to investigate and their investigation led them to an Algerian named Ouhnane Daoud. Id. at 81. When Daoud fingerprints were compared with the latent print at issue, an identification was made and the erroneous nature of the FBI's Mayfield match was clearly revealed. The FBI subsequently acknowledged the misidentification and Mayfield was released from jail. Id. at 88.

## 2. The OIG's findings

The OIG found several major factors that contributed to the Mayfield misidentification, the most significant of which was the substantial similarity between Mayfield's fingerprint and the latent print it was erroneously matched with. Id. at 130. Ten of the ridge characteristics charted by the FBI for the latent print were found by the OIG to be generally consistent with Mayfield's print as well as Daoud's. As the OIG observed, there has been no systemic study of the rarity of such an event. Id. at 6-7.

The OIG also concluded that the FBI examiners erred in finding five additional points of similarity that did not in reality exist. Id. at 7 (murky or ambiguous details in [the latent] were erroneously identified as points of similarity with Mayfield's prints.) Similarly, the FBI examiners erroneously relied on Level 3 detail that did not actually match. Id. at 8 (none of the purported Level 3 features in [the latent] used to identify Mayfield corresponded to features in the known prints of the true donor (Daoud). [The examiners] apparently misinterpreted distortions in [the latent] as real

features corresponding to Level 3 details seen in Mayfield's known prints. ) (See supra, at 8 for a discussion of Level 3 detail).

The OIG also found that the FBI examiners had inadequate explanations for differences between the latent and Mayfield's print. Id. at 8-9. The examiners thus failed to appropriately apply the one-dissimilarity rule, id., a rule which, as discussed above, is routinely ignored by examiners once they have found what they believe to be a sufficient degree of similarity to declare a match. See supra, at 15-16.

In addition, the OIG found that the examiners failed to assess the poor quality of similarities between Mayfield's print and [the latent print]. Several of the characteristics charted on [the latent] were of limited clarity and as such should not have been given as much weight as the FBI examiners apparently accorded them. Id. at 170-71.

Finally, the OIG concluded that it did not find any conduct by [the FBI] examiners that specifically violated explicit FBI Laboratory [Standard Operating Procedures] or policies. Id. at 215. Accordingly, the OIG explicitly recognized that it could not state that other examiners in the FBI Laboratory, acting in compliance with existing Laboratory policies and procedures, would not have made the same error. Id.

### 3. The OIG's recommendations

As a result of the Mayfield misidentification the FBI's internal review team issued a number of recommendations for the FBI Laboratory, recommendations that the OIG, in turn, considered and endorsed. The first and most significant of these recommendations is for basic research aimed at the most fundamental issues in latent fingerprint analysis:

- Research aimed at developing and testing the validity of a minimum quantitative threshold for effecting an identification that takes into account all levels of detail and the clarity of the print;
- Research to test the hypothesis that Level 2 and Level 3 details occur on the friction ridges as independent, random events;
- Testing examiner performance in a rigorous, controlled manner to determine accuracy of performance;
- Comparison of the performance of examiners using a subjective approach . . . to those using a minimum threshold of points; and
- Research to determine the permanence of Level 3 details and features on the lower joints, soles and palms.

Id. at 196.

With respect to research aimed at developing a minimum quantitative threshold, the OIG specifically added that the utilization of more objective criteria for identifications . . . may provide a greater margin for safety in latent fingerprint identification than is provided by a wholly subjective approach in which an examiner's initial or gut reaction to a comparison might lead him to overlook important ambiguities or differences in the prints. Id. at 107.

The FBI's latent print review team and, in turn, the OIG also recognized that substantial changes should be made to the FBI's Standard Operating Procedures (SOP's). The revisions suggested include

- Defining each phase of the ACE-V (analysis, comparison, evaluation, and verification) process in greater detail and listing and defining the step-by-step procedure involved in the examination process in greater detail;
- Adopting more specific definitions of each of the three levels of detail;
- Defining the Quality and Quantity aspects of examination;
- Establishing criteria to determine a latent fingerprint to be a print of value, including minimum latent print quality considerations.

Id. at 97.

The OIG, in endorsing these recommendations, observed that the contents of the FBI's SOPS,

are repetitive and all of them are stated in vague and general terms. As the OIG recognized,

Nothing in the existing standards governing the LPU prohibited, discouraged, or even addressed the process of circular reasoning by which Green apparently allowed the Mayfield exemplar to bias his interpretation of [the latent print]. Nothing in these documents prohibited an examiner from cherry-picking helpful Level 3 details to support an identification while discarding those which did not, or described the circumstances under which Level 3 detail is sufficiently reliable to use. Nothing in the standards required the examiners to justify their explanations for differences in appearance between the latent and known prints on the basis of objective information from the print or the crime scene to demonstrate any degree of certainty with respect to such explanations, or even to document the differences or explanations at all. Likewise, although all of the OIG consultants agreed that lesser individualizing weight should be assigned to a Level 2 ridge deviation found in agreement when the examiner cannot determine whether the point is a bifurcation or an ending ridge until he sees the exemplar print, nothing in the existing standards gives any such instruction to LPU examiners. In short, the examiners were able to make each of the decisions described above that contributed to the erroneous identification without violating any specific provision of the applicable LPU or SWGFAST standards.

Id. at 198.

Finally, the FBI's latent review team and the OIG recommended a dramatic expansion of the case documentation requirements for latent print examinations. Id. at 201. As of the time of the Mayfield identification, the FBI did not require any documentation of the different phases of the ACE-V process other than the statement of a conclusion. Id. The latent review team, and the OIG, recommends that examiners be required to document (1) characteristics that contribute to an inclusion/exclusion during the comparison process, (2) discrepancies/dissimilarities observed and explained during the comparison process, and (3) Level 1, 2, and 3 details utilized during the comparison process. Id. The same report also recommends that: If during the comparison process, Identification is made, the case notes should reflect the process by which the Identification was made and the comparison details that were used. Id. This can be done by enlarging a photograph

and annotating it with arrows, lines or other methods to show details used. Id.<sup>21</sup> In Defendant Zajac's case, there is no indication that any such documentation was performed by the fingerprint examiner(s). Certainly, there was no testimony of such documentation, and no documents evidencing same, provided to the defense despite repeated requests.

4. The lessons to be learned from Mayfield misidentification

There are five critical lessons that can be derived from the Mayfield case and the OIG Report, lessons that should be kept in mind whenever latent fingerprint evidence is proffered by the prosecution:

First, fingerprints from different people can have substantial similarity, and the probability of that occurring is not known. As discussed above, Mayfield and Daoud's fingerprints had at least ten matching points of similarity. As the OIG Report confirms, there has been no systemic study of the rarity of such an event. Id. at 6-7.

Second, even fingerprint examiners who are thought to be the best in the field are capable of making misidentifications, and currently there is no available data to assess the likelihood of such error. As the FBI itself recognized in the wake of the Mayfield misidentification, research is needed to test examiner performance in a rigorous controlled manner to determine accuracy of performance. Id. at 196.

Third, internal verification does not insure the accuracy of an identification. In Mayfield's case, two senior FBI fingerprint examiners with many years of experience made the same

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<sup>21</sup> The OIG further recommends that examiners be required to document their analyses of the latent print, prior to their proceeding to a comparison of the latent print with the known print. Id. at 203-04.

misidentification as the original examiner, himself a supervisor.

Fourth, the ability of defendants to retain their own independent examiners does not insure that misidentifications will be caught. The court in Mayfield, on Mayfield's behalf, retained an extremely experienced examiner who was considered to be at the top of the field and who had been certified by the fingerprint examiner's professional association. He made the same misidentification as the FBI.

Fifth, the fact that examiners may proclaim 100% certainty in their matches does not insure the reliability of those matches. The three examiners from the FBI, and the court retained examiner, all claimed that they were 100% certain of their identification. All of them were wrong.

When these five lessons are considered in the aggregate, one ultimate lesson should become clear; any given fingerprint case may be a misidentification like Mayfield, and there is presently no basis to determine what the likelihood is of that occurring. This lesson becomes even clearer when one looks at the recently released report by the National Academy of Sciences.

### **III. THE NAS, THE FORENSIC SCIENCE COMMITTEE, AND THE NAS REPORT**

#### **A. The NAS**

In the aftermath of the Mayfield misidentification and a plethora of other documented cases of forensic error, Congress, by statute enacted November 22, 2005, directed the National Academy of Sciences (the NAS) to conduct a study of the state of forensic science in this country. See P.L. No. 109-108, 119 Stat. 2290 (2005). The NAS and its operational arm, the National Research Council (NRC) are the leading scientific organizations in the United States, if not the world. Signed into existence by President Abraham Lincoln, the NAS has, since 1863, served to investigate,

examine, experiment and report upon any subject of science or art whenever called upon to do so by any department of the government.

The NAS's membership is composed of approximately 2,100 members of whom nearly 200 have won Nobel prizes. Id. Members of the Academy are elected in recognition of their distinguished and continuing achievements in original research and election to the Academy is considered one of the highest honors that can be accorded a scientist or engineer. Id.

In light of the impartiality and expertise that are the hallmarks of NAS committees, courts have uniformly recognized that the conclusions of the NAS and NRC regarding scientific validity of a particular methodology are authoritative.<sup>22</sup> Courts further routinely recognize the expertise of the NRC<sup>23</sup> and the NAS,<sup>24</sup> and both courts<sup>25</sup> and federal agencies<sup>26</sup>

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<sup>22</sup> See, e.g., United States v. Lowe, 954 F.Supp. 401, 403 (D. Mass. 1996) ( both the government and the defendant agree [the NRC report] is an authoritative work in the field ); State v. Butterfield, 27 P.3d 1133, 1142 (Utah 2001) (describing NRC report as authoritative ); Commonwealth v. Rosier, 685 N.E.2d 739 (Mass. 1997) (describing NRC report as an authoritative scientific study ); People v. Allen, 72 Cal.App.4th 1093, 1100 (Cal. App. 1999) (describing NRC report as an authoritative scientific study ); State v. Kinder, 942 S.W.2d 313, 327 (Mo. 1996) (describing NRC report as authoritative ); Commonwealth v. Bly, 862 N.E.2d 341, 355 (Mass. 2007) (describing NRC report as authoritative ); People v. Wilson, 136 P.3d 864, 868 n.1 (Cal. 2006) (describing NRC report as authoritative ); see also United States v. Davis, 602 F. Supp. 2d 658, 663 n.4 (D. Md. 2009) (noting that NRC report on DNA is widely regarded as one of the definitive publications on the use of DNA evidence in the field of forensics ); United States v. Trala, 162 F. Supp. 2d 336, 351 (D. Del. 2001) ( Both the government and the defendant agree that the NRC [report] is widely regarded as one of the definitive publications on the use of DNA evidence in the field of forensics. ); Whiting v. Boston Edison Co., 891 F. Supp. 12, 15 (D. Mass. 1995) ( The most authoritative assessments of the health effects on humans of ionizing radiation are the periodic reports issued by the National Research Council of the National Academy of Sciences . . . ).

<sup>23</sup> See, e.g., United States v. Porter, 618 A.2d 629, 643 n.26 (D.C. 1992) (NRC committees represent a distinguished cross section of the scientific community ); State v. Garcia, 3 P.3d 999, 1003 (Ariz. App. 1999) ( The NRC is comprised of a distinguished cross section of the scientific community. ) (quoting State v. Johnson, 922 P.2d 294, 299 (Ariz. 1996)); People v. Venegas, 954 P.2d 525, 552 (Cal. 1998) ( courts have recognized that the [NRC] is a distinguished cross section of the

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scientific community. ) (quoting Porter, 618 A.2d at 643 n.26); see also State v. Hammons, 2002 WL 484645, at \*7 (Del. Super. 2002) (describing NRC committee as consisting of eminent scientists and jurists ); State v. Pappas, 776 A.2d 1091, 1107 (Conn. 2001) (describing NRC committee members as eminent scientists and jurists ); Plough Inc., 530 A.2d at 1156 (describing NAS committees as composed of prominent scientists and engineers in the relevant field of study ); People v. Soto, 981 P.2d 958, 974 n.30 (Cal. 1999) (describing the NRC as society of distinguished scholars ); Com. v. Blasioli, 713 A.2d 1117, 1120 n.3 (Pa. 1998) (same); State v. Marcus, 683 A.2d 221, 227 n.6 (N.J. Super. Ct. App. Div. 1996) (same); Love v. Wolf, 38 Cal. Rptr. 183, 185 (Cal. Dist. Ct. App. 1964) (describing the NRC as a public body of distinguished scientists ).

<sup>24</sup> See, e.g., Nuclear Energy Inst., Inc. v. EPA, 373 F.3d 1251, 1267 (D.C. Cir. 2004) (NAS serves as the federal government's scientific adviser, convening distinguished scholars to address scientific and technical issues confronting society ); Kitzmiller v. Dover Area Sch. Dist., 400 F. Supp. 2d 707, 735 (M.D. Pa. 2005) (noting that NAS was recognized by experts for both parties as the most prestigious scientific association in this country ); Mineral Policy Ctr. v. Norton, 292 F. Supp. 2d 30, 34 n.7 (D.D.C. 2003) (NAS is society of prestigious American scientists founded . . .to give expert advice on technical matters. ); Lee v. Martinez, 96 P.3d 291, 295 (N.M. 2004) (noting that NAS is society of distinguished scientists and engineers that advises the federal government on scientific and technical matters, recently conducted a review of the validity of polygraph testing and that NAS report objectively reviews the scientific literature on the reliability of polygraph examinations ).

<sup>25</sup> See also, e.g., Trala, 162 F. Supp. 2d at 351 ( In making its determination, the court finds the conclusions announced in the [NRC report] to be persuasive ); United States v. Moultrie, 552 F. Supp. 2d 598, 601 (N.D. Miss. 2008) (finding persuasive the study performed by the National Academy of Sciences ); People v. Reeves, 109 Cal. Rptr. 2d 728, 749 (Cal. Ct. App. 2001) (citing the respect courts afford conclusions of this esteemed scientific body ); Lemour v. State, 802 So. 2d 402, 405 (Fla. Dist. Ct. App. 2001) ( courts rely on relevant scientific and forensic literature including The National Research Council's report ); State v. Sivri, 646 A.2d 169, 191 (Conn. 1994) (noting that when NRC report on DNA was published it significantly changed the scientific landscape ).

<sup>26</sup> See, e.g., Massachusetts v. EPA, 549 U.S. 497, 521 (2007) (noting that the EPA regards [the NRC Report] as an objective and independent assessment of the relevant science ); American Council of the Blind v. Paulson, 525 F.3d 1256, 1262 n.5 (D.C. Cir. 2008) (noting that: After the 1995 NRC Report [Currency Features for Visually Impaired People], U.S. paper currency was modified to incorporate subtle differences in background color in different denominations. ); United States v. Morrow, 374 F. Supp. 2d 51, 59 (D.D.C. 2005) ( the FBI Laboratory has adopted the recommendation of the National Academy of Sciences regarding DNA frequencies); Commonwealth v. Lykus, 885 N.E.2d 769, 779 (Mass. 2008) ( Based on the NRC report, the FBI discontinued offering voice identification testimony in judicial proceedings. ); Nutritional Health Alliance v. Shalala, 144 F.3d 220, 224 n.9 (2d Cir. 1998) (noting that FDA rules provide that

follow the recommendations of NRC reports when making a range of decisions. See, e.g., State v. Tester, 968 A.2d 895, 906 (Vt. 2009) (The courts have almost uniformly followed the recommendation of the National Research Council.); Blasioli, 713 A.2d at 1120 ( courts have traditionally deferred to pronouncements from the National Academy of Sciences ). In short, when the NAS and the NRC speak, courts rightly listen.

B. The Forensic Science Committee that produced the instant report

The 2009 NAS report on the forensic sciences was likewise produced by a committee of impartial and exceptionally qualified experts, who reviewed extensive testimony and studies before addressing the most important issues facing the forensic sciences including latent print identification. ( NAS Report, at S-3.) The committee was made up of an illustrious group of members of the forensic science community, including forensic practitioners,<sup>27</sup> crime laboratory directors,<sup>28</sup> members of the legal community,<sup>29</sup> including the leading authorities on scientific

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prohibition on placing claims on food labels does not apply if the National Academy of Sciences publishes an authoritative statement about the relationship between a nutrient and a disease or health-related condition ); Love v. Wolf, 38 Cal. Rptr. 183, 185 (Cal. Dist. Ct. App. 1964) ( the recommendations of this [NRC] committee . . . were also approved by the Food and Drug Administration ).

<sup>27</sup> Committee Member Dr. Randall S. Murch is the former deputy director of the FBI Laboratory, and is now the Associate Director of Research Program Development at Virginia Tech. Id. at A-7. Dr. Murch has also served on the Board of Directors for the American Society of Crime Lab Directors. Id. Peter M. Marone is the Executive Director of the Virginia Department of Forensic Sciences, and has worked in crime laboratories for over 30 years. He is the past chair of the Board of Directors of the Consortium of Forensic Science Organizations. Id. at A-4.

<sup>28</sup>The Committee was co-chaired by The Honorable Harry T. Edwards, Judge of the U.S. Court of Appeals for the D.C. Circuit and Visiting Professor of Law at the New York University of Law. Id. at A-1. Committee Member Geoffrey S. Means is a former prosecutor with the U.S. Department of Justice who is now the Dean of the Cleveland-Marshall College of Law at Cleveland State University. Id. at A-5. Marvin E. Schecter is a criminal defense attorney and is a member of the Board of Directors of the National Association of Criminal Defense

evidence issues,<sup>30</sup> and a diverse group of scientists,<sup>31</sup> including renowned statisticians.<sup>32</sup> Id. at S-1 to S-2. Committee members together possess an unassailable set of credentials, an impressive array of experience, and reflect a range of perspectives on forensic evidence.

To prepare the Report, the Committee reviewed numerous published materials, studies, and reports related to the forensic science disciplines, engaged in independent research on the subject, and heard extensive expert testimony. (NAS Report, at S-2.) As the Report details:

Experts who provided testimony included federal agency officials; academics and research scholars; private consultants; federal, state, and local law enforcement

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Attorneys. A-7.

<sup>29</sup> Committee member Margaret A. Berger has been on the faculty of Brooklyn Law School since 1973 and is widely recognized as one of the nation's leading authorities on scientific evidentiary issues. Id. at A-2. Professor Berger has been called on a consultant to the Carnegie Commission on Science, Technology, and Government and has contributed chapters to both editions of the Federal Judicial Center's Reference Manual on Scientific Evidence. Id. Joe S. Cecil serves as the principal editor of the [Federal Judicial] Center's Reference Manual on Scientific Evidence and is a Senior Research Associate and Project Director in the Division of Research at the Federal Judicial Center. Id. at A-3.

<sup>30</sup> Committee member Dr. M. Bonner Denton is a Professor of Chemistry and a Professor of Geosciences at the University of Arizona and has authored more than 190 peer-reviewed manuscripts. Id. at A-3. Dr. Channing Robertson is a Professor of Chemical Engineering at Stanford University and has published more than 140 articles. Id. at A-6. Dr. Sargur Srihari is a SUNY Distinguished Professor in the Department of Computer Science and Engineering at the University of Buffalo and is the Chair of the International Association for Pattern Recognition's Publicity and Publications Committee. Id. at A-8. Dr. Sheldon M. Wiederhorn is a Senior Fellow at Material Science and Engineering Laboratory of the National Institute for Standards and Technology. Id. at A-9.

<sup>31</sup> The Committee was co-chaired by Dr. Constantine Gatsonis, founding Director of the Center for Statistical Sciences, Brown University, and the leading authority on statistical methods for the evaluation of diagnostic tests and biomarkers. Id. at A-2. Committee member Dr. Karen Kafadar is Rudy Professor of Statistics and Physics at Indiana University, and has authored more than 80 journal articles and book chapters and has served on the governing boards for the American Statistical Association, the Institute of Mathematical Statistics, and the International Statistical Institute. Id. at A-4.

officials; scientists; medical examiners; a coroner; crime laboratory officials from the public and private sectors; independent investigators; defense attorneys; forensic science practitioners; and leadership of professional and standard setting organizations.

Id. The testifying experts included leading latent fingerprint examiners,<sup>33</sup> representatives of the professional association for latent print examiners, the IAI,<sup>34</sup> and representatives of major forensic science organizations and crime labs. The Committee's Report was also reviewed by individuals chosen for their diverse perspectives and technical expertise. Id. The 2009 NAS report thus shares the characteristics of objectivity, expertise, and rigorous research that have justified the consistent judicial deference to reports by the NAS.

C. The NAS's findings and recommendations regarding latent fingerprint evidence.

Having conducted an exhaustive and unprecedented examination of the various forensic identification fields, including latent fingerprint analysis, the NAS has concluded that fingerprint examiners have yet to establish either the validity of their approach or the accuracy of their conclusions. . . . (NAS Report, at 1-14) ( Over the years the courts have admitted fingerprint evidence, even though this evidence has made its way into the courtroom without empirical validation of the underlying theory and/or its particular application)

In reaching these dramatic conclusions, the NAS specifically examined the standard ACE-V methodology employed by fingerprint examiners. As the NAS recognizes, ACE-V provides only a broadly stated framework for conducting friction ridge analyses and is not specific enough to

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<sup>32</sup> Presenters included Stephen Meager, the leading Fingerprint Specialist at the FBI and Vice-Chair of the Scientific Working Group on Friction Ridge Analysis, Study and Technology (SWGFAST), and Ed German, Latent Print Examiner, U.S. Army, Retired. Id. at B-3, B-5.

<sup>34</sup>For example, presenters included Bruce A. Goldberger, President-Elect, American Academy of Forensic Scientists; Bill Margbaker, President, American Society of Crime Laboratory Directors; and Joseph A. DiZinno, Assistant Director, Laboratory Division, Federal Bureau of Investigation. Id. At B-1, B-2.

qualify as a validated method . . . Id. at 5-12. The report provides

ACE-V does not guard against bias; is too broad to ensure repeatability and transparency; and does not guarantee that two analysts following it will obtain the same results. For these reasons, merely following the steps of ACE-V does not imply that one is proceeding in a scientific manner or producing reliable results. A recent paper by Haber and Haber presents a thorough analysis of the ACE-V method and its scientific validity. Their conclusion is unambiguous: We have reviewed available scientific evidence of the validity of the ACE-V method and found none.

Id.<sup>35</sup>

The NAS also considered the claim of fingerprint examiners that the [ACE-V] method, if followed correctly (i.e., by well-trained examiners properly using the method) has a zero error rate.

Id. at 5-13. (Tr. 76, 356) In clear and unambiguous language, the NAS dismisses this assertion:

Clearly, this assertion is unrealistic, and moreover, it does not lead to a process of method improvement. The method, and the performance of those who use it, are inextricably linked, and both involve multiple sources of error (e.g., errors in executing the process steps, as well as errors in human judgment).

Id.

The NAS also recognizes that the fundamental issue in latent fingerprint analysis is not the uniqueness of each persons fingers, but the ability of examiners to accurately make identifications from the small distorted fragments of fingerprints detected at crime scenes. Id. at 5-7 (The question is less a matter of whether each person's fingerprints are permanent and unique as uniqueness is commonly assumed. Rather, it is more a matter of whether one can determine with adequate reliability that the finger that left an imperfect impression at a crime scene is the same finger that left an impression [with different imperfections in a file of fingerprints.] As the NAS further explains,

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<sup>34</sup> The NAS also notes that the ACE-V method does not specify particular measurements or a standard test protocol, and examiners must make subjective assessments throughout. NAS Report, at 5-9.

Uniqueness and persistence are necessary conditions for friction ridge identification to be feasible, but those conditions do not imply that anyone can reliably discern whether or not two friction ridge impressions were made by the same person. Uniqueness does not guarantee that prints from two different people are always sufficiently different that they cannot be confused, or that two impressions made by the same finger will also be sufficiently similar to be discerned as coming from the same source. The impression left by a given finger will differ every time, because of inevitable variations in pressure, which change the degree of contact between each part of the ridge structure and the impression medium. None of these variabilities of features across a population of fingers or of repeated impressions left by the same finger has been characterized, quantified, or compared.

Id. at 5-13.

The NAS thus recognizes that to properly underpin the process of friction ridge identification, . . . research is needed into ridge flow and crease pattern distributions on the hands and feet . . . and the discriminating value of the various ridge formations and clusters of ridge formation. Id. at 5-13. Contrasting fingerprint analysis with DNA evidence, the NAS observes that population statistics for fingerprints have not been developed, and friction ridge analysis relies on subjective judgements by the examiner. Id. at 5-10. The NAS further recognizes that, while little research has been directed toward developing population statistics, . . . more would be feasible. Id.

“Given the lack of research that has been conducted in the fingerprint field, the NAS explicitly states that the testimony that is routinely offered by fingerprint examiners, that they can match a latent print to the one and only person in the entire world who produced it is unjustified.” Id. at 5-12 (quoting J.L. Mnookin, The Validity of Latent Fingerprint Identification: Confessions of a Fingerprinting Moderate, 7 Law Probability and Risk, 127 (2008)). As the NAS explains,

At present, fingerprint examiners typically testify in the language of absolute certainty. Both the conceptual foundations and the professional norms of latent fingerprinting prohibit experts from testifying to identification unless they believe themselves certain that they have made a correct match. Experts therefore make the

claim that they have matched the latent print to the one and only person in the entire world whose fingertip could have produced it . . . Given the general lack of validity testing for fingerprinting; the relative dearth of difficult proficiency tests; the lack of a statistically valid model of fingerprinting; and the lack of validated standards for declaring a match, such claims of absolute, certain confidence in identification are unjustified.

Id.

As the NAS thus recognizes, fingerprint analysis has not been shown to have the capacity of consistently, and with a high degree of certainty, demonstrate a connection between evidence [i.e., a latent print] and a specific individual or source. Id. at S-5.

Accordingly, the NAS expressly warns against the risk of having the reliability of certain forensic science methodologies [such as fingerprints] judicially certified before the techniques have been properly studied and their accuracy verified by the forensic science community. Id. at S-9. Because of the severity of the problems that it has identified with respect to fingerprints and a number of the other forensic identification techniques, the NAS recommends the creation of a new federal agency, the **National Institute of Forensic Science**, with a primary goal of this new agency being to undertake the basic research that has never been conducted for these various forensic techniques. As the NAS explains,

Research is needed to address issues of accuracy, reliability, and validity in the forensic science disciplines. The National Institute of Forensic Science (NIFS) should competitively fund peer-reviewed research in the following areas:

(a) Studies establishing the scientific bases of demonstrating the validity of forensic methods.

(b) The development and establishment of quantifiable measures of the reliability and accuracy of forensic analyses. Studies of the reliability and accuracy of forensic techniques should reflect actual practice on realistic case scenarios, averaged across a representative sample of forensic scientists and laboratories. Studies also should establish

the limits of reliability and accuracy that analytic methods can be expected to achieve as the conditions of forensic evidence vary. The research by which measures of reliability and accuracy are determined should be peer reviewed and published in respected scientific journals.

(c) The development of quantifiable measures of uncertainty in the conclusions of forensic analyses.

(d) Automated techniques capable of enhancing forensic technologies.

Id. at 5-17.

While not unmindful of the extreme costs entailed by the creation of a new federal forensic science agency, the NAS views the problems associated with fingerprints and some of the other forensic identification fields as being *so severe as to necessitate such extreme action*. Id. at S-15 (emphasis added) (What is clear, however, is that Congress must take aggressive action if the worst ills of the forensic science community are to be cured. Political and budgetary concerns should not deter bold, creative, and forward looking action, because the country cannot afford to suffer the consequences of inaction.)

D. The legal standard to be applied.

Under Fed. R. Evid. 702, the proponent of expert testimony must establish, among other things, that the witnesses's testimony is the product of reliable principles and methods, and . . . that the witness has applied the principles and methods reliably to the facts of the case. Fed. R. Evid. 702. Accordingly, the Supreme Court has made clear that federal trial judges, pursuant to Fed. R. Evid. 702, have a special gatekeeping obligation to insure that only reliable expert testimony be presented to jurors. Kumho Tire v. Carmichael, 526 U.S. 137, 147 (1999) ( In Daubert, this Court held that Federal Rule of Evidence 702 imposes a special obligation upon a trial judge to ensure that

any and all [expert] testimony . . . is not only relevant, but reliable. ) (quoting Daubert v. Merrell Dow Pharmaceuticals, 509 U.S. 579, 589 (1993)). Significantly, for purposes of this case, (See POINT I, supra) the Supreme Court in Daubert held that this requirement applies both to novel scientific techniques and to well established propositions. Id. at 592 n.11.<sup>36</sup>

As set forth in POINT I, but will be revisited here, the Daubert Court suggested five factors that trial courts should ordinarily consider in determining whether proffered expert testimony is sufficiently reliable.<sup>37</sup> The first and most critical factor is whether the theory or technique . . . can be (and has been) tested. Id. at 593. As the Court recognized, testing of a technique is critical for an assessment of its reliability.

A second closely related factor that the Daubert Court suggested is whether the theory or technique has been subjected to peer review and publication. Id. at 593. As the Court recognized, submission to the scrutiny of the scientific community is a component of good science, in part because it increases the likelihood that substantive flaws in methodology will be detected. Id. Accordingly, [t]he fact of publication (or lack thereof) in a peer reviewed journal . . . [is] a relevant, though not dispositive, consideration in assessing the scientific validity of a particular technique or

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<sup>36</sup> Accordingly, in the wake of Daubert, federal trial court judges have begun to reassess the various forensic identification fields, such as fingerprints, which were able to gain acceptance during the early 1900's, at a time when courts were not providing anywhere near the type of scrutiny that Daubert now requires.

<sup>37</sup> As the Supreme Court subsequently made clear in Kumho, these same five factors may also be applied by a district court in assessing the reliability of an expert regardless of whether the expert is testifying on the basis of scientific, technical or specialized knowledge, each of which is mentioned in Rule 702. Kumho, 526 U.S. at 149-158 (holding that district court properly applied the Daubert factors to an engineering expert who opined that the tire blow out on the plaintiff's minivan was caused by a manufacturing defect).

methodology on which an opinion is premised. Id. at 594.

A third factor is the existence and maintenance of standards controlling the technique's operation. Daubert, 509 U.S. at 594. As an example, the Supreme Court cited the Second Circuit's opinion in United States v. Williams, 583 F.2d 1194, 1198 (2d Cir. 1978), in which the Second Circuit observed that the International Association of Voice Identification . . . requires that ten matches be found before a positive identification can be made. Id.<sup>38</sup>

The fourth factor that should ordinarily be considered is the known or potential rate of error of the particular technique. Id. at 594. In this regard, the Court cited the Seventh Circuit's decision in United States v. Smith, 869 F.2d 348, 353-354 (7th Cir. 1989), in which the Seventh Circuit surveyed studies concerning the error rate of spectographic voice identification techniques. Id.

Finally, the Daubert Court held that general acceptance can . . . have a bearing on the inquiry. Id. A reliability assessment does not require, although it does permit, explicit identification of a relevant scientific community and an express determination of a particular degree of acceptance within that community. Id. (quoting United States v. Downing, 753 F.2d 1224, 1242 (3d Cir. 1985)). As the Court recognized, widespread acceptance can be an important factor in ruling particular evidence admissible and a known technique which has been able to attract only minimal support within the community . . . may properly be viewed with skepticism. Id. (quoting Downing, 753 F.2d at 1238).

As demonstrated below, it is once again argued that the government's proposed expert

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<sup>38</sup> Here, by contrast, the fingerprint examiners professional association, the IAI, expressly eschews any type of minimum identification standard. See Ashbaugh, Ridgeology, at 1-2.

testimony fails with respect to each and every factor that has been identified by the Supreme C

#### **IV. THE GOVERNMENTS INABILITY TO SATISFY ANY OF THE DAUBERT FACTORS**

The Third Circuit in Mitchell addressed each of the Daubert factors with respect to the evidence submitted in that case concerning the proffered FBI fingerprint identification. While the court found that the trial judge did not abuse his discretion in allowing the FBI fingerprint examiner to testify, the court nevertheless concluded that the standards factor did not actually favor admission. Mitchell, 365 F.3d at 241. The Court also found that the publication facet of the publication/peer review factor did not favor admission. Id. at 239. Also discussed below, the NAS and OIG reports further substantiate the Mitchell court's conclusions as to the standards and publication factors. These reports, moreover, make clear that the other factors, general acceptance, testing, error rates, and the peer review facet of publication/peer review, favor the exclusion of the fingerprint evidence being offered in Defendant Zajac's case.

As addressed above, the Third Circuit in Mitchell specifically stated that it was not announc[ing] a categorical rule that latent fingerprint identification is admissible in this Circuit. Id. at 246. But, with the publication of the NAS and OIG reports, it is clear that the evidentiary landscape has changed significantly since Mitchell was decided, particularly with respect to these other Daubert factors.

##### A. The lack of general acceptance by the relevant scientific community.

With the publication of the NAS report, the scientific community has now spoken; as the report makes crystal clear, the relevant scientific community, see Daubert, 509 U.S. at 594, does not generally accept that fingerprint examiners can reliably make identifications from the type of partial

distorted latent fingerprint fragment at issue in the instant case. The report explicitly states that fingerprint examiners have yet to establish either the validity of their approach or the accuracy of their conclusions and that [o]ver the years courts have admitted fingerprint evidence even though this evidence has made its way into the court room without empirical validation of the underlying theory and/or its particular application. (NAS Report, at 1-14) Indeed, according to the testimony of Dr. Cole (Tr. 631), what has arisen in the absence of scientific validation, is what might be termed “judicial certification” meaning, (Tr. 632) that courts have simply relied upon precedent without inquiring into new developments.

The NAS examined the standard fingerprint methodology, ACE-V, and concluded that merely following the steps of ACE-V does not imply that one is . . . producing reliable results. Id. at 5-12. The NAS could find no evidence of the validity of the ACE-V method. Id. Accordingly, the NAS determined that the fundamental claim of fingerprint examiners, to be able to match a latent fingerprint fragment to the one person in the world who could have produced it, is unjustified. Id. at 5-12. As the NAS recognizes, fingerprint analysis has not been shown to have the capacity of consistently, and with a high degree of certainty, demonstrate a connection between evidence [i.e., a latent print] and a specific individual or source. Id. at S-5.

As discussed above, the NAS views this state of affairs as being so dire as to warrant the creation of a new federal agency that will be charged with promoting the basic validation studies that have never been conducted. The OIG, in the wake of the Mayfield investigation, similarly recommended that basic research be done to test examiner performance in a rigorous, controlled manner to determine accuracy of performance. (OIG Report, at 196) Nevertheless, five years after

Mayfield, such research still has not been conducted. As the NAS now puts it, Congress must take aggressive action if the worst ills of the forensic science community are to be cured . . . because the country cannot afford to suffer the consequences of inaction. ( NAS Report, at S-15)

At the time of the Third Circuit's decision in Mitchell, the NAS and OIG reports had yet to be written. Accordingly, in finding the general acceptance factor to militate in favor of admission, the Third Circuit pointed solely to acceptance within the forensic identification community, as manifested by a survey of state law enforcement agencies which showed, unsurprisingly, that state law enforcement agencies accept the reliability of fingerprint analysis. Mitchell 365 F.3d at 241.

The situation has now changed. The NAS, the nation's leading scientific organization, comprised of some 2100 members, including 200 Nobel prize winners, has now weighed in. Courts, in defining a relevant scientific community, both under Daubert and under the Frye general acceptance test, have long recognized that the relevant scientific community must be construed to include not just the practitioners of a technique, but those most qualified to assess the general validity of a scientific method. Jones v. United States, 548 A.2d 35, 39 (D.C. 1988) (quotations and citation omitted). The relevant scientific community for latent fingerprint identification accordingly includes not just fingerprint examiners, but scholars and scientists who have evaluated the validity of the practice.

Courts have consistently held that [w]hile views of forensic scientists have weight and must be considered, members of the relevant scientific field will include those whose scientific background and training are sufficient to allow them to comprehend and understand the process and form a judgment about it. United States v. Porter, 618 A.2d 629, 634 (D.C. 1992) (quotation and

citation omitted). Although input from forensic practitioners is important, it is clear that the relevant community must include scientists competent to make professional judgments concerning experiments undertaken by others. Reed v. State, 391 A.2d 364, 377 (Md. 1978); see also State v. Russell, 882 P.2d 747, 761 (Wash. 1994) ( a court looks not only to the technique’s acceptance in the forensic setting but also to its acceptance by the wider scientific community familiar with the theory and underlying technique). Because there is a critical difference between practicing a technique and assessing the validity of a technique,<sup>39</sup> a technician’s testimony should never suffice to establish the validity of a . . . technique: [T]he technician . . . knows how, but not why. Because it is critical to know the why, . . . the views of scientists are essential. People v. Seda, 529 N.Y.S.2d 931, 939 n.15 (N.Y.Sup. 1988) (quoting Paul C. Giannelli, The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later, 80 Col. L. Rev. 1197, 1214-15 (1980)).

Explicitly because of the difference between practicing and evaluating a technique, courts have consistently declined to limit the relevant community to forensic practitioners when evaluating the general acceptance of a range of forensic techniques, including field sobriety tests;<sup>40</sup> tests of sexual dangerousness;<sup>41</sup> handwriting analysis;<sup>42</sup> medical causation;<sup>43</sup> electrophoretic typing of human

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<sup>39</sup> Simon A. Cole, Out of the Daubert Fire and Into the Fryeing Pan? Self-Validation, Meta-Expertise and the Admissibility of Latent Print Evidence in Frye Jurisdictions, 9 MINN. J. L. SCI. & TECH. 453, 487 (Spring 2008).

<sup>40</sup> See also People v. Leahy, 882 P.2d 321, 334 (Cal. 1994) ( testimony by police officers regarding the mere *administration* of the test is insufficient to meet the general acceptance standard ); State v. O Key, 899 P.2d 663, 686 (Or. 1995) ( the scientific disciplines of pharmacology, ophthalmology, and to a lesser extent optometry should be included with behavioral psychology, highway safety, neurology, and criminalistics in the relevant scientific community ).

<sup>41</sup> See, e.g., In re Commitment of Burton, 884 So.2d 1112, 1118 (Fla. App. 2004) (Altenbernd, J., concurring) ( [T]he relevant scientific community that must generally accept these tests and the interpretation of their results should include a broader group of clinical and experimental

fluid stains;<sup>44</sup> polygraph examinations;<sup>45</sup> voiceprint experiments or spectrograms;<sup>46</sup> and hair analysis.<sup>47</sup>

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psychologists and psychiatrists, and not merely the group of licensed professionals who are making a living by relying upon these tests. )

<sup>42</sup> See, e.g., United States v. Saelee, 162 F. Supp. 2d 1097, 1104 (D.Alaska 2001) ( general acceptance of the theories and techniques involved in the field of handwriting analysis among the closed universe of forensic document examiners . . . proves nothing. ); United States v. Oskowitz, 294 F.Supp. 2d 379, 384 (E.D.N.Y. 2003) ( To the extent that handwriting analysis techniques have been generally accepted by a relevant technical community, that community has not been a financially disinterested independent community, like an academic community. ) (citation omitted); United States v. Starzecpyzel, 880 F.Supp. 1027, 1038 (S.D.N.Y. 1995) ( FDEs [forensic document examiners] certainly find general acceptance within their own community, but this community is devoid of financially disinterested parties, such as academics.

<sup>43</sup> See, e.g., Blackwell v. Wyeth, -- A.2d --, 2009 WL 1269751, at \*14 (Md. 2009) (Citing with approval opinion of trial court that the relevant scientific community includes the full community of scientists with sufficient training and expertise to permit them to comprehend novel scientific methods, and may not properly be restricted to those who practice or otherwise adhere to the methods at issue. ).

<sup>44</sup> See, e.g., People v. Brown, 726 P.2d 516, 532-33 (Cal. 1985), rev d on other grounds in California v. Brown, 479 U.S. 538 (1987)) (the witnesses were competent and well-credentialed forensic technicians, but their identification with law enforcement, their career interest in acceptance of the tests, and their lack of formal training and background in the applicable scientific disciplines made them unqualified to state the view of the relevant community of impartial scientists ); People v. Young, 391 N.W.2d 270, 276-77 (Mich. 1986) ( The community of scientists having direct empirical experience with electrophoresis of evidentiary bloodstains does not seem sufficiently large so that the *Frye* objective of receiving a consensus judgment of the scientific community can be met. The community of nonforensic scientists using electrophoresis is, however, large enough to obtain an adequate sampling of scientific opinion. These scientists have sufficient theoretical understanding and practical experience to be able to evaluate the evidence. ) (footnote and citation omitted); People v. Reilly, 196 Cal.App.3d 1127, 1138 (Cal.App. 1987) ( to the extent that those scientists in broader disciplines are knowledgeable about bloodstain typing, their opinions should be considered as part of the relevant scientific community ) (citations omitted).

<sup>45</sup> See, e.g., State v. Thompkins, 891 So.2d 1151, 1153 (Fla. App. 2005) ( The testimony in this record, which came only from persons who administer polygraph tests, is insufficient to establish the general scientific recognition required by *Frye* ); United States v. Alexander, 526 F.2d 161, 164 n.6 (8th Cir. 1975) ( Some commentators have posited the argument that the polygraph need only attain general acceptance among the polygraph operators themselves to satisfy the test for admissibility. . . . This position must be rejected. . . . Experts in neurology, psychiatry and physiology may offer needed enlightenment upon the basic premises of polygraphy. ); People v. Barbara, 255 N.W.2d 171, 181 (Mich. 1977) ( While the special record before us establishes that the polygraph is accepted as reliable by polygraphers, it does not establish that polygraph analysis

Moreover, as discussed above, the courts have further recognized that the conclusions of the NAS regarding the reliability of a particular methodology can easily be equated with general acceptance of those methodologies in the relevant scientific community. Porter, 618 A.2d at 643 n.26. Because courts have acknowledged that [t]he NRC is comprised of a distinguished cross section of the scientific community, State v. Garcia, 3 P.3d 999, 1003 (Ariz. App. 1999) (quoting Johnson, 922 P.2d at 299), they consistently have treated the reports of the NRC as authoritative works for

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is accepted as reliable by the scientific community. Credentials of the witnesses, although outstanding for polygraph technicians, are not those of scientists. Therefore, unless we depart from the standard *Davis/Frye* test for admissibility, defendant has failed to convince us that the polygraph should be admitted into evidence at trial in our state. ); Akonom v. State, 394 A.2d 1213, 1217 (Md. App. 1978) ( the relevant field in which the polygraph belongs is not limited to those who practice the science (or art) of polygraphy, but extends into the larger scientific community as well ).

<sup>46</sup> See, e.g., Cornett v. State, 450 N.E.2d 498, 503 (Ind. 1983) ( We agree that the relevant scientific community should be made up of linguists, psychologists, and engineers, in addition to the people who use voice spectrography for identification purposes. Limiting the community to only the latter group would be too narrow and misleading. ).

<sup>47</sup> See, e.g., Williamson v. Reynolds, 904 F. Supp. 1529, 1558 (E.D.Okl. 1995), abrogated on other grounds, Ross v. Ward, 165 F.3d 793 (10th Cir. 1999) (general acceptance standard not met, since any general acceptance seems to be among hair experts who are generally technicians testifying for the prosecution, not scientists who can objectively evaluate such evidence); State v. Coon, 974 P.2d 386, 397 (Alaska 1999) (trial court did not abuse its discretion in determining the relevant scientific community [included] . . . forensic scientists and scientists in acoustics and speech-related fields with experience using the technique); State v. Gortarez, 686 P.2d 1224, 1233 (Ariz. 1984) (In the area of spectrographic analysis, we feel that disinterested and impartial experts in many fields, possibly including acoustical engineering, acoustics, communications electronics, linguistics, phonetics, physics, and speech communications, must generally accept the technique before we will allow its admission into evidence in this state.); Reed v. State, 391 A.2d 364, 377 (Md. 1978) (finding no basis for restricting the relevant field of experts to those who have performed voiceprint experiments, and eliminating from consideration the opinions of those scientists in the fields of speech and hearing, as well as related fields, who, by training and education, are competent to make professional judgments concerning experiments undertaken by others); People v. Collins, 405 N.Y.S.2d 365, 368 (N.Y.Sup. 1978) (Certainly, speech scientists familiar with the use of the spectrograph are qualified to form an opinion as to its adequacy in voice identification, and are also qualified to judge whether any sound spectrographic technique is scientifically accepted.).

purposes of determining generally accepted standards within the scientific community . . . . Com. v. Gaynor, 820 N.E.2d 233, 250 (Mass. 2005) (emphasis added). See, e.g., United States v. Morrow, 374 F. Supp. 2d 42, 49 (D.D.C. 2005) (quoting with approval conclusion that strongest evidence on this point [general acceptance] is the conclusion reached by the National Research Council's Committee) (quoting United States v. Shea, 957 F. Supp. 331, 338-39 (D.N.H. 1997)); Shea, 957 F. Supp. at 338-39, affmd., 159 F.3d 37 (1st Cir. 1998) (describing conclusion of NRC report as strongest evidence that technology was a generally accepted technique); People v. Venegas, 954 P.2d 525, 552 (Cal. 1998) (NRC's conclusion can easily be equated with general acceptance . . . in the relevant scientific community) (quoting Porter, 618 A.2d at 643 n.26); State v. Johnson, 922 P.2d 294, 299 (Ariz. 1996) (We, too, believe that endorsement by the NRC of [a particular] method is strong evidence of general acceptance within the relevant scientific community.); State v. Jones, 922 P.2d 806, 809 (Wash. 1996) (noting with approval conclusion in prior case that because the approach was recommended in the NRC Report, it had gained general acceptance within the scientific community); Hayes v. State, 660 So.2d 257, 264 (Fla. 1995) (describing the National Research Council as a major voice in the scientific community); Roberts, 916 A.2d at 930 (referencing scientific consensus reflected in [NRC] report).<sup>48</sup>

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<sup>48</sup> See also Coy v. Renico, 414 F.Supp.2d 744, 762 (E.D.Mich. 2006) ( The courts have routinely found that statistical analyses performed pursuant to the standards set forth in [a NRC report] are reliable and generally accepted ); People v. Reeves, 109 Cal. Rptr. 2d 728, 749 (Cal. Ct. App. 2001) (courts have recognized that the [NRC] is a distinguished cross section of the scientific community. . . . Thus, that committee's conclusion . . . can easily be equated with general acceptance of those methodologies in the relevant scientific community.) (quoting Venegas, 954 P.2d at 552); State v. Garcia, 3 P.3d 999, 1003 (Ariz. App. 1999) (endorsement by the NRC is strong evidence that a methodology or formula satisfies *Frye*) (quoting Johnson, 922 P.2d at 299); State v. Cauthron, 846 P.2d 502, 517 (Wash. 1993), overruled in part on other grounds, State v. Buckner, 941 P.2d 667

Accordingly, the NAS's ultimate conclusion that fingerprint examiners have yet to establish either the validity of their approach or the accuracy of their conclusions and that research on examiner accuracy is desperately needed, provides virtually unassailable evidence that the reliability of latent fingerprint analysis is not generally accepted by the relevant scientific community. The government cannot satisfy its burden with respect to this Daubert factor, which, in light of the NAS report, now weighs strongly in favor of exclusion.

B. The testing factor.

The NAS report, as well as the report of the OIG in Mayfield, also now makes clear that the government cannot satisfy this critical Daubert factor as well. The NAS found an utter dearth of testing to support the reliability of latent fingerprint analysis. As the NAS recognizes, a body of research is required to establish the limits and measures of performance and to address the impact of sources of variability and potential bias. (NAS Report, at S-6) While the NAS states that [s]uch research is sorely needed, the NAS concludes that it is lacking in most of the forensic disciplines [such as fingerprints] that rely on subjective assessments of matching characteristics. Id. The OIG, in investigating the Mayfield error, similarly recognized that research is needed to test [e]xaminer performance in a rigorous, controlled manner to determine accuracy of performance. (OIG Report, at 196.)

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(1997) (Although we lack the scientific expertise to either assess or explain the methodology, its adoption by the [NRC] Committee indicates that sufficient acceptance within the scientific community has been achieved to satisfy Frye in appropriate circumstances.); State v. Alt, 504 N.W.2d 38, 50 (Minn. App. 1993) (quoting with approval observation of the Washington Supreme Court that methodology's adoption by the [NRC] Committee indicates that sufficient acceptance within the scientific community has been achieved to satisfy Frye in appropriate circumstances.) (quoting Cauthron, 846 P.2d at 517).

The Third Circuit in Mitchell found that the testing factor in that case, tilted in favor of admission largely because of an FBI survey of state law enforcement agencies in which no agency claimed that it had found a latent fingerprint that was identified with two different fingers of the same person or even different persons. Mitchell, 365 F.3d at 237. But, it is less than clear what any of the state agencies actually meant by this statement. In any actual case of misidentification, such as Mayfield for example, where a latent print is mistakenly matched to one individual, and then subsequently matched to someone different, the latent fingerprint has in fact been identified with two different fingers of different persons. Accordingly, to the extent that the quotation from the survey was meant to suggest otherwise that no latent fingerprint has ever been identified to two different people it is plainly mistaken, a fact that Mayfield makes obvious.

Conversely, to the extent that the quotation is meant to suggest that no latent fingerprint has ever been correctly identified to two different fingers, i.e., that two fingers have never been found to be completely identical, the statement is essentially irrelevant. As the NAS Report now makes plain, the issue here is not the uniqueness of entire fingerprints, but whether fingerprint examiners can reliably make identifications from the type of small distorted fingerprint fragments routinely recovered from crime scenes. (NAS Report at 36-37) The quotation from the FBI survey does not even begin to address this question, much less answer it.

The NAS, moreover, in concluding that testing in the fingerprint field is sorely needed, presumably was made aware of the FBI survey. The very same FBI fingerprint examiner who presented the survey in the Mitchell case, Steven Meagher, testified before the NAS's Forensic Science Committee. See Mitchell, 365 F.3d at 222-23; (NAS Report at B-5) To the extent that Mr.

Meagher and the FBI continued to believe that the FBI survey had any bearing on the reliability of latent fingerprint analysis, Mr. Meagher undoubtedly would have brought the survey to the Committee's attention. The NAS's conclusion, however, is unambiguous. Testing in the fingerprint field to assess the accuracy of examiner performance has not been conducted and is sorely needed. (NAS Report, at S-6.)

In sum, the government cannot satisfy its burden as to the testing prong of Daubert.

C. The error rates factor.

The NAS report is also clear on the issue of error rates. The NAS dismisses out of hand the claim of the fingerprint profession that fingerprint analysis, if correctly performed, has an error rate of zero:

[C]laims that these analyses have zero error rates are not scientifically plausible.

\* \* \*

Errors can occur with any judgment-based method, especially when the factors that lead to the ultimate judgment are not documented. Some in the latent print community argue that the method itself, if followed correctly (i.e. by well trained examiners properly using the method), has a zero error rate. Clearly, this assertion is unrealistic, and, moreover, it does not lead to a process of method improvement. The method, and the performance of those who use it, are inextricably linked, and both involve multiple sources of error (e.g., errors in executing the process steps, as well as errors in human judgment).

(NAS Report, at 5-13)

As the NAS recognizes, testing is needed in the fingerprint field to address issues of accuracy, reliability and validity. Id. at S-16; (OIG Report, at 196) Such research, the NAS states, must reflect actual practice on realistic case scenarios, averaged across a representative sample of forensic scientists and laboratories. Id. This research, by which measures of reliability and accuracy are determined, should be peer-reviewed and published in respected scientific journals. Id. And, until

this work is done, the error rates for fingerprint analyses will remain unknown and, since the burden of persuasion is on the proponent of the expert testimony, the factor of error rates should be balanced against the government.

Although the Third Circuit in Mitchell found the factor of error rates to favor admission, the NAS and OIG Reports again provide vital new evidence on this point which significantly changes the calculus. The Mitchell court pointed to what it termed the absence of significant numbers of false positives in practice. 365 F.3d at 241. The government experts in Mitchell, law enforcement fingerprint examiners, had testified to their being unaware of significant false positive identifications. Id. at 240.

Since Mitchell was decided, however, many more cases of misidentification have now come to light. In the course of the OIG investigation, for example, a member of the IAI, acknowledged that he alone had encountered some 30 cases of misidentification by IAI certified examiners, examiners who by virtue of their certification are presumed to be the best in the field. ( OIG Report, at 137) If IAI certified examiners, who constitute only about 2% of the field, are committing these many documented cases of misidentification, one can only imagine how many false identifications have actually occurred across the profession.

The Mayfield case dramatically demonstrates why very little can be gleaned from simply counting up the number of documented cases of misidentifications; as the case well illustrates, there may be scores of cases of misidentification that have never come to light. The misidentification in Mayfield, after all, was only discovered because examiners in another country were able to find a more compelling match. All of the examiners in this Country who had examined the Mayfield prints,

the three FBI examiners and the court appointed IAI certified expert, declared that they were 100% certain of the match. How many other cases of misidentification might there be which have not been miraculously caught by foreign examiners? Researchers have recognized the documented cases of fingerprint misidentification represent what is probably only the tip of the iceberg. Simon Cole, More Than Zero: Accounting for Error in Latent Fingerprint Identifications, J. Criminal Law and Criminology, (2005); Haber & Haber, Challenges to Fingerprints, at 139.

Both the NAS and the OIG recognize that research is sorely needed to establish what the error rates for fingerprint analyses actually are. Indeed, the NAS has determined that the problem is dire enough to warrant the creation of a new federal agency to insure that the necessary testing is performed. The NAS and OIG, having conducted extremely extensive examinations of the fingerprint field, do not suggest, in any way, that the number of documented cases of misidentification is indicative of a low error rate. The NAS and OIG reports thus constitute compelling evidence that the error rates for fingerprint analyses have yet to be established and that no presumptions can properly be made as to what those error rates might be until the necessary testing is completed, published and subjected to peer review.

The Third Circuit in Mitchell, in assessing the error rate factor, also referenced a study by Lockheed Martin that the FBI commissioned for purposes of the Mitchell case and the FBI's survey of the state law enforcement agencies. Mitchell, 365 F.3d at 240-41. The court's discussion of these research efforts by the government only serves to demonstrate why courts should be extremely reluctant to rely on testing that has not been published and subjected to peer review. The Lockheed Martin study, which has still never been published, has nevertheless been the subject of withering

criticism by every scientist who has reviewed it, and it has now been skewered by the NAS:

Some in the friction ridge community point to an unpublished 1999 study by the Lockheed-Martin Corporation, the 50K vs. 50K Fingerprint Comparison Test, as evidence of the scientific validity of fingerprint matchup. But that study has several major design and analysis flaws, as pointed out in D.H. Kaye. 2003. Questioning a courtroom proof of the uniqueness of fingerprints. International Statistical Review 71(3):524. Moreover, even if it were valid, the study provides only a highly optimistic estimate of the reliability of friction ridge analyses, biased toward highly favorable conditions.

NAS Report, at 5-13.

Similarly unhelpful to the issue of error rates is the FBI's survey of state law enforcement agencies. The Third Circuit in Mitchell pointed to the fact that the agencies were asked to run computer searches of the latent prints at issue in that case and none reported a match being made as a result of those searches. The Court derives from this fact that the latent prints were searched against some 1 billion fingers with no false positives resulting. Id. at 240. What the court appears not to recognize, however, is that computers do not actually make matches, they simply generate possibilities for human examiners to compare. Supra, at 21. There was no indication in the survey results that state law enforcement fingerprint examiners actually compared any fingerprints from the computer databases with the latent prints at issue in Mitchell. The agencies simply reported that no hits had been made from the computer searches, with no explanation being given as to the meaning of that term.<sup>49</sup>

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<sup>49</sup> In this regard it should be noted that automated fingerprint identification systems are far from perfect. When a latent print, or even an exemplar print, is searched through an AFIS, the system will often fail to produce the correct matching print, even when the correct match is contained in the system's database. See Haber & Haber, Challenging Fingerprints, at 104, 108 (discussing study where AFIS was found to fail approximately 20% of the time).

Even assuming arguendo, that the survey correctly stands for the proposition that the Court appeared to derive from it, that the latents in Mitchell were not falsely matched by any of the agencies to any of the prints in any of the state computer databases, the insignificance of such a result is now made clear by Mayfield. Consider, for example, if the exact same experiment was conducted in that case, with the latent print from Spain being run through all of the state databases with no match ultimately being made, other than the match the FBI made to Brandon Mayfield. The Mayfield identification would nevertheless still be a false one, the correct match would be to an individual whose prints were not contained in any of the state databases, and of course the vast majority of people in the United States do not have their fingerprints on file in any computerized database. Accordingly, the FBI survey does not actually speak to the issue of examiner error rate. It is again notable that neither the OIG report nor the NAS Report even mentions the survey, despite the fact that the same examiner who presented the survey in Mitchell, Steven Meagher, testified before the NAS and was interviewed by the OIG. (NAS Report, at B-5); (OIG Report, at 85)

In sum, the error rate for fingerprint analysis is unknown given the lack of research that has been conducted to establish it. The error rate factor, thus, does not support admission.

D. The standards factor.

In Mitchell, the court found that this factor does not favor admitting the evidence. Mitchell, 365 F.3d at 241. As the Third Circuit recognized, the ACE-V methodology is insubstantial in comparison to the elaborate and exhaustively refined standards found in many scientific and technical disciplines. Id.

The NAS report further demonstrates that the ACE-V methodology employed by fingerprint

examiners does not satisfy the standards prong of Daubert:

ACE-V provides a broadly stated framework for conducting friction ridge analyses. However, this framework is not specific enough to qualify as a validated method for this type of analysis. ACE-V does not guard against bias; is too broad to ensure repeatability and transparency; and does not guarantee that two analysts following will obtain the same results. For these reasons, merely following the steps of ACE-V does not imply that one is proceeding in a scientific manner or producing reliable results. A recent paper by Haber and Haber presents a thorough analysis of the ACE-V method and its scientific validity. Their conclusion is unambiguous: We have reviewed available scientific evidence of the validity of the ACE-V method and found none.

(NAS Report at 5-12).

In the words of a leading commentator on forensic science, [a]ny unbiased intelligent assessment of fingerprint identification practices today reveals that there are, in reality, no standards. David A. Stoney, Measurement of Fingerprint Individuality, in Advances in Fingerprint Technology at 329-330 (Henry C. Lee & Robert E. Gaensslen eds. 2d ed. 2001).

Accordingly, the standards factor strongly militates against admission.

E. The publication and peer review factor.

The NAS and OIG Reports also make clear that the publication and peer review factor does not favor admissibility. The overarching purpose of this factor is to assure that the relevant scientific community has an opportunity to assess the research products of its members:

The larger purpose of such scrutiny in all its forms is to assess the quality of a study s (or a line of studies ) research methodology and, in light of that assessment, the meaning and value of the data generated by the research. The courts, no less than the scientific community, should be concerned not with the mere formal act of submission to the scrutiny of the scientific community, but with what the community concluded following such scrutiny. What weaknesses were discovered in the research methods? How do those affect the meaning or weight of the finding? Were there erroneous interpretations of the findings? Or did the study s design and its findings withstand the critical evaluation of a discerning community?

Modern Scientific Evidence, supra, 1-3.4.4 at 39.

Consistent with these views, the NAS stresses throughout its Report that when the necessary fingerprint research is finally conducted, it should be published and subjected to peer-review. Given that there has been a profound absence of research conducted in the fingerprint field, it is hardly surprising that there is a corresponding lack of published material discussing any such research.

Accordingly, the Third Circuit in Mitchell found that the publication facet of the peer review factor did not favor admission of the government's evidence. 365 F.3d at 239. Nevertheless, the court, found that the over-all peer review factor favored admission because of the verification step in ACE-V analysis, and because the particular identification in that case had been verified by more than thirty different law enforcement agencies. Id. at 238-39.

In this Defendant's case, by contrast, there has not been verification by any other agency much less thirty. And as the NAS and OIG reports now make clear, the faith expressed by the Third Circuit in the verification prong of ACE-V is misplaced. The Mayfield misidentification was made by the FBI despite the fact that three extremely experienced and senior FBI examiners were asked to verify it, as well as a court appointed IAI certified expert. The FBI's own internal review of Mayfield recognized that its verification procedures are informal and may contribute to a confirmation bias due to the verifier's knowledge that another examiner in the Laboratory had already made an identification. ( OIG Report, at 204.) Accordingly, both the FBI internal review and the OIG recommend that a blind verification procedure be established in which the verifying examiners would not know the result of the first examiner's comparison and in which they would occasionally be provided with decoy prints and non-identifications so as to try to assure that the verifier is doing a

careful examination and not merely rubber stamping the initial identification. Id. at 204-205. The discovery provided thus far by the government does not suggest that any such blind verification procedures were utilized in the instant case.

There is, moreover, an even more fundamental problem with the Mitchell court's reliance on the verification prong of ACE-V in finding that the peer review factor had been satisfied in that case. In so holding, the court failed to recognize the fundamental distinction between peer-review of research which is designed to test whether a particular technique is valid, i.e., that it works, and peer review of a particular application of the technique, i.e., a fingerprint identification by a particular examiner. The latter type of peer review can only tell you, at best, whether the examiner performed the technique as it is supposed to be performed; it cannot tell you whether the technique is actually capable of producing accurate results on a consistent basis or whether it was accurately performed in a given case.

The polygraph provides a good analogy. A polygraph exam may be verified by a second polygrapher, but that verification will only assess whether the first examiner conducted the exam in an appropriate manner; it will not determine that the polygraph is actually reliable or that it correctly determined whether the subject of the test was lying or telling the truth. For the latter type of assessment concerning the validity of the polygraph, validation studies must be conducted, published and subjected to peer review. The same is true for latent fingerprint analysis. Just as two polygraph examiners might reach the wrong conclusion about whether someone is telling the truth, because of deficiencies in the polygraph, several fingerprint examiners might make a false identification, as in Mayfield, because of deficiencies in the standards and procedures of the fingerprint profession.

Accordingly, while the NAS was well aware of the fact that verification is part of the standard ACE-V analysis, it nevertheless has recognized that basic validation studies are needed in the fingerprint profession to assess the reliability of fingerprint analysis.

In sum, the Third Circuit was correct in determining that the publication facet of the publication/peer review factor does not favor the admission of latent fingerprint evidence. The NAS and OIG Reports further make clear that the government cannot satisfy the peer review facet in the instant case.

**V THE GOVERNMENTS INABILITY TO SATISFY ITS BURDEN AS TO THE ADDITIONAL *DOWNING* FACTORS.**

A. The relationship to established reliable techniques.

Rather than bearing a relationship to established reliable techniques, fingerprint analysis is instead comparable to other forensic identification techniques, such as handwriting and firearms/toolmarks analyses that have likewise come under fire in recent years. As discussed in the NAS Report, these other techniques suffer from the same problems that plague fingerprint analysis -- a lack of basic validation studies and a dearth of objective standards to govern their operation. (NAS Report, at (5-30) (discussing handwriting and firearms analysis).

Federal district courts have recently recognized the deficiencies in these other fields and have prohibited handwriting and toolmark/firearms examiners from testifying, or have significantly limited the type of opinions that they can offer. See United States v. Glynn, 578 F.Supp.2d 567 (S.D.N.Y. 2008) (Requiring firearms examiner to express his opinion of a match as only more likely than not, and recognizing that because the burden of proof in a criminal case is beyond a reasonable doubt, it follows that a conviction in a criminal case may not rest exclusively on ballistics testimony.);

United States v. Green, 405 F. Supp. 2d 104 (D. Mass. 2005) (firearms expert not permitted to give opinion of a match, only allowed to testify to similarities.); United States v. Hines, 55 F. Supp. 2d 62 (D. Mass. 1990) (same, handwriting); United States v. Santillan, 1999 WL 1201765 (N.D. Cal. 1999) (same); United States v. Rutherford, 104 F. Supp. 2d 1190 (D. Neb. 2000) (same); United States v. Brown, No. CR-184ABC (C.D. Cal. Dec. 1, 1999) (same); United States v. Hernandez, 42 Fed. Appx. 173 (10th Cir. 2002) (same); United States v. Hidalgo, 229 F. Supp. 2d 961 (D. Ariz. 2002) (same); United States v. Fuji, 152 F. Supp. 2d 989 (N.D. Ill. 2002) (handwriting examiner excluded); United States v. Saelee, 162 F. Supp. 2d 1097 (D. Alaska 2001) (same); Ramirez v. State, 819 So.2d 836 (Fla. 2001) (toolmark examiner excluded).

Several of the decisions above-referenced had not been issued at the time that Mitchell was decided, and the Court did not address either handwriting, firearms or any other analogous forensic identification technique. Instead, the Court, in finding this factor to lend additional support toward admission referred to some research that the government had offered from the fields of developmental embryology and anatomy, . . . [which] tended to establish biological bases for the uniqueness and permanence of friction ridges. Mitchell, 365 F.3d at 242. This research is in fact noted by the NAS. (NAS Report, at 5-13) ( Some scientific evidence supports the presumption that friction skin patterns are unique to each person and persist unchanged throughout a lifetime.) But, as the NAS persuasively recognizes, uniqueness and permanence do not even imply that fingerprint examiners can reliably make identifications from the type of small distorted fragments typically found at crime scenes:

Uniqueness and persistence are necessary conditions for friction ridge identification to be feasible, but those conditions do not imply that anyone can reliably discern

whether or not two friction ridge impressions were made by the same person. Uniqueness does not guarantee that prints from two different people are always sufficiently different that they cannot be confused, or that two impressions made by the same finger will be sufficiently similar to be discerned as coming from the same source. The impression left by a given finger will differ every time, because of inevitable variations in pressure, which change the degree of contact between each part of the ridge structure and the impression medium. None of these variabilities of features across a population of fingers or of repeated impressions left by the same finger has been characterized, quantified, or compared.

Id. at 5-13.

Accordingly, as the NAS Report now makes clear, the Third Circuit was mistaken in believing that the embryology and anatomy studies provide any support for the admission of a latent fingerprint identification. And in this Defendant's case, the government cannot meet its burden of establishing that this factor favors the admission of its proposed expert.

B. The degree to which the expert testifying is qualified.

Bonnie Stewart, the crime laboratory supervisor at the Salt Lake City Police Department is not certified by the International Association of Identification. (Tr. 37, 38) Further, the SLCPD crime lab is not ASCLAD certified. (Tr. 41)

The NAS Report recommends mandatory certification. Even at that, this appears to establish nothing in terms of reliability in light of all the error committed by IAI certified examiners in the Mayfield case.

Last, until the validity of the methodology is established, the qualifications of the examiner can't matter and have no bearing in the matter. After all, even the most credentialed polygraph examiners and psychics do not get to testify.

**CONCLUSION**

For all the foregoing reasons, defendant's motion exclude the admission of the government's proffered expert witness should be granted.

RESPECTFULLY SUBMITTED this 1<sup>st</sup> day of June, 2010.

/s/ Deirdre A. Gorman  
DEIRDRE A. GORMAN  
Attorney for Defendant

## CERTIFICATE OF SERVICE

I hereby certify that on June 1, 2010 I electronically filed the foregoing with the Clerk of the Court using the CM/ECF system which sent notification of such filing to the following:

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