MEMORANDUM OF LAW IN SUPPORT OF THE DEFENDANT'S MOTION TO PRECLUDE THE PROPOSED TESTIMONY OF A GOVERNMENT FINGERPRINT EXAMINER

Preliminary Statement

The government has indicated its intention to call at trial a fingerprint examiner from the Philadelphia Police Department to testify that a partial, distorted latent fingerprint fragment, which was recovered from the automobile that was "car-jacked" in this case, was left by Mr. X's left index finger. The examiner claims that he can make this identification with absolute certainty, to the exclusion of every other finger in the world. For the reasons discussed below, the examiner should be precluded from providing such testimony.

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 nation's 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 (2009) [hereinafter NAS Report]. 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.[1]

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[1] 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].

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 53; see also Id. at 102 ("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 142. The NAS concluded that there is no "available scientific evidence of the validity of [the fingerprint analysis] method." Id. at 143. 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 exclusion of all others in the world. Id. at 142; see also id. at 7 (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 discussed further 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 and publication/peer review.

The government in responding to this motion will undoubtedly cite the decisions of the Third Circuit in United States v. Mitchell, 365 F.3d 215 (2004) and Judge Pollack in United States v. Llera Plaza, 188 F. Supp. 2d 549 (E.D. Pa. 2002), both of which considered, at some length, the admissibility of expert fingerprint testimony from the FBI.[2] Mitchell, however, while affirming the district court's decision to permit the FBI examiner's testimony, expressly stated that it was not "announcing a categorical rule that latent fingerprint identification evidence is admissible in this Circuit." Id. at 246.[3] Likewise Judge Pollack limited his decision to the particular FBI identification that was before him. Llera Plaza, 188 F. Supp. 2d at 557. Both of these cases were 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 and Llera Plaza, the government is unable to establish the reliability of the expert testimony it seeks to admit. The testimony of the Philadelphia Police Department examiner should be excluded.

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[2] There were two Llera Plaza decisions. In the first, Judge Pollack precluded the FBI examiner from providing an opinion of an identification. See United States v. Llera Plaza, 57 Fed.R.Evid.Serv. 983 (E.D. Pa. Jan. 7, 2002). In the second, cited above, Judge Pollack reversed himself and permitted the identification to take place. Llera Plaza, 188 F. Supp. 2d at 576.

[3] As discussed further below, the FBI in Mitchell had conducted elaborate testing regarding the particular identification at issue in that case, including the verification of that identification by more than thirty different law enforcement agencies. 365 F.3d at 223-24. Here, by contrast, there is no evidence that a single agency has verified the identification at issue, much less thirty.

1. A Basic 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 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. 4 Modern Scientific Evidence: The Law and Science of Expert Testimony [hereinafter Mod. Sci. Evid] § 32:15.[4] 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 n.58.

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.")

[4] Known prints are also collected with electronic fingerprint capture devices. OIG Report, at 104.

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];[5] see also 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,[6] or because it makes the transfer of a print by law enforcement more complicated;[7] (2) the shape of the ridges can be distorted or blurred by the amount of pressure used to deposit the print;[8] (3) movement of the finger while the print was

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[5] "John 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.

[6] 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.")

[7] 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.")

[8] 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 ridge by flattening or broadening each ridge.")

deposited can distort the 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;[9] (4) overlapping or "double tap" prints can "obscure details in each print;[10] (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;[11] and (6) fingerprints are developed and transferred by a variety of methods, all of which have the potential to cause distortions.[12] "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.

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[9] 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.")

[10] Nielson, at 34; Ashbaugh, Ridgeology, at 114; OIG Report, at 103.

[11] 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.")

[12] 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.")

It is commonly believed that an average human fingerprint contains between 75 and 175 ridge 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.[13]

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

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[13] OIG Report, at 101 (illustrating several ridge characteristics).

identifications on the basis of very limited information. See 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.[14]

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 FBI, Fingerprint Identification, at 3 ("Writers on fingerprints quite frequently mention the value

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[14] 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).

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.") with 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.")[15]

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. 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

[15] See also Dusty Clark, What Is the Point, 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.

"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 world's 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[16]

Caught in the middle of this contentious debate are the thousands of rank and file fingerprint examiners, such as those who work at the Philadelphia Police Department, 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 Berkley, 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, e.g., Y. Mark and D. Attias, What is the Minimum Standard of Characteristics for Fingerprint Identification, 22 Fingerprint Whorld 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).[17] There have been no scientific studies performed that can reasonably serve to predict the probability of such events occurring.

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[16] See supra, note 12.

[17] See also OIG Report, at 130 (recognizing the substantial similarity between a fingerprint from Brandon Mayfield and a latent print deposited by another person).

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").[18] 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

[18] See Resolution VII, Identification News (Int'l Ass'n for Identification, New Harford, N.Y.), Aug. 1979, at 1 (resolving "that any member, officer or certified latent print examiner who provides oral or written reports, or gives testimony of possible, probable, or likely friction ridge identification shall be deemed to be engaged in [unbecoming] conduct . . . and charges may be brought.")

> 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).[19] 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 142.

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 field's 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.

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

[19] 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.

characteristics. 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.") As discussed above, 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. See Exhibit A (listing cases of documented error). 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 or she 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.
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> 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 some other crime 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. 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 138. 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 140, 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 138.

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 examiner's 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. 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 for 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.[20] As one leading fingerprint commentator has recognized, "people are being hired directly into latent

[20] William Leo, Identification Standards - The Quest for Excellence Cal. Identification Digest, Dec. 1995 (recognizing need for "minimum training and experience standards" for latent print examiners); David Stoney, Measurement of Fingerprint Individuality, in Advances in Fingerprint Technology (Henry C. Lee & Robert E. Gaensslen, eds, 2d ed. 2001) (recognizing that "[n]either the education of fingerprint examiners, nor the process of fingerprint comparison is standardized").

print units without so much as having looked at a single fingerprint image."[21] Once hired, the training that 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.[22]

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.[23] And since certification is not

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[21] Pat Wertheim, The Ability Equation, 46 J. Forensic Identification 149, 152 (1996).

[22] David L. Grieve, The Identification Process: The Quest For Quality, 40 J. Forensic Identification 109, 110 (1990).

[23] Andy Newman, Fingerprinting's Reliability Draws Growing Court Challenges, N.Y. Times, April 7, 2001, at A8 (observing that "while 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").

required, many, if not most, of the examiners who failed the test are still practicing.[24] Indeed, the vast majority of fingerprint examiners in this country are not board certified.[25]

2. 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,[26] perhaps the most stunning and revealing of these cases is the FBI's 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

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[24] Id. (reporting "'There's very few employers who will terminate an employee for not passing the test,' said Ken Smith, the association's certification chairman").

[25] Id. (further noting that "Mr. Smith added that most of the 5,000 examiners in the country have never taken the test").

[26] Exhibit A provides a non-exhaustive listing of cases of fingerprint error; see also OIG Report, at 137 (discussing 25-30 cases of misidentification by IAI certified examiners encountered by just one member of the IAI Board.)

defects in current latent fingerprint methodology." Maryland v. Bryan Rose, No. K06-0545 at 5 (Md. Cir. Ct. Oct. 2007).[27]

A. 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.[28] 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.[29]

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

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[27] A copy of the Court's Opinion in Rose is attached as Exhibit B.

[28] The bag was found in a stolen van that was discovered near one of the train stations serviced by the commuter trains. OIG Report, at 29.

[29] Automated computer systems such as the FBI's do not make indemnifications, 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. Id.

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 than 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 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.[30] 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 U.S. Attorney's Office. Id.[31] 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.

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[30] 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.

[31] 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.

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 that of the FBI. The SNP examiners looked 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's 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.

B. 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 Doud'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.

C. 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.[32]

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;

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[32] The OIG suggested one modification to this list of research projects, that the FBI "shift at least some of the emphasis on research of Level 3 detail from the issue of permanence to the issue of reproducibility and defining the circumstances under which Level 3 detail should be utilized." Id. at 196-97. Reproducibility refers to the "issue of whether Level 3 details are reproduced in latent prints with sufficient consistency and reliability of appearance to provide valid individualizing power." Id.

- 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, 'Ident' is made, the case notes should reflect the process by which the 'Ident' 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.[33] There is no indication that any such documentation was performed by the fingerprint examiner in the case at bar and none has been provided to the defense despite repeated requests.

D. The lessons to be learned from the 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.

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[33] 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.

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 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.

3. 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. http://www.nasonline.org

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.

The process for producing NAS/NRC reports such as the instant forensic science report is rigorous.[34] First, a committee is assembled: nominees are identified from a number of sources and are then "reviewed and approved at several levels within the National Academies."[35] Once a provisional slate is approved by the President of the National Academy of Sciences, the list is posted for public comment before the committee is formally approved.[36] Once the committee produces a report, it "must be reviewed by a diverse group of experts other than its authors before it may be released outside the institution. This independent, rigorous review is a hallmark that distinguishes the National Academies from many other organizations offering scientific and technical advice."[37]

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[34] See generally Plough Inc. v. National Academy of Sciences, 530 A.2d 1152, 1156 (D.C. 1987) ("When NAS is requested to do a study, it convenes a Committee, composed of prominent scientists and engineers in the relevant field of study, who volunteer their services to conduct a study and prepare a report. The Committee reviews the relevant data, and undertakes an extended series of deliberations involving candid exchanges of views by the Committee members in closed session. The reports are then submitted to a review panel composed of members other than those on the authoring Committee.")

[35] See Committee Appointment Process, *available at* http://www8.nationalacademies.org/cp/information.aspx?key=Committee_Appointment.

[36] Id.

[37] See http://sites.nationalacademies.org/nrc/PoliciesandProcedures/index.htm.

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 the scientific validity of a particular methodology are "authoritative."[38] Courts further routinely recognize the expertise of the NRC[39] and the NAS,[40] and both courts[41] and federal agencies[42] follow the

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[38] 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 . . . .").

[39] 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 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").

[40] 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.

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.

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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").

[41] 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").

[42] 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 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").

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 4. The committee was made up an illustrious group of "members of the forensic science community," including forensic practitioners,[43] crime laboratory directors,[44] "members of the legal community,"[45] including the leading authorities on scientific

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[43] Committee member Dr. Robert Shaler is the Director of the Forensic Science program at Pennsylvania State University. NAS Report, at 296. He was formerly on the staff of the Pittsburgh Crime Laboratory and New York City's Medical Examiner's Office, where he created the Department of Forensic Biology. Id. Dr. Jay A. Siegel is the Director of Forensic and Investigative Sciences Program, Indiana University-Purdue University, and is the author of two textbooks in forensic science and is the editor in chief of the Encyclopedia of Forensic Sciences. Id. at 296-297. Dr. Marcella F. Fierror was formerly the Chief Medical Examiner for the Commonwealth of Virginia, and Chair of the Department of Legal Medicine at Virginia Commonwealth University. She is Past President of the National Association of Medical Examiners and has served as a consultant to the FBI for the National Crime Information Center Unidentified and Missing Persons Files. Id. at 290-291. Dr. Ross E. Zumwalt is Chief Medical Investigator of the State of New Mexico and is also a Past President of the National Association of Medical Examiners. Id. at 299.

[44] 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 293-294. 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 292.

[45] 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 Visting Professor of Law at the New York University of Law. Id. at 287-288. Committee Member Geoffrey S. Mearns 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 Statute University. Id. at 292-293. Marvin E. Schecter is a criminal defense attorney and is a member of the Board of Directors of the National Association of Criminal Defense Attorneys. Id. at 296.

evidence issues,[46] "and a diverse group of scientists,"[47] including renowned statisticians.[48] Id. at 36. 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 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 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.

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[46] 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 289. 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 289-290.

[47] 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 290. Dr. Channing Robertson is a Professor of Chemical Engineering at Stanford University and has published more than 140 articles. Id. at 295. 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 297. Dr. Sheldon M. Wiederhorn is a Senior Fellow at Material Science and Engineering Laboratory of the National Institute for Standards and Technology. Id. at 298-299.

[48] 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 texts and biomarkers." Id. at 288-289. 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 291-292.

Id. The testifying experts included leading latent fingerprint examiners,[49] representatives of the professional association for latent print examiners, the IAI,[50] and representatives of major forensic science organizations and crime labs.[51] The Committee's Report was also reviewed by "individuals chosen for their diverse perspectives and technical expertise." Id. at xii to xiii (listing reviewers). 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 53; see also id. at 102 ("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

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[49] 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 307, 309.

[50] The Committee heard from Joe Polski, Chief Operations Advisor, International Association for Identification. Id. at 303; see also February 19, 2009 Memo to IAI members from President Robert J. Garrett, available at http://www.theiai.org/current_affairs/nas_memo_20090219.pdf ("During the course of the NAS hearings the IAI was invited to present its positions concerning these issues.")

[51] For example, presenters included Bruce A. Goldberger, President-Elect, American Academy of Forensic Scientists; Bill Marbaker, President, American Society of Crime Laboratory Directors; and Joseph A. DiZinno, Assistant Director, Laboratory Division, Federal Bureau of Investigation. Id. at 304-305.

provides only a "broadly stated framework for conducing friction ridge analyses" and "is not specific enough to qualify as a validated method . . ." Id. at 142. 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. at 142-143.[52]

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 143. 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 person's fingers, but the ability of examiners to accurately make identifications from the small distorted fragments of fingerprints detected at crime scenes. Id. at 43 ("The question is less a matter of whether each person's fingerprints are permanent and unique – uniqueness is commonly assumed – and 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

[52] 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 139.

same finger that left an impression (with different imperfections in a file of fingerprints.") As the NAS further explains,

> 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 144.

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 144. 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 139. The NAS further recognizes that, while "little research has been directed toward developing population statistics, . . . more would be feasible." Id. at 139-140.

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 142 (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 7.

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 12. 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 22-23.

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 82 ("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.")

4. 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, 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.[53]

The Daubert Court suggested five factors that trial courts should ordinarily consider in determining whether proffered expert testimony is sufficiently reliable.[54] 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. 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 methodology on which an opinion is premised." Id. at 594.

A third factor is the "existence and maintenance of standards controlling the technique's

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[53] 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. See United States v. Santillan, 1999 WL 1201765, *3 (N.D. Cal. 12/3/99) ("the government is correct in their assertion that pre-Daubert/Kumho Ninth Circuit precedent supports the admissibility of this [handwriting expert] testimony, however, the world has changed."); Williamson v. Reynolds, 904 F.Supp. 1524, 1554-59 (E.D. Okla. 1995) (holding that under the criteria of Daubert, hair identification evidence should not have been admitted despite the existence of pre-Daubert case law accepting it); Modern Scientific Evidence, § 21-01 at 52 (Ex. 17) (the early fingerprint cases, "germinal not only for fingerprint identification but for the many other forensic individualization techniques invested virtually no effort assessing the merits of the proferred scientific evidence, but merely cited treatises on criminal investigation, or general approval of science, or . . . other cases admitting [such evidence].")

[54] 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).

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.[55]

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 spectograghic 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).

In providing the above factors, the Supreme Court emphasized that the inquiry under Federal Rule of Evidence 702 is a "flexible one"and that, as such, additional factors may be considered in determining the essential issue of reliability. Id. Several such additional factors have been suggested by the Third Circuit:

(1) the relationship of the technique to methods which have been

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[55] Here, by contrast, the fingerprint examiner's professional association, the IAI, expressly eschews any type of minimum identification standard. See Ashbaugh, Ridgeology, at 1-2.

> established to be reliable;
> (2) the qualifications of the expert witness testifying based on the methodology;
> (3) the non judicial uses to which the method has been put.

Downing, 753 F.2d at 1238-39; see also In re Paoli R.R. Yard PCB Litig., 35 F.3d 717, 742 n.8 (3d Cir. 1994).

As demonstrated below, the government's proposed expert testimony fails with respect to each and every factor that has been identified by the Supreme Court and the Third Circuit.

5. The Government's 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. As discussed further below, the NAS and OIG reports further substantiate the Third Circuit'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 this particular case. As set forth at the outset of this brief, 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. With the publication of the NAS and OIG reports, the evidentiary landscape has changed significantly since Mitchell was decided, particularly with respect to these other Daubert factors.

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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. As discussed above, 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 53, 102.

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 142. The NAS could find no "evidence of the validity of the ACE-V method." Id. at 143. 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 142. 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 7.

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 20.

At the time of the Third Circuit's decision in Mitchell, of course, 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. 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").[56] Because there is a critical "difference between practicing a technique and assessing the validity of a technique,"[57] 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

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[56] See, e.g., United States v. Horn, 185 F. Supp. 2d 530, 554 (2002) ("However skilled law enforcement officials, highway safety specialists, prosecutors and criminologists may be in their fields, the record before me provides scant comfort that these communities have the expertise needed to evaluate the methods and procedures underlying human performance tests such as the [standard field sobriety tests]); Blackwell v. Wyeth, -- A.2d --, 2009 WL 1269751, 14 (Md. 2009) (describing relevant community as "scientists with sufficient training and expertise to permit them to comprehend novel scientific methods"); Ramirez v. State, 810 So.2d 836, 51 (Fla. 2001) ("[G]eneral scientific recognition requires the testimony of impartial experts or scientists. It is this independent and impartial proof of general scientific acceptability that provides the necessary Frye foundation."); State ex rel. Collins v. Superior Court, 644 P.2d 1266, 1285- 86 (Ariz. 1982) (describing relevant community as "disinterested and impartial experts, knowledgeable in the scientific specialty which deals with and uses such procedures or techniques"); People v. Collins, 405 N.Y.S.2d 365, 368 (N.Y.Sup. 1978) (observing that "expertise in disciplines tangential to the one under consideration could have significant bearing on the issue" of general acceptance); People v. Kelly, 549 P.2d 1240, 1250 (Cal. 1976) (describing relevant community as those "engaged in the scientific fields").

[57] 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).

tests;[58] tests of sexual dangerousness;[59] handwriting analysis;[60] medical causation;[61] electrophoretic typing of human fluid stains;[62] polygraph examinations;[63] voiceprint experiments

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[58] 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").

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

[60] 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.

[61] 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.").

[62] 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

or spectrograms;[64] and hair analysis.[65]

As discussed above, moreover, the courts have further recognized that the conclusions of

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considered as part of the relevant scientific community") (citations omitted).

[63] 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 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").

[64] 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.").

[65] 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.").

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 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, aff'd, 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").[66]

[66] 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.

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 8. 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

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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 (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).

accuracy of performance." OIG Report, at 196.

The Third Circuit in Mitchell found that the testing factor in that particular 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 ("This is perhaps the strongest point for the government on this point."). 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. See supra 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 309. 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 8.

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 143.

As the NAS recognizes, testing is needed in the fingerprint field to address issues of "accuracy, reliability and validity." Id. at 22; see also 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. at 23. This research, "by which measures of reliability and accuracy are determined, should be peer-reviewed and published in

respected scientific journals." Id. 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 (the fingerprint examiner's professional association) 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. See OIG Report, at 137. If IAI certified examiners, who constitute only about 2% of the field, are committing this many documented cases of misidentification, one can only imagine how many false identifications have actually occurred across the profession.

The Mayfield case, moreover, 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

misidentication might there be which have not been miraculously caught by foreign examiners?[67] Accordingly, as 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.

Accordingly, 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

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[67] That there have been scores of cases of misidentifications that have never been discovered is also evidenced by a scandal that occurred in the New York State Trooper's Office which involved some forty cases of fingerprint fraud over an eight-year period. Cole, Suspect Identities, at 274. It was subsequently determined that many of these cases of fraud were crude endeavors that would have been blatantly obvious to anyone trained in fingerprint identification. Id. at 280. Yet in none of these cases did the defense even have the fingerprint evidence evaluated by an independent fingerprint examiner. Id. The scandal thus effectively "revealed the extent of the trust extended to fingerprint examiners, how little defense attorneys scrutinize fingerprint evidence, and how rare is the retention of an expert by the defense." Id. Indeed, in their confessions, the troopers themselves acknowledged that they chose to fabricate fingerprint evidence because they knew it would go unquestioned.

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 144, n35.

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 latents 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. See supra, at 21, n29. There was no indication in the survey results that state law enforcement fingerprint examiners actually compared any fingerprints from the computer databases with the latents 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.[68]

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[68] 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

Even assuming, moreover, 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 this Country 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. See NAS Report, at 309; 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.

The Third Circuit in Mitchell 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

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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).

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 142-143.[69]

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

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[69] The NAS Report further quotes from the paper by Haber and Haber as follows:

> [W]e report a range of existing evidence that suggests that examiners differ at each stage of the method in the conclusions they reach. To the extent that they differ, some conclusions are invalid. We have analysed the ACE-V method itself, as it is described in the literature. We found that these descriptions differ, no single protocol has been officially accepted by the profession and the standards upon which the method's conclusions rest have not been specified quantitatively. As a consequence, at this time the validity of the ACE-V method cannot be tested.

NAS Report, at 143.

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 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 two 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.[70] 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, so too 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.

6. The Government's 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. See NAS Report, at 140-155; 163-167 (discussing handwriting and firearms analysis).

Federal district courts have recently recognized the deficiencies in these other fields and

[70] And, unlike fingerprints, validation studies have been conducted for the polygraph and courts have considered those studies in determining that the polygraph is not sufficiently reliable to be introduced at trial except under very limited circumstances. See United States v. Scheffer, 523 U.S. 303, 310-11 (1998) (discussing cases)

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, handwriitng); 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 these decisions had not been issued yet 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. See NAS Report, at 143-144 ("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 144.

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. 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.

[This section will need to be drafted based on what the qualifications of the particular expert are. If the expert is not certified by the IAI, which he probably won't be, you should make a big deal of the fact that the NAS Report recommends mandatory certification. If by chance examiner is certified argue that this establishes nothing in terms of reliability in light of all the errors committed by IAI certified examiners. Argue that until the validity of the methodology is established, the particular qualifications of the examiner doesn't matter. For example, even the most credentialed polygraph examiners and psychics don't get to testify.]

C. Non-Judicial uses.

There are no non-judicial applications of latent fingerprint analysis. While fingerprints are used for "biometric identification" and as a means of identifying whether people have

previously been arrested, these non-judicial uses, the Third Circuit recognized, use "full rolled prints, or avoid the difficulties introduced by distortion or both." Mitchell, 365 F.3d at 243. It is only in the judicial system that examiners attempt to make identifications from the type of small distorted latent fingerprint fragments found at crime scenes. Accordingly, the Third Circuit found that this factor supported admission of the government's evidence "only weakly." Id. While one might quibble even with this assessment, there can be no serious debate that this factor cannot possibly warrant admission given the foregoing discussion of all the other Daubert and Downing factors.

In sum, the government cannot establish the reliability of the expert testimony it seeks to offer. Consideration of the Daubert and Downing factors, as well as the recently released reports by the NAS and OIG, makes clear that the government's proposed expert does not have a reliable basis for the absolute identification that he seeks to offer. Accordingly, his testimony should be excluded.

CONCLUSION

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

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