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### Forensic Science; Far From "Scientific Certainty"

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## I. FORENSIC SCIENCE; FAR FROM “SCIENTIFIC CERTAINTY”

*“We just did our job and made a mistake... That’s how I like to think of it—an honest mistake.... I’ll preach fingerprints till I die. They’re infallible. I still consider myself one of the best in the world.”<sup>1</sup>*

On March 11, 2004, terrorists detonated bombs on several trains located in Madrid, Spain, killing approximately 191 people and injuring upwards of 2,000.<sup>2</sup> The Spanish National Police recovered fingerprints from a bag filled with detonators that were found to be connected with the attacks.<sup>3</sup> When compared to their own database, the fingerprint did not result in a match. The Spanish authorities forwarded the recovered print to several other investigative organizations.<sup>4</sup> One of these organizations being the United States, Federal Bureau of Investigation (FBI).<sup>5</sup> Upon examination of the unidentified print through the FBI’s Integrated Automated Fingerprint Identification System (“IAFIS”),<sup>6</sup> it provided that there was a possible match to this latent print; the source being Brandon Mayfield.<sup>7</sup> Following this database ‘match,’ FBI Senior Fingerprint Examiner, Terry Green manually matched the latent print to Brandon Mayfield’s exemplar print.<sup>8</sup>

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<sup>1</sup> Flynn McRoberts et al., *Forensics Under the Microscope: Unproven Techniques Sway Courts, Erode Justice*, CHI. TRIB., Oct. 17, 2004, at A1. (John Massey, referring to the Mayfield misidentification.)

<sup>2</sup> See Robert B. Stacey, *Report on the Erroneous Fingerprint Individualization in the Madrid Train Bombing Case*, 54 J. FORENSIC IDENTIFICATION 706 (2004); OVERSIGHT & REVIEW DIV., U.S. DEP’T OF JUSTICE, A REVIEW OF THE FBI’S HANDLING OF THE BRANDON MAYFIELD CASE (2006)

<sup>3</sup> *Id.*

<sup>4</sup> *Id.* See; OFFICE OF THE INSPECTOR GEN., A REVIEW OF THE FBI’S HANDLING OF THE BRANDON MAYFIELD CASE 1 (2016).

<sup>5</sup> *Id.*

<sup>6</sup> The FBI has since decommissioned IAFIS and now uses “Advanced Fingerprint Identification Technology” (“AFIT”) as part of its larger “Next Generation Identification System” (“NGI”). Alice Lipowicz, *FBI Deploys Faster Fingerprint ID System*, GCN (Mar. 9, 2011); Ellen Messmer, *FBI Turns Up Faster, More Accurate Fingerprint Identification System*, NETWORK WORLD (Mar. 8, 2011).

<sup>7</sup> Mayfield’s print was in the database because of an arrest from 1984, and his military service.

<sup>8</sup> MAYFIELD CASE

The government's affidavit stated that Green "considers the match to be a 100% identification" of Mayfield.<sup>9</sup> Green's identification was verified by Supervisory Fingerprint Specialist, Unit Chief of the Latent Print Unit, Michael Wieners, as well as fingerprint examiner John T. Massey.<sup>10</sup> After this 'identification' the FBI opened an investigation into Mayfield. During this investigation, they discovered that although Mayfield was Muslim, married to an Egyptian immigrant, had contacts with suspected terrorists, and even represented a convicted terrorist in a child custody dispute, there was no evidence linking Mayfield to the Madrid bombing.<sup>11</sup> Further, it was discovered that Mayfield did not have a valid passport, and that he had not left the United States since the 1990s.<sup>12</sup>

Spanish National Police subsequently determined that Mayfield's print was not a match to the latent print recovered from the bombing scene.<sup>13</sup> The FBI claimed to have found fifteen matching points of agreement between the recovered print and Mayfield's, while the Spanish National Police found only seven.<sup>14</sup> While the FBI continued its investigation into Mayfield, the Spanish National Police continued to conduct its own investigation as to the source of the prints.<sup>15</sup> On May 19, 2004, an independent examiner was brought in and agreed with the FBI's identification and became at least the fourth examiner to positively link Mayfield to the recovered print.<sup>16</sup> However on the same day, the Spanish National Police determined that the latent print had a match, and it was not Brandon Mayfield.<sup>17</sup> They concluded that the print

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<sup>9</sup> Application for Material Witness Order and Warrant Regarding Witness: Brandon Bieri Mayfield, *In re* Federal Grand Jury Proceedings 03-01, 337 F. Supp. 2d 1218 (D. Or. 2004).

<sup>10</sup> *Id.*

<sup>11</sup> *See generally*; OFFICE OF THE INSPECTOR GEN., A REVIEW OF THE FBI'S HANDLING OF THE BRANDON MAYFIELD CASE 1 (2016).

<sup>12</sup> *Id.* at 58.

<sup>13</sup> Sarah Kershaw et al., *Spain and U.S. at Odds on Mistaken Terror Arrest*, N.Y. TIMES (June 5, 2004).

<sup>14</sup> *Id.* at A1

<sup>15</sup> *Supra* note 4.

<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

matched Algerian national, Ouhane Daoud.<sup>18</sup> After spending two weeks held in jail, Mayfield was released to home detention.<sup>19</sup> On May 24, 2004 the FBI withdrew its identification of Mayfield, and the case against him was officially dismissed.<sup>20</sup>

In a report issued by *The New York Times*, the FBI had made statements to Congress that they had concluded a match after working off a “second-generation” digital print, explaining that it was a copy of a copy.<sup>21</sup> The FBI official who later spoke directly with *The New York Times*, added that the true issue of their misidentified match was the quality of the latent print that the Spanish National Police recovered from the blue bag.<sup>22</sup> Moreover, the determination that the print was useable was erroneous, and that factor alone is the reason why there was a misplaced identification.<sup>23</sup> However, in response to the FBI’s investigative methods, Pedro Luis Melida Lledo, the head of the Spanish National Police’s fingerprint unit commented that Mayfield’s prints found on the blue bag differed in arc pattern on the lower portion, pointing downward rather than upward (as observed in the recovered latent print), and showed different concentric ring patterns.<sup>24</sup>

While Brandon Mayfield was not convicted by this misleading evidence, others have not had the same fortune.<sup>25</sup> Since 1961, there have been 776 known wrongful convictions based on

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<sup>18</sup> *Id.* at 2

<sup>19</sup> *Id.* at 3.

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

<sup>21</sup> *Kershaw*, *supra* note 13 at A1

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

<sup>23</sup> *Id.*

<sup>24</sup> *Id.*

<sup>25</sup> *See e.g.*; *Commonwealth v. Cowans*, 756 N.E.2d 622 (Mass. App. Ct. 2001).

On May 30, 1997, an African-American male shot and wounded Boston Police Officer Gregory Gallagher. The assailant’s baseball hat fell off in the initial struggle between Gallagher and the assailant. Shortly after the shooting, an African American man holding a gun gained entry into the resident of Bonnie Lacy, asked and received a glass of water and left. Officer Gallagher later identified Mr. Stephan Cowans as his assailant in a photographic lineup that included the pictures of eight individuals. The officer also subsequently identified Cowans in a standard lineup that included the suspect. In addition to the eyewitness evidence, investigators located a fingerprint on the glass used by the individual who had gained entry to Ms. Lacy’s house. Two Boston Police

faulty forensic evidence.<sup>26</sup> In recent years, courts have made strides in reversing or vacating convictions based on other questionable forensic discipline evidence. While courts have been open to scrutinizing some forensic disciplines, they have been hesitant to approach the concerns of fingerprint identification. As the Mayfield case demonstrates, the methodology of comparing ‘unknown’ latent fingerprints and known inked prints is inherently subjective and subject to error. But how can errors like the Mayfield case be prevented if the methodology of latent fingerprint identification continues to be openly accepted by legal scholars?

## II. THE TRUTH, THE WHOLE TRUTH, NOTHING BUT THE TRUTH, AND FORENSIC SCIENCE...

Forensic science can be best defined as the provision of information used to answer questions of importance to investigators and courts of law.<sup>27</sup> The term “forensics” is a broad term that encompasses a diverse array of practices and techniques.<sup>28</sup> Long used disciplines of forensic science such as; fingerprint examination, questioned documents, firearms, and tool mark comparison are pillars of criminal prosecution. Forensic scientists present their findings to

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department fingerprint examiners matched the recovered print to that of Cowans. An independent fingerprint examiner for the defense later confirmed the fingerprint match. On the basis of this evidence, Mr. Cowans was convicted of shooting a police officer and sentenced to thirty to forty-five years in state prison. However, in May 2003, Orchid Cellmark Laboratories performed DNA testing on both the glass and the baseball hat found at the crime scene. The DNA profile found on the glass did not match that of Mr. Cowans, but it did match that of the primary contributor to the DNA on the baseball cap. Suffolk Assistant District Attorney David E. Meier stated that, given the “compelling” evidence of the fingerprint on the glass, his office would retry Cowans if the conviction were overturned. Two days later, after the fingerprint had been re-examined, however, Meier changed his mind. In addressing Superior Court Judge Peter Lauriat, Meier explained that the fingerprint evidence presented at trial did not match that of Cowans. Mr. Cowans was then released, having spent six years in jail for a crime he did not commit.

<sup>26</sup> See generally, NAT’L REGISTRY OF EXONERATIONS, <http://www.law.umich.edu/special/exonera-/Pages/detailist.aspx> (last visited Apr. 18, 2020) (listing exoneration cases in which the underlying conviction involved false or misleading forensic evidence). This accounts for about 24% of known wrongful convictions.

<sup>27</sup> Jessica Gabel Cino, *Roadblocks: Cultural and Structural Impediments to Forensic Science Reform*, 57 Hous. L. Rev. 533 (2020).

<sup>28</sup> NAT’L RESEARCH COUNCIL, FORENSIC SCIENCE IN THE UNITED STATES, 38 (2009).

various parties within the legal justice system, including prosecutors, judges, police, and jurors.<sup>29</sup> “A scientist becomes a forensic scientist when their scientific knowledge is used to assist courts in understanding their test results.”<sup>30</sup> Forensic analysis involves both deductive and inductive research techniques.<sup>31</sup> Deductive analysis can be best explained as a plausible explanation that is tested and verified.<sup>32</sup> While inductive analysis combine confirmed activities with observed traces to create a case-specific result.<sup>33</sup> Upon completion of their analyses, forensic scientists are often relied on as ‘experts’ within the courtroom.

Experts play an ever-increasing role in the trial process.<sup>34</sup> Both judges and lawyers are expected to play an active role in evaluating scientific evidence. Lawyers rely heavily on expert testimony to provide powerful, convincing evidence.<sup>35</sup> For roughly hundreds of years these comparison and identification methods have not only been employed as legal evidence, but also have been largely accepted as trustworthy and uncontroversial.<sup>36</sup>

### A. *The Law Before Daubert*

#### 1. *Frye v. United States*<sup>37</sup>

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<sup>29</sup> Cino, *supra* note 27.

<sup>30</sup> *Id.* See also; *What’s a Forensic Scientist?* AM. ACAD. FORENSIC SCI., <https://www.aafs.org/home-page/students/choosing-a-career/whats-a-forensic-scientist/> [<https://perma.cc/6MHC-YFQQ>].

<sup>31</sup> Cino, *supra* note 27; See also; ORG. OF SCI. AREA COMMS., NO. 0002R1, A FRAMEWORK FOR HARMONIZING FORENSIC SCIENCE PRACTICES AND DIGITAL/MULTIMEDIA EVIDENCE 3–12 (revised 2019), [https://www.nist.gov/system/files/documents/2018/01/10/osac\\_ts\\_0002.pdf](https://www.nist.gov/system/files/documents/2018/01/10/osac_ts_0002.pdf) [<https://perma.cc/9A9C-4HHR>].

<sup>32</sup> *Id.* at 3

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

<sup>34</sup> Domitrovich, S. (2016) “*Fulfilling Daubert’s Gatekeeping Mandate Through Court-Appointed Experts*,” THE JOURNAL OF CRIMINAL LAW & CRIMINOLOGY, 106(1), pp. 35–48. Available at: <http://www.jstor.org/stable/26402865>. (Accessed: April 22, 2023). Citing; Janet Cotterill, *Language and Power In Court: A Linguistic Analysis Of The O.J. Simpson Trial*, 156 (2003).

<sup>35</sup> Deborah Gander, *Prescription For Powerful Expert Testimony*, TRIAL, May 2007, at 40.

<sup>36</sup> Mnookin, JL, Cole, SA, Dror, IE, Fisher, BAJ, Houck, MM, Inman, K, Kaye, DH, Koehler, JJ, Langenburg, G, Michael Risinger, D, Rudin, N, Siegel, J & Stoney, DA 2011, *The Need for A Research Culture in The Forensic Sciences*, UCLA L. REV., vol. 58, no. 3, pp. 725-780.

<sup>37</sup> *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923).

For evidence to be used as a ‘truth-determining’ function it must meet certain standards of reliability, this includes scientific expert testimony.<sup>38</sup> In 1922, James Frye was accused of murder in Washington D.C.<sup>39</sup> In *Frye*, the defendant attempted to introduce evidence of a novel systolic blood pressure deception test, more commonly referred to as a ‘lie detector’ or polygraph test.<sup>40</sup> The defendant’s desired use for this testimony was to show that he was being truthful when he was examined and subsequently denied involvement in the crime for which he was charged.<sup>41</sup> The trial court judge, Walter Irving McCoy refused to admit the testimony and test into evidence.<sup>42</sup> Frye was found guilty and his lawyer appealed, arguing that the scientific expert and scientific evidence were improperly excluded.<sup>43</sup>

The Court of Appeals of the District of Columbia also rendered a decision rejecting the admissibility of the results of the systolic blood pressure deception test.<sup>44</sup> In 1923 there was no precedent rule for the admissibility of scientific evidence. Scientific evidence, like non-scientific was held to the traditional criteria of logical relevancy, in other words its helpfulness to the trier of fact, and the qualifications of the witness.<sup>45</sup> However, looking at this standard, there was little reason for the court to exclude the expert testimony and scientific evidence, as its logical relevancy and potential helpfulness were blatantly apparent. Unable to exclude the evidence by the current rules of admissibility, the *Frye* court created a new standard, shifting the focus of the

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<sup>38</sup> Giannelli, P. C., *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*. COLUMBIA L. REV., vol. 80, no 6, pp. 1197–1250. <https://doi.org/10.2307/1122061>

<sup>39</sup> *Frye*, 293 F. 1013.

<sup>40</sup> *Id.*

<sup>41</sup> *Id.*

<sup>42</sup> See, Tai Golan, *Revisiting the History of Scientific Expert Testimony*, 73 BROOK. L. REV. (2008).

<sup>43</sup> *Frye*, 293 F. at 1014.

<sup>44</sup> *Id.*

<sup>45</sup> Tai, *supra* note 41 at 928.

admissibility process from the expert's credentials, to the scientific knowledge proffered to the court.<sup>46</sup>

In its opinion the Court wrote that the systolic blood pressure deception test, had “not yet gained such standing and scientific recognition among physiological and psychological authorities.”<sup>47</sup> As a result, the *Frye* court imposed a special burden for the admission of scientific techniques.<sup>48</sup> The court explained:

While courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.<sup>49</sup>

The scientific technique must be generally accepted by the relevant scientific community.<sup>50</sup> In order to be generally accepted, the method must pass through an experimental stage which is scrutinized by the scientific community. The *Frye* opinion illustrated scientific knowledge as an evolutionary process that need advance from experimental to a demonstrable stage before it can be accepted in a court of law.<sup>51</sup> By the 1970s, *Frye*'s general acceptance test had become, “not only the majority view... but the almost universal view.”<sup>52</sup> This was until 1975, and the enactment of the Federal Rules of Evidence.

## 2. *Federal Rule of Evidence 702*

In 1975, Congress enacted the Federal Rule of Evidence,<sup>53</sup> setting a new standard for admitting scientific evidence through expert testimony in federal court. FRE 702, unlike *Frye*,

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<sup>46</sup> *Id.*

<sup>47</sup> 293 F. at 1014.

<sup>48</sup> Giannelli, *supra* note 37

<sup>49</sup> *Frye*, 293 F. at 1014

<sup>50</sup> *Id.*

<sup>51</sup> Tai, *supra* note 41, at 929.

<sup>52</sup> *Id.*

<sup>53</sup> Pub. L. 93-595, §1, Jan. 2 1975, 88 Stat. 1937



mentioned no special test to ensure reliability of scientific evidence. The original rule enacted, Federal Rule 702, provided:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.<sup>54</sup>

FRE 702 was interpreted by courts in a more flexible manner than *Frye*, allowing for more types of scientific evidence to be admitted into evidence.<sup>55</sup> Although the rule appears to stray from *Frye*, there is no explicit language to indicate any intent of abandoning *Frye*. In fact, many jurisdictions continue to apply the *Frye* standard when evaluating the admissibility of scientific evidence.<sup>56</sup> While FRE 702 discusses the ‘qualifications’ to which an expert may give their testimony, it fell silent on what role, if any, a judge should assign to the risk of error.

### B. *The Daubert Trilogy*

#### 1. *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,<sup>57</sup>

After nearly two decades since the enactment of the Federal Rules of Evidence, the United States Supreme Court addressed the continued vitality of the *Frye* standard. In 1993, Jason Daubert and Eric Schuller and their parents filed suit against Merrell Dow Pharmaceutical company. Daubert and Schuller were born with serious birth defects and argued that Merrell

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<sup>54</sup> The current version of Federal Rule 702 Provides:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

- (a) The expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- (b) The testimony is based on sufficient facts or data;
- (c) The testimony is the product of reliable principles and methods; and
- (d) The expert has reliably applied the principles and methods to the facts of the case

FRE 702, 28 U.S.C.A.

<sup>55</sup> The United States Supreme Court explained that the general approach of the FRE was “of relaxing the traditional barriers to opinion testimony.” The Court referred to the *Frye* standard as an “austere standard, absent from and incompatible with the Federal Rules of Evidence.: *Daubert, infra* note 57, at 589.

<sup>56</sup> As of March 2022; California, District of Columbia, Illinois, Maryland, New Jersey, New York, Pennsylvania, and Washington state apply the *Frye* standard when evaluating admissibility of expert testimony.

<sup>57</sup> *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).

Dow's Bendectin,<sup>58</sup> which was taken by both their mothers during pregnancy, was the cause of their defects.<sup>59</sup> In attempt to prove there was a causal link between the drug and birth defects, Daubert's lawyers sought to introduce the testimony of eight experts, who based their conclusions on studies conducted between Bendectin and malformation.<sup>60</sup> The trial court judge determined that the evidence failed to meet the standard of 'general acceptance' under *Frye*, and excluded the evidence.<sup>61</sup> On appeal, the United States Supreme Court introduced a new standard for the admissibility of scientific evidence.<sup>62</sup> Noting that FRE 702 required that the subject of admissible scientific expert testimony must reflect "scientific knowledge,"<sup>63</sup> the Court asserted that the hallmark of scientific knowledge is the reliability. The Court further reasoned that this reliability requirement should be extended to proffered scientific evidence at trial.<sup>64</sup>

*Daubert* set forth a list of non-exhaustive factors as well as general guidance for trial judges on how to approach the reliability of proffered scientific evidence.<sup>65</sup> The first *Daubert* asks whether the scientific method has been tested.<sup>66</sup> The second factor looks to whether there is existence of peer-reviewed publications as to the methodology or discipline proffered.<sup>67</sup> The third factor looks to the "known or potential rate of error" of the method.<sup>68</sup> The fourth factor

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<sup>58</sup> Bendectin was widely used for the treatment of nausea and vomiting of pregnancy until 1983.

<sup>59</sup> *Daubert v. Merrell Dow Pharm. Inc.*, 727 F. Supp. 570, 571 (1989), *vacated*, 509 U.S. 579 (1993).

<sup>60</sup> *Daubert*, 727 F. Supp. at 573.

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

<sup>62</sup> Jonathan J. Koehler and John B. Meixner Jr., *An Empirical Research Agenda for the Forensic Sciences*, 106 J. CRIM. L. & CRIMINOLOGY (2016).

<sup>63</sup> *Daubert*, 509 U.S. at 589-90.

<sup>64</sup> *Id.* at 590.

<sup>65</sup> *Id. See; Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).

<sup>66</sup> *Daubert*, 509 U.S. 579 at 593.

<sup>67</sup> *Id.* at 593-94 ("Another pertinent consideration is whether the theory or technique has been subjected to peer review and publication. Publication is not a *sine qua non* of admissibility; it does not necessarily correlate with reliability, and in some instances well-grounded but innovative theories will not have been published. Some propositions, moreover, are too particular, too new, or of too limited interest to be published. But 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.")

<sup>68</sup> *Id.* at 594.

relies on whether there is a “standard controlling the technique’s operation.”<sup>69</sup> Lastly, the fifth factor incorporates the *Frye* general acceptance test.<sup>70</sup>

In 1995, on remand from the United States Supreme Court, the United States Court of Appeals for the Ninth Circuit suggested that “methodologies practiced by a recognized minority of scientists in the field could fall within the range of generally accepted methodologies.”<sup>71</sup> The Ninth Circuit added a sixth factor to the *Daubert* standard, about whether the proffered expert formed their opinion in anticipation of litigation.<sup>72</sup> The court added this factor on the argument that experts whose research predates filing of a complaint are more trustworthy than experts whose research postdates a litigant’s promise of compensation.<sup>73</sup>

## 2. *General Electric Co., v. Joiner*<sup>74</sup>

The Supreme Court addressed the standard of appellate review for admissibility made by courts under the newly enacted *Daubert* standard.<sup>75</sup> Robert Joiner was an electrician whose work required him to place his hands and arms into dielectric fluid that had been contaminated with polychlorinated biphenyl, which was an illegal substance generally considered hazardous to human health.<sup>76</sup> In 1991, Joiner was diagnosed with lung cancer, and subsequently sued General Electric Co., and other corporations, who were the manufacturers of the contaminated fluid.<sup>77</sup> Joiner alleged that his exposure to the contaminated fluid had “promoted” his cancer; in order

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<sup>69</sup> *Id.*

<sup>70</sup> *Id.*, *supra* note 37.

<sup>71</sup> *Daubert v. Merrell Dow Pharm., Inc.*, 43 F.3d 1311, 1317 (9<sup>th</sup> Cir. 1995).

<sup>72</sup> *Id.* at 1316-17 (“One very significant fact to be considered is whether the experts are proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying.”).

<sup>73</sup> *Id.* at 1317.

<sup>74</sup> *General Electric Co., v. Joiner*, 522 U.S. 136 (1997).

<sup>75</sup> *Joiner*, 522 U.S. at 139.

<sup>76</sup> *Id.*

<sup>77</sup> *Id.*

to support his claim he proffered expert testimony that supported his theory.<sup>78</sup> The trial court ruled that the expert testimony was inadmissible.

At the Supreme Court, both petition and respondent agreed that review of *Daubert* admissibility standards should be abuse of discretion. However, they disagreed on whether the “particularly stringent” standard applied by the appellate court, was the same as abuse of discretion.<sup>79</sup> The Court held that the appellate court applied a more stringent standard than abuse of discretion, and found that the district court was within its discretion to deem the expert testimony inadmissible.<sup>80</sup>

### 3. *Kumho Tire v. Carmichael*<sup>81</sup>

In 1999, the Supreme Court again expanded on *Daubert*, in *Kumho Tire Co.*, deciding that the “gatekeeping” responsibility extended to non-scientific evidence, relating the same non-dispositive factors set forth in *Daubert*.<sup>82</sup> At issue in *Kumho Tire Co.*, was the proffered testimony of the plaintiff’s alleged expert in tire failure analysis.<sup>83</sup> The plaintiff’s expert opined that the right rear tire had blown out because of a defect in design or manufacture.<sup>84</sup> The expert reached their conclusion based on a visual examination of the tire, in which he looked for the presence of four physical signs that are indicative of a blowout due to “over-deflection.”<sup>85</sup> Both the trial and Supreme Court addressed the fact that neither the plaintiff nor their expert provided any indication that other experts in the industry of tire analysis follow the two factor test used by the expert here.<sup>86</sup> Further, the plaintiff failed to identify criteria that would mitigate in favor of

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<sup>78</sup> *Joiner v. Gen. Electric Co.*, 864 F. Supp. 1310, 1326 (N.D. Ga. 1994).

<sup>79</sup> *Joiner*, 522 U.S. at 141.

<sup>80</sup> *Id.* at 143-147.

<sup>81</sup> *Kumho Tire v. Carmichael*, 526 U.S. 137 (1999).

<sup>82</sup> *Kumho Tire Co.*, 526 U.S. at 141-42.

<sup>83</sup> *Id.* at 142.

<sup>84</sup> *Id.* at 143

<sup>85</sup> Underinflating the tire or causing it to carry too much weight. *Kumho Tire Co.*, 526 U.S. at 144

<sup>86</sup> *Id.* at 157

admissibility.<sup>87</sup> In attacking the questions regarding non-scientific evidence, *Kumho* held as an initial matter that a district court's "gatekeeping" obligation to ensure that expert testimony is "reliable" applies to all experts, not just scientific experts.<sup>88</sup>

*Kumho Tire Co.*, is a critical case when evaluating the testimony of fingerprint analysts, because it ruled that prosecutors can no longer avoid the burdens of establishing reliability of the expertise, merely by recharacterizing it as "technical" or "specialized" knowledge in comparison to the originally *Daubert* applicable terminology of "scientific" knowledge.<sup>89</sup> Following *Kumho Tire Co.*, prosecutors have the responsibility of demonstrating the reliability of latent fingerprint identification testimony through the *Daubert* factors, or by meeting an alternative applicable criterion.<sup>90</sup> However, as time has passed from *Kumho Tire Co.*'s expansion of *Daubert*, prosecutors have fallen short of bringing fingerprint identification methods to the standards of *Daubert*.

### III. LOOKING AT THE FINE *PRINTS*

#### A. *People v. Jennings*<sup>91</sup>

In 1911, the Supreme Court of Illinois was the first court to approve the admission of fingerprint identification evidence. The court wrote, "[e]xpert testimony is admissible when the subject-matter of the inquiry is of such character that only persons of skill and experience in it are capable of forming a correct judgement as to any facts connected therewith."<sup>92</sup> In applying this standard the court upheld the testimony made by the 'expert' fingerprint examiner. In reviewing the testimony, the court found that, "the classification of finger print impressions and

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<sup>87</sup> *Id.* at 158

<sup>88</sup> *Id.* at 147.

<sup>89</sup> Robert Epstein, *Fingerprints Meet Daubert: The Myth of Fingerprint Science Is Revealed*, 75 S. CAL. L. REV. 605, 621 (2002).

<sup>90</sup> *Id.* at 622.

<sup>91</sup> *People v. Jennings*, 96 N.E. 1077 (Ill. 1911).

<sup>92</sup> *Jennings*, 96 N.E. at 1082

their method of identification is a science requiring study... [which] does not come within the common experience of all men of common education and in the ordinary walks of life.”<sup>93</sup>

Despite characterizing fingerprint identification as a science, the court failed to point to any scientific studies that have been conducted in the field of fingerprint analysis, that would indicate that an examiner can reliably make an identification from a latent fingerprint fragment recovered from a crime scene.<sup>94</sup> Throughout the last hundred years since this decision, fingerprint identification evidence has continually been allowed into courts.

### *B. One in a million...*

“Forensic fingerprint identification...rests in part upon the...ambitious premise that no two *partial* fingerprints are alike, or that fragmentary areas of the papillary ridge<sup>95</sup> detail of a certain size can be matched to one and only one finger, to the exclusion of all other fingers in the world.”<sup>96</sup> While fingerprint examiners have claimed that no two fingerprints are the same, there has been little scientific testing to validate the premises upon which the field is based.

The common adult fingerprint is comprised mainly of an aqueous mixture of eccrine<sup>97</sup> sweat.<sup>98</sup> When a person’s hand comes into contact with a surface, a pattern is left behind by the deposit of oil and the friction ridges of a finger.<sup>99</sup> These friction ridge patterns are commonly

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<sup>93</sup> *Id.* at 1083.

<sup>94</sup> See generally; David Stoney, *Fingerprint Identifications*, In *Modern Scientific Evidence: The Law and Science of Expert Testimony* § 21-2.3.1, at 52-53 (David L. Faigman et al. eds., 1997); (“Nowhere in the opinion, however, does the court articulate the basis of the expertise it is evaluating, or discuss any scientific evidence in support of expertise, or illuminate the technique’s theoretical premises, or explain why one should believe that fingerprint examiners can do what they claim they have the ability to do.)

<sup>95</sup> Elevated strips of skin that begin as raised apertures around the pores and then are joined together in rows forming the ridges. These begin to form on the human fetus during the third and fourth months of fetal life.

<sup>96</sup> Simon A. Cole, *Suspect Identities: A History of Fingerprinting and Criminal Identification* 79, 89 (2001).

<sup>97</sup> Components of eccrine sweat include, sodium chloride, lactic acid, urea, amino acids, glucose, sodium phosphate, and potassium phosphate.

<sup>98</sup> Wargacki, S.P., Lewis, L.A. and Dadmun, M.D. (2007), *Understanding the Chemistry of the Development of Latent Fingerprints by Superglue Fuming*. JOURNAL OF FORENSIC SCIENCES, 52: 1057-1062.

<sup>99</sup> *Commonwealth v. Patterson*, 840 N.E.2d 12, 15 (Mass. 2005) (“Fingerprints are left by the deposit of oil on contact between a surface and the friction ridges of a finger.”).

referred to as ‘latent prints.’<sup>100</sup> For identification purposes fingerprints can generally be separated into three groupings of patterns, each bearing the same general characteristics or resemblance.<sup>101</sup> These patterns are further divided into sub-groups by means of smaller differences existing between the patterns.<sup>102</sup>

The common method used for identifying and comparing fingerprints is known as the Galton Point method.<sup>103</sup> In the early 1890s, Francis Galton identified a variety of features that commonly occur in fingerprints; including islands (single independent ridges), bifurcations (ridge splitting), and ridge endings.<sup>104</sup> Fingerprint examiners compare the Galton points of fingerprints in order to determine if they match.<sup>105</sup>

Despite the ‘requirements’ of Galton points of comparison, fingerprint analysis does not involve the comparison of 150 or even as little as 50 points of identification. Instead, most jurisdictions in the United States do not require a minimum number of points between samples to sufficiently call a comparison a “match”.<sup>106</sup> Even among fingerprint analysts, the number of points of similarity required may range from a little as eight points to twelve or greater.<sup>107</sup> Further, there is no specific formula or benchmark established in the fingerprint analysis community that is the qualifier for match determination.

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<sup>100</sup> A latent print results from the reproduction of friction ridges found on parts of the fingers, hands, and feet. These prints consist of a combination of different chemicals that originate from natural secretions, blood, and contaminants. A latent fingerprint is invisible to the naked eye, and are commonly recovered from crime scenes.

<sup>101</sup> U.S. DEP'T JUSTICE, FED'L BUR. INVESTIGATION, *The Science of Fingerprints: Classification and Uses*.

<sup>102</sup> *Id.*

<sup>103</sup> Nathan Benedict, *Fingerprints and The Daubert Standard for Admission Of Scientific Evidence: Why Fingerprints Fail And A Proposed Remedy*, 46 ARIZ. L. REV. 519, 534 (2004).

<sup>104</sup> *Id.*

<sup>105</sup> *Id.*

<sup>106</sup> *See, e.g., Commonwealth v. Patterson*, 840 N.E.2d 12, 17 (Mass. 2005) (“[M]ost agencies in the United States no longer mandate any specific number [of matches.] Rather, the examiner uses his expertise, experience, and training to make a final determination.” (Citation omitted)).

<sup>107</sup> *See Epstein, supra* 89 (noting that the number of matching characteristics sufficient for identification is “entirely subjective”).

Within the last century the procedure of “matching” a recovered fingerprint to an inked suspect print is known as friction ridge analysis.<sup>108</sup> Supporters of fingerprint identification argue three claims: (1) “every individual possesses a unique and permanent set of fingerprints.” (2) fingerprint examiners can identify the donor of a latent print, “to the exclusion of all others.” And (3) fingerprint identification is infallible and has a zero-error rate.<sup>109</sup> On the other hand, opponents of the use of fingerprint evidence urge that there is no proof of the accuracy of latent print analysis made from imperfect samples; therefore, defense attorneys often argue that latent print ‘experts’ should not be allowed to testify regarding their conclusive findings to identify a defendant to the jury.<sup>110</sup>

Under the current ACE-V method,<sup>111</sup> examiners compare a latent fingerprint with a reference sample by gathering relevant data from the two fingerprints, such as the pattern of ridges or orientation of loops in the fingerprints.<sup>112</sup> Analysis using this method evaluates a latent print at three levels of detail: (1) the flow and direction of friction ridge patterns, (2) examination of each individual ridge to determine if there are characteristics specific to them, and (3) an examination of the pores of the ridges to determine if there are specialties or irregularities to note.<sup>113</sup> In order to determine a “match” the examiner looks at the ridges of the compared prints for similarity, relationship and sequence.<sup>114</sup> While this may appear to be a strict methodology, in application, the method of identification and comparison of latent prints appears to be at the

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<sup>108</sup> See; Tabassi, E. and Iyer, H.K. (2021) *Statistical friction ridge analysis (SFRA)*, NIST. Available at: <https://www.nist.gov/programs-projects/statistical-friction-ridge-analysis-sfra> (Accessed: April 22, 2023).

<sup>109</sup> Jaqueline McMurtrie, Swirls and Whorls: *Litigating Post-Conviction Claims of Fingerprint Misidentification After the NAS Report*, 2012 UTAH L. REV. 267, 274 (2010).

<sup>110</sup> See Epstein, *supra*, note 89

<sup>111</sup> *Infra*, note 124.

<sup>112</sup> *Id.* at 11. See, e.g., IGOR PACHECO ET AL., MIAMI-DADE POLICE DEP'T FORENSIC SERVS. BUREAU, MIAMI-DADE RESEARCH STUDY FOR THE RELIABILITY OF THE ACE-V PROCESS: ACCURACY & PRECISION IN LATENT FINGERPRINT EXAMINATIONS 14–15 (2014).

<sup>113</sup> *United States v. Aman*, 748 F. Supp. 2d 531, 539 (2010).

<sup>114</sup> *Id.*



discretion of the examiner. Despite this blatant subjectivity in the methodology alone, courts continue to blindly rely upon the identification procedures as reliable under *Daubert*.

#### IV. EVIDENCE IN THE EYE OF THE EXAMINER

##### A. NAS Report and Fingerprint Identification

Even looking beyond *Mayfield*, additional research has been done to demonstrate that fingerprint analysis has been undermined by its own methodology.<sup>115</sup> In February 2009, the National Academy of Sciences (NAS) issued a major report on forensic science reform.<sup>116</sup> The NAS report, outlined concern about the field of forensic science and suggests that the assumptions and foundational principles in the forensic sciences have not yet been sufficiently demonstrated to be reliable.<sup>117</sup> The NAS Report notes “[r]eview of reported judicial opinions reveals that, at least in criminal cases, forensic science evidence is not routinely scrutinized pursuant to the standard of reliability enunciated in *Daubert*.”<sup>118</sup> Trial courts typically rely on the long history of admitting various types of forensic evidence, and essentially give this type of evidence a pass when it comes to proof of reliability.<sup>119</sup> The NAS Report further asserts:

In most areas of forensic science, no well-defined system exists for determining error rates, and proficiency testing shows that some examiners perform poorly... In most forensic science disciplines, no studies have been conducted on large populations to establish the uniqueness of marks or features. Yet, despite the lack of statistical foundation, examiners make probabilistic claims based on their experience. A statistical framework that allows quantification of these claims greatly needed. These disciplines also critically need to standardize and clarify

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<sup>115</sup> See Epstein, *supra* 89

<sup>116</sup> NAT’L RESEARCH COUNCIL OF THE NAT’L ACADS., STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD (2009) [hereinafter NAS REPORT].

<sup>117</sup> *Id.* at 7-8.

<sup>118</sup> *Id.* at 106.

<sup>119</sup> Jonathan J. Koehler and John B. Meixner Jr., *An Empirical Research Agenda for the Forensic Sciences*, at 7; See generally; Simon A. Cole, *Grandfathering Evidence: Fingerprint Admissibility Rulings from Jennings to Llera Plaza and Back Again*, 41 AM. CRIM. L. REV. 1189, 1216–19 (2004) (arguing that fingerprint evidence has never been scrutinized by trial courts using the *Daubert* factors because this type of evidence was too important to the criminal justice system to risk being ruled inadmissible).

terminology used in reporting and testify about the results and in providing more information.<sup>120</sup>

With respect to fingerprint identification the NAS Report acknowledged that friction ridge analysis has, “long served as a valuable tool, both to identify the guilty and to exclude the innocent.”<sup>121</sup> Further, the NAS Report agreed that “[s]ome scientific evidence supports the presumption that friction ridge patterns are unique to each person and persist unchanged throughout a lifetime.”<sup>122</sup> Despite their acceptance of some elements of fingerprint analysis, the report finds that the discipline is not “properly underpin[ed]”<sup>123</sup>

The NAS Report references *Scientific Validation of Fingerprint Evidence Under Daubert*, which concluded: “We have reviewed the available scientific evidence of the validity of the ACE-V<sup>124</sup> method (of latent fingerprint identification) and found none.”<sup>125</sup> This method was adopted following *Kumho*, which stripped the cloak of reliability from forensic disciplines that relied upon “technical experience” rather than scientific methods as the foundation of an expert’s opinion.<sup>126</sup> Despite widespread support of the ACE-V ‘methodology,’ latent fingerprint analysis lacks validated standards and repeatable testing that rises it to the threshold of reliability needed to render conclusions about the similarity, or “match”, between two prints.<sup>127</sup>

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<sup>120</sup> NAS REPORT, *supra* 116 at 188-89

<sup>121</sup> NAS REPORT, *supra* note 116, at 142

<sup>122</sup> *Id.* at 143-44.

<sup>123</sup> *Id.* at 144

<sup>124</sup> The “ACE-V” method stands for analysis, comparison, evaluation, and verification. At the analysis stage, the examiner inspects the fingerprint in order to determine if it is suitable for analysis. Moving to the comparison stage, the examiner visually compares the ‘unknown’ fingerprint to a standard/reference print side-by-side under a magnifier. The evaluation consists of the examiner determining whether the observed friction ridges are consistent between the two prints. Lastly, the verification stage requires a second examiner who independently conducts the same aforementioned steps. However, more often than not, the verification stage consists of a second examiner reviewing the “match” report and confirming the first examiner’s determination rather than conducting their own. *See* NAS REPORT, *supra* note 116

<sup>125</sup> NAS REPORT, *supra* note\*116; (quoting; Harber, *Scientific Validation of Fingerprint Evidence Under Daubert*, 7 L. Probability & Risk 87, 105 (2008)).

<sup>126</sup> *See* Epstein, *supra* 89 at 621.

<sup>127</sup> Gabel, J.D. 2014, "REALIZING RELIABILITY IN FORENSIC SCIENCE FROM THE GROUND UP", *Journal of Criminal Law & Criminology*, vol. 104, no. 2, pp. 283-352. (Citing; Jennifer L. Mnookin, *The Validity of Latent*

Moreover, the verification step of the ACE-V method should be faced with the utmost scrutiny. This step is supposed to address the need for peer review, however putting this method into practice reveals vulnerabilities of bias within fingerprint identification and analysis. For instance, forensic examiners are often interconnected with the local police departments, whom have connections with the local prosecutors' offices. As a result, forensic examiners may be privy to the nature and details of a particular crime or suspect, which can create pressure on the examiner to find a match amongst samples. Additionally, the verifying analyst may be knowledgeable of a colleague's findings, and be more inclined to agree with those findings rather than going against another analyst. In fact, the methodology of the ACE-V method encourages fingerprinting experts to agree with their colleagues, instead of checking the validity of their conclusions. The NAS Report argues that if an expert tried to speak before a judge and oppose the findings of a fellow fingerprint examiner, they risk being deemed as not an expert because of their inability to reach a conclusion "so obvious."<sup>128</sup> This fear of being removed of their expert statuses has led examiners to agree blindly with their colleagues and neglect not only the standards set forth through the ACE-V method, but the requirements of *Daubert*.

#### *B. PCAST Report and Fingerprint Identification*

In 2016 the President's Council of Advisors on Science and Technology (PCAST) released a report about forensic science usage in criminal courts.<sup>129</sup> In the years following the NAS Report, the purpose of this report was to determine whether there were additional steps available within the disciplines of forensic science that would help ensure validity to be used in

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*Fingerprint Identification: Confessions of a Fingerprinting Moderate*, 7 L. PROBABILITY & RISK 127, 131 (2008)).

<sup>128</sup> NAS REPORT, *supra* note 116 at 144.

<sup>129</sup> President's Council of Advisors on Science and Technology., Executive Office of the President, *Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods* 9-11 (2016). [hereinafter PCAST REPORT].

the legal system.<sup>130</sup> The PCAST addressed two portions of in particular; (1) the need to evaluate specific forensic methods to determine if they have been scientifically established, reliable, and valid, and (2) clarification about the scientific standards for reliability and validity within the specific forensic methods.<sup>131</sup> The PCAST Report specifically notes the forensic discipline of fingerprint analysis. PCAST concluded that “estimated false positive rates are much higher than the general public would like to believe based on the longstanding claims about the accuracy of fingerprint analysis.”<sup>132</sup> There have been few courts that have examined the reliability of latent fingerprint testimony, rather than relying on past decisions as justification for the less than reliable methodology.<sup>133</sup>

Recommending that the FBI Laboratory should undertake a rigorous research program to improve forensic science, building on its work on latent-fingerprint analysis.<sup>134</sup> Further, that the National Institutes of Standards and Technology should step up to a leadership role and transform latent fingerprint analysis “from currently subjective methods with their heavy reliance on human judgement, into objective methods, in which standardized, quantifiable process require little or no judgement.”<sup>135</sup> Since its release, no standards have changed. In fact, the National District Attorney’s Association, (NDAA)<sup>136</sup> made a statement regarding the PCAST Report;

The PCAST position regarding the use of forensic science is scientifically irresponsible. Adopting any of their recommendations would have a devastating effect of the ability of law enforcement, prosecutors, and the defense bar, to fully

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<sup>130</sup> PCAST REPORT at 10.

<sup>131</sup> *Id.*

<sup>132</sup> *Id.* at 95

<sup>133</sup> Brandon L. Garret & M. Chris Fabricant, *The Myth of the Reliability Test*, 86 FORDHAM L. REV. 1559, 1561 (2018). (Reviewing cases and finding that courts “typically do not conduct any meaningful analysis of reliability of fingerprint evidence.”) Instead, they rely on precedent.)

<sup>134</sup> *Id.* at 10

<sup>135</sup> *Id.*

<sup>136</sup> Founded in 1950, the National District Attorneys Association (NDAA) is a national, non-partisan non-profit membership association that provides training, technical assistance, and services to prosecutors around the country in support of the prosecution profession. As the oldest and largest association of prosecutors in the country with over 5,500 members, NDAA represents state and local prosecutors’ offices from both urban and rural districts, as well as large and small jurisdictions.

investigate their cases, exclude innocent suspects, implicate the guilty, and achieve true justice at trial... Notwithstanding the lack of qualifications, PCAST has taken it upon itself to usurp the Constitutional role of the Courts and decades of legal precedent and insert itself as the final arbiter of the reliability and admissibility of the information generated through these forensic science disciplines.<sup>137</sup>

As a result of the NDAA's refusal to consider the PCAST report, where do we stand? The government continues to address large numbers of cases that are shown to be wrongful convictions based on faulty science.<sup>138</sup> Yet despite two reports addressing the issues, unreliable identification and comparison methods continue to be freely admitted into courtrooms. Courts defend their admission of faulty evidence on the reliance of past cases without questioning their outdated justifications.

## V. ARGUMENT

The use of fingerprint identification evidence is more than a century old. A technique that was introduced when forensic science was still in its infancy, the technique of fingerprint analysis was welcomed with open arms into the courts. From the beginning advocates in favor of fingerprint identification methods have claimed that the ability to identify the source of a latent print to the exclusion of all others is an infallible method, with a zero percent error rate. However, such claims have no scientific basis, a fact that has been recognized by both scientific and legal scholars alike. When errors have been brought to the surface, the fingerprint community have attempted to argue away such errors on the individual rather than the methodology itself. Yet within their arguments, there is never a clear discussion of what such "methodology" entails, apart from the subjective opinion of the fingerprint examiner.

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<sup>137</sup> NDAA Press Release on the PCAST REPORT, (Sept. 2, 2016).

<sup>138</sup> Brandon L. Garret & M. Chris Fabricant, *The Myth of the Reliability Test*, 86 FORDHAM L. REV. 1559, 1561 (2018); *See also*; Eric. S. Lander, *Fixing Rule 702: The PCAST REPORT and Steps to Ensure the Reliability of Forensic Feature-Comparison Methods in Criminal Courts*, 86 FORDHAM L. REV. 1661, 1662-63. ("Roughly half of these cases involved forensic-science evidence that was faulty- sometimes egregiously so. The problem could not simply be blamed on a few 'bad apples' among forensic examiners. Rather, the failure was systemic in that some of the supposedly scientific methods had never been shown to be scientifically valid.").

Fingerprint proponents rely heavily on the ACE-V method, aligning it with other known scientific methods. However, what many fail to realize is the ACE-V ‘method’ is nothing more than common sense steps on how to compare two items; it does not have any particularity or focus on the specificities of fingerprints. The ‘science’ of fingerprint identification is purely subjective, its “100% accuracy” is one-hundred percent dependent on the individual judgement of the examiner. Frankly there are non-existent standards for training and qualifications needed to become a fingerprint analyst.<sup>139</sup>

This denial to admit the flaws of the ‘science’ only translates into our justice system. Both society and the courts accord science great deference and respect. When a scientist is brought in to testify to their findings, they are viewed as an impartial and objective expert speaking only on indisputable facts of science. If a fingerprint identification expert took the stand and testified that they were “100% certain” that the prints examined were a match to the defendant at counsel’s table, this may as well check the guilty box for jurors without hearing any more testimony. This is not to say that the use of forensic evidence, even fingerprint identification, in trial is improper; but this is a fact that needs to be acknowledged in order to take steps toward fixing faulty practices in the forensic science community.

The Mayfield case is not the only case of fingerprint misidentification. Many innocent individuals have not been as fortunate as Mayfield, and are incarcerated for crimes they did not commit. Courts’ hesitancy to exclude fingerprint evidence at trial may be based on the evidence’s

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<sup>139</sup> Michael J. Saks, *Bashing Ipse Dixit: The Impact of Kumho Tire on Forensic Identification Science*, 57 WASH. L. REV. 879 (2000). (“Most of the fields we are discussing [fingerprints] did not grow out of basic science. Police investigators invented these fields to meet a criminal justice system need, namely, to help figure out who committed a crime and to help win a conviction. Scientists in university laboratories or in industry did not invent the techniques; instead, police investigators who sometimes were engaged in little more than a parody of science invented them. Other forensic sciences, what we might call the “normal forensic sciences” (e.g., forensic toxicology and forensic chemistry), borrow and apply principles from normal basic sciences such as physics, chemistry, and biology. Those applications have the benefit of basic research on which to build.”).

long historical acceptance and perhaps the fear that the whole justice system could collapse if it were determined that fingerprint evidence is inaccurate or unreliable. Regardless, we cannot continue convicting individuals based on questionable evidence.

Taking a deeper look into *Daubert*, it is evident that latent fingerprint identifications do not constitute reliable evidence. So, what should we do about it? Researching the uniqueness of fingerprints by looking back on databases and old comparisons. Scholarly investigations must be performed so that future identification evidence can be backed up by statistical support that satisfied the *Daubert* factors. Another correction that can be made is to abandon the insistence that fingerprints are infallibly unique. Lastly, the databases of known fingerprints need to be streamlined into one national comparison database; additionally working towards computerized systems with algorithms that can account for the human factor of examiner error. Ultimately, it is crucial that we determine whether the practice of fingerprint identification can actually produce accurate and reliable evidence, or whether it is pure junk science.

## VI. CONCLUSION

The breakthroughs of *Daubert* are still occurring. Its ruling set up the framework to improve how lawyers, judges, and scientists approach the use of scientific evidence in the legal justice system through the use of expert witness testimony. However, there is still neglect towards unreliable forensic science testimony. After two government studies and decades of proposals calling for reform, there is no doubt that a wide array of forensic disciplines remain invalid.

When done right, fingerprint identifications can be valuable pieces of evidence. However, the issue that still remains is what is the ‘right’ way to identify and compare fingerprints. The best solution is to improve the surrounding infrastructure of fingerprint evidence. Peer-review of claims and theories, certification of examiners, and establishment of a researched based error rate

would qualify fingerprint identification evidence under the reliability standards required by *Daubert*. These changes would result in a system in which fingerprints can continue being used as valuable evidence, while still openly acknowledging the faults of the science.