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JUDICIAL RESPONSES TO CHALLENGES TO FIREARMS-IDENTIFICATION  
EVIDENCE: A NEED FOR NEW JUDICIAL PERSPECTIVES ON FINALITY

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ABSTRACT

*There have been 329 post-conviction DNA exonerations in America to date. Forty-seven percent of these wrongful convictions are attributable, in some way, to unreliable forensic evidence being used against the defendant, including unreliable firearms-identification evidence. Some firearms examiners testify that they can match tool-marks produced by a suspect weapon to suspect ammunition, but in recent years such claims--termed individualization--have been significantly undermined, including by the National Research Council. However, challenges concerning the veracity of such evidence are routinely rejected by the courts. In so ruling, courts rely on two particular finality interests: namely preventing a flood of frivolous claims and incentivizing defense counsel to get it right the first time. This Article argues that this pattern in judicial reasoning is problematic. This is because it overlooks the struggle both jurors and lawyers have when it comes to accurately engaging with scientific evidence: Jurors are generally not science-literate, but they are nevertheless science-thirsty with inflated expectations of scientific theory and a tendency to find comfort in alleged expert certainty. Lawyers, on the other hand, have blunt tools to handle scientific evidence, including their restricted scientific knowledge, limited resources, and low-impact adversarial arsenal. This Article explores these struggles and encourages judges to rethink their reliance on finality when faced with challenges concerning the veracity of firearms-identification evidence.*

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**\*458 I. INTRODUCTION**

Firearms-identification evidence has been admitted into American courtrooms since the early 1990s.<sup>1</sup> Firearms identification is premised on the notion that a weapon leaves unique tool-marks on the ammunition it fires and that these marks are reproduced each time the weapon is discharged.<sup>2</sup> Using these markings, many firearms examiners believe they can conclude that a particular gun fired a particular bullet “to the exclusion of all other[s].”<sup>3</sup> Such claims are termed *individualization*.<sup>4</sup> However, in its 2009 landmark report--*Strengthening Forensic Science in the United States: A Path Forward* (Forensic Science Report)--the National Research Council (NRC) raised significant concerns about this discipline's scientific underpinnings.<sup>5</sup> The report coincided with, and in some instances propelled, efforts by numerous American courts to discourage **\*459** individualization

testimony and curtail the language experts use to connect weapons to suspect ammunition.<sup>6</sup> These courts began instructing firearms experts to replace *matches* and *degrees of certainty* with *descriptions of observations* and phrases such as *more likely than not*.<sup>7</sup>

In light of this conservative shift by some courts, and along with increased national initiatives towards improving the use and reliability of forensic science since 2009,<sup>8</sup> it is unsurprising that defendants have continued to challenge firearms-identification evidence admitted against them at trial. However, some trial courts still allow experts to testify unfettered, and appellate courts routinely reject challenges to that testimony.<sup>9</sup>

The obvious reason for this pattern in judicial decision-making is finality. Judges and scholars routinely argue that restricting post-conviction review and increasing the finality of judgments benefits society.<sup>10</sup> The term *finality* is “shorthand for a collection of interests scholars assume are furthered by any restrictions on review.”<sup>11</sup> These interests include ensuring respect for criminal judgments, conserving state resources, furthering the efficiency and deterrent and educational functions of criminal law, satisfying the human need for \*460 closure, incentivizing defense counsel to “get it right first time” and preventing a flood of frivolous claims from masking the fewer, credible ones.<sup>12</sup>

These latter two interests are prominent in post-2009 cases where courts have rejected challenges concerning firearms-identification evidence. In relation to preventing frivolous claims from flooding the system, courts often conclude that the admission of such evidence was non-prejudicial in light of other evidence against the defendant. In other words, courts are terming the legally sound or unsound admission of firearms-identification evidence as immaterial. However, this rationale arguably overlooks the high impact scientific evidence has on jurors and the difficulty they have in accurately evaluating scientific evidence. In relation to incentivizing defense counsel, the courts emphasize the importance of the adversarial system--defense counsel's ability to weed out frailties in forensic evidence via cross-examination. But again, this view arguably overlooks the difficulties lawyers have in resourcing, making, and understanding challenges to forensic evidence.

This Article examines the conflict between finality interests and the impact of firearms-identification evidence. Part II outlines the theory of finality. Part III considers the process of firearms identification, the recent criticism aimed at it, and the initial conservative shift in judicial approaches to firearms-identification evidence. Part IV reviews recent judicial responses to challenges to admitting this evidence by highlighting the influence and implications of finality on judicial decision-making. Part IV will also expand upon how jurors and lawyers engage with forensic evidence in order to demonstrate how the courts, by favoring finality, are arguably overlooking the difficulties these groups have in handling such evidence. Part V concludes that the courts should consider taking new perspectives on these finality interests and more meaningfully consider the issues that arise when law consumes forensic science in this way.

## \*461 II. THE THEORY OF FINALITY

The main reason courts routinely reject challenges to firearms-identification evidence is finality. The concept of finality developed out of a taxonomy detailed by Professor Paul M. Bator in his landmark 1963 article--*Finality in Criminal Law and Federal Habeas Corpus for State Prisoners*.<sup>13</sup> Professor Bator “laid the intellectual groundwork for the Supreme Court's posttrial review jurisprudence and has been cited in hundreds of law review articles and court opinions. Bator argued that the finality of criminal judgments serves important interests that are harmed by expansions of posttrial rights.”<sup>14</sup>

The term “‘finality’ is shorthand for a collection of interests scholars assume are furthered by any restrictions on review.”<sup>15</sup> These interests include ensuring respect for criminal judgments; conserving state resources; furthering the efficiency, deterrent, and educational functions of criminal law; satisfying the human need for closure; incentivizing defense counsel to get it right

the first time; and preventing a flood of frivolous claims from masking the fewer, credible ones.<sup>16</sup> These latter two interests are prominent in post-2009 cases where courts have rejected challenges to the admissibility of firearms-identification evidence.

Finality is believed to provide significant benefits, but when finality is employed as a monolithic “trump card” by judges, it may encourage an abuse of process.<sup>17</sup> When considering appeals, judges must balance society's interests in finality against defendants' rights.<sup>18</sup> Notably, finality serves the interests of defendants too: their interests in moving on in their lives and not being subject to repetitive trials that wear down their resources and stamina.<sup>19</sup> Yet the scales are not commonly tipped in favor of defendants, and finality is often used as a “trump card that presumptively outranks defendants' interests.”<sup>20</sup> For example, the Supreme Court of the United States has \*462 gone so far as to deny a defendant access to DNA evidence that could prove his innocence based, in part, on the assumption that it would harm the unspecified “traditional [interest in] finality.”<sup>21</sup> As Professor Laurie Levenson states, “The criminal justice system is obsessed with finality. While it professes to focus on obtaining fair and accurate results, the goal of finality is never far away.”<sup>22</sup>

Finality has a significant influence on legal discourse. Judges and scholars routinely assert that restricting defendants' post-conviction arsenal benefits society. Courts have been criticized for not expanding on how finality benefits society, with some even arguing that such restrictions can “harm the very interests increased finality is presumed to protect.”<sup>23</sup> Restrictions on posttrial review, while conserving judicial and prosecutorial resources, may nonetheless harm society by preventing wrongful incarcerations from being remedied, have no beneficial effects on the quality of legal representation for defendants, and increase recidivism.<sup>24</sup> Judges are supposed to weigh these interests singularly and not view finality as a “monolithic interest of presumptive importance.”<sup>25</sup> But this is often not the case—many courts rationalize their judgments with a simple reference to a general societal interest in finality. And some courts make no mention of the concept at all.

This identifiable pattern, although indirect, can be found in post-2009 cases where courts have rejected challenges to the admissibility of firearms-identification evidence. These cases show that courts regularly focus on two societal interests allegedly furthered by finality: preventing frivolous claims from flooding the appellate system and incentivizing defense counsel to get it right the first time.<sup>26</sup>

Regarding the former, courts often conclude that admitting this evidence was non-prejudicial in light of other evidence against the defendant.<sup>27</sup> In other words, courts classify either the legally sound, or unsound, admission of firearms-identification evidence as \*463 immaterial. However, this rationale overlooks the impact this type of scientific evidence has on jurors and the special trust jurors place in this evidence and in expert witnesses.<sup>28</sup> In fact, studies show that jurors rate firearms examiners among the most honest, competent, and influential experts.<sup>29</sup>

Regarding the latter, incentivizing defense counsel, the courts emphasize the importance of the adversarial system and defense counsel's ability to cross-examine.<sup>30</sup> But this view overlooks the limitations of the adversarial process and the inherent difficulties with making a legal challenge to forensic evidence. As consumers of science, lawyers (including judges) “have very little understanding of the product they are buying.”<sup>31</sup>

These are both valid finality interests. As Kim explains:

[F]ew would argue that a defendant convicted at trial by a mountain of properly admitted evidence should be granted a new trial based on a claim that a minor piece of evidence was improperly admitted .... In such a case, reversing the conviction would simply waste resources on a new trial, the result of which would likely be another conviction. Even worse, if the prosecutor chose not to retry the defendant, a reversal would allow a guilty defendant to go free on a technicality. Similarly, a defendant whose attorney withheld certain evidence at trial for sound strategic reasons generally cannot obtain a new trial in order to present

this “sandbagged” evidence. Allowing a new trial under such circumstances would give the defendant an unfair second opportunity to avoid conviction.<sup>32</sup>

**\*464** These rationales, however, overlook important issues that arise when law consumes science in criminal courtrooms. “Since neither law nor science is uncomplicated, few should expect their marriage to be.”<sup>33</sup> The courts' emphasis on defense counsel's performance first overlooks the difficulties lawyers have in obtaining adequate resources to make and understand challenges to forensic evidence. Also overlooked are the limitations of the adversarial process itself; the adversarial process neither always showcases a full picture of relevant scientific evidence nor dilutes unreliable evidence in the eyes of jurors. Second, the courts' dismissal of the importance of forensic evidence, especially when expert opinion links the defendant to a suspect weapon (particularly in the terms of a “match”), overlooks the persuasive impact scientific evidence has on jurors.<sup>34</sup>

### III. FIREARMS IDENTIFICATION, CRITICISM, AND THE INITIAL CONSERVATIVE SHIFT IN JUDICIAL DECISION-MAKING

Despite some early criticism, firearms-identification evidence has been admitted into American courtrooms since the early 1900s.<sup>35</sup> Since then, the discipline has satisfied both of the leading standards for the admissibility of expert evidence: the “general acceptance” standard set out in *Frye v. United States*<sup>36</sup> in 1923 and the “flexible, factor-based approach”<sup>37</sup> detailed by the Supreme Court of the United States in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*<sup>38</sup> in 1993.<sup>39</sup> Currently, *Daubert* generally governs the admissibility of scientific expert evidence.<sup>40</sup> *Daubert* charges courts to examine the principles and methodologies behind proffered scientific evidence and not simply whether the expert's conclusions drawn from the evidence are generally accepted in the scientific community.<sup>41</sup> *Daubert* lists five key factors for judges to consider when analyzing **\*465** the reliability of expert testimony: (1) whether a method can or has been tested, (2) the known or potential rate of error, (3) whether the method has been subjected to peer review, (4) whether there are standards controlling the method's operation, and (5) the general acceptance of the method within the relevant community.<sup>42</sup>

Firearms identification is premised on the notion that a weapon leaves unique tool-marks on the ammunition it fires and that these marks are reproduced each time the weapon is discharged.<sup>43</sup> When the hard metal of an internal part of a gun connects with the softer metal of the ammunition, it makes a tool-mark on the ammunition.<sup>44</sup> Tool-marks can be divided into class, subclass, and individual characteristics.<sup>45</sup> Class characteristics are “distinctively designed features” and will be present on every tool in that class.<sup>46</sup> And individual characteristics are unique to a particular tool and consist of purportedly random, microscopic imperfections and irregularities present on the tool's surface.<sup>47</sup> Subclass characteristics straddle the line between class and individual characteristics.<sup>48</sup> Subclass characteristics arise when manufacturing processes create batches of tools that are similar to each other but distinct from other tools of the same class.<sup>49</sup> Thus, many firearms examiners believe they can examine these marks and conclude that a particular gun fired a particular bullet to the exclusion of all others.<sup>50</sup>

**\*466** In the late 1990s, the Association of Firearms and Tool Mark Examiners (AFTE) drafted a protocol (AFTE Protocol) for experts to follow during their examinations.<sup>51</sup>

Presently, the AFTE Protocol is the industry standard by which examiners conduct their examinations. Under the AFTE Protocol, an examiner may make one of the following four conclusions: (1) identification, (2) inconclusive, (3) elimination, or (4) unsuitable for comparison. To make an “identification” (i.e., a “match”), there must be “sufficient agreement” between the tool-marks present on ammunition found at a crime scene and a test cartridge fired from a suspect weapon.<sup>52</sup>

Despite this protocol and the routine admission of firearms-identification evidence, the discipline came under significant criticism in 2008 and 2009. In 2008, the National Research Council of the National Academies published its Ballistic Imaging Report, which focused on the feasibility of a national ballistics database.<sup>53</sup> The Ballistic Imaging Report was not intended to provide an overall assessment of firearms identification as a discipline. But in assessing the feasibility of a national ballistics database, the report also considered the uniqueness of firearms-related tool-marks and found that a definitive correlation had not been fully demonstrated.<sup>54</sup> \*467 Moreover, in 2009, the National Academy of Sciences published its landmark report, *Strengthening Forensic Science in the United States: A Path Forward*,<sup>55</sup> which was commissioned by Congress in recognition that significant improvements were needed across the forensic science disciplines. The Academy was asked to report on the past, present, and future use of forensic science in America,<sup>56</sup> and after two years of collaborating with legal and scientific scholars and practitioners<sup>57</sup> and sixteen days of testimony involving over eighty witnesses,<sup>58</sup> the Academy issued a report containing its findings.

The Forensic Science Report concluded that the forensic-science system had serious problems,<sup>59</sup> faced many challenges,<sup>60</sup> and was responsible for multiple wrongful convictions.<sup>61</sup> First, it concluded that “no forensic method has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual or source,” except for DNA analysis.<sup>62</sup> Second, it concluded that the existing legal framework governing the admissibility of forensic evidence in the United States was inadequate for resolving the identified problems.<sup>63</sup>

Regarding firearms identification, the Forensic Science Report found that class characteristics could be useful “in narrowing the pool of tools that may have left a distinctive mark”<sup>64</sup> and that individual characteristics “might, in some cases, be distinctive enough to suggest one particular source.”<sup>65</sup> But overall, the report concluded that the “scientific knowledge base for tool mark and firearms \*468 analysis is fairly limited.”<sup>66</sup> In order to make the process of individualization more precise and consistent, the report concluded that more studies were necessary.<sup>67</sup> It further concluded that the AFTE Protocol was not defined sufficiently for examiners to follow, particularly for when an examiner can be said to have “matched” two samples.<sup>68</sup> The report berated the protocol: “This AFTE document, which is the best guidance available for the field of tool mark identification, does not even consider, let alone address, questions regarding variability, reliability, repeatability, or the number of correlations needed to achieve a given degree of confidence.”<sup>69</sup>

The Forensic Science Report followed a conservative shift by some courts regarding firearms-identification evidence. Prior to the report, a number of courts curtailed testimony given by firearms experts because individualization claims were unsupported or misleading. In *United States v. Green*,<sup>70</sup> the trial court admitted expert testimony but refused to allow the expert to conclude that the shell casings came from a specific pistol to the exclusion of every other firearm: “That conclusion--that there is a definitive match-- stretches well beyond [the expert's] data and methodology.”<sup>71</sup> The expert was permitted to describe his observations and comparisons regarding the shell casings.<sup>72</sup>

The same court considered a similar challenge weeks later in *United States v. Monteiro*.<sup>73</sup> In *Monteiro*, the defendant sought to exclude expert testimony that suspect cartridge cases matched firearms linked to him.<sup>74</sup> The court rejected the defendant's challenge, finding that the underlying scientific principle of individualization in firearm identification was valid.<sup>75</sup> But on the basis that an identification is largely subjective and there is no existing reliable statistical or scientific methodology that allows an expert to testify to a match to an absolute certainty, the expert was \*469 only allowed to testify to a “reasonable degree of ballistic certainty.”<sup>76</sup>

Similarly, in *United States v. Diaz*,<sup>77</sup> the court found that individualization claims in the firearms-identification field were not supported. Thus, the court only allowed the examiners to testify “that a match has been made to a ‘reasonable degree of certainty

in the ballistics field.”<sup>78</sup> And in *United States v. Glynn*,<sup>79</sup> the trend continued. In *Glynn*, the court concluded that allowing the examiner to testify that he had matched ammunition to a particular gun “to a reasonable degree of ballistic certainty” would “seriously mislead the jury as to the nature of the expertise involved.”<sup>80</sup> To resolve this problem, the court (1) limited the expert to testifying that a firearms match was “more likely than not;” (2) prevented the expert from testifying that he reached his conclusions to any degree of certainty; and (3) prevented the expert from testifying that ballistics was a science.<sup>81</sup>

After the Forensic Science Report was published, some courts continued the conservative trend. For example, in *United States v. Taylor*,<sup>82</sup> the defendant moved to exclude firearms-identification evidence showing that his rifle could be matched to suspect ammunition in a racketeering prosecution.<sup>83</sup> The *Taylor* court considered the Forensic Science Report in the context of *Daubert's* controlling-standards factors. The court found, “Arguably the biggest obstacle facing any firearms examiner is that there is no such thing as a ‘perfect match.’”<sup>84</sup> The court partially attributed this to the circular nature of the AFTE Theory of Identification, which “does not provide any uniform numerical standard examiners can use to determine whether or not there is a match.”<sup>85</sup> Thus, much is left to the subjective eye of the examiner.<sup>86</sup> The court acknowledged that the Forensic Science Report had recognized this problem but did not indicate whether such criticism favored admission of expert \*470 testimony.<sup>87</sup> Yet, the court noted that the AFTE Theory met the generally accepted standard because it was widely accepted, although not universally followed, by trained firearms examiners.<sup>88</sup> In the end, the *Taylor* court admitted the firearms-identification evidence but limited the examiner to testifying that the ammunition came from the defendant's rifle within a “reasonable degree of certainty in the firearms examination field.”<sup>89</sup>

A review of challenges to firearms-identification evidence decided post-2005 shows that a number of American courts have changed their approach to the admissibility of firearms-identification evidence, “moving firearms examiners away from making claims of individualization by restricting examiners to specific terminology and phrases, which allegedly reflect less absolute conclusions.”<sup>90</sup> Overall, courts have seemingly taken this approach because of concerns about the subjectivity of firearms identification and its lack of empirical underpinnings for claims of individualization.<sup>91</sup> The extent to which both this shift has continued post-2009 and has been influenced by finality interests is considered in Part IV.

#### IV. JUDICIAL RESPONSES TO CHALLENGES TO FIREARMS-IDENTIFICATION EVIDENCE, THE INFLUENCE OF FINALITY, AND ITS IMPLICATIONS

As mentioned above, when rejecting challenges to firearms-identification evidence, courts are seemingly drawing upon two particular finality interests, namely the prevention of frivolous claims from flooding the system and incentivizing defense counsel.

##### *A. Preventing a Flood of Frivolous Claims*

Preventing courts from being flooded with trivial claims is a very significant finality interest that links closely with conserving resources and maintaining efficiency. When rejecting challenges to \*471 firearms-identification evidence, courts often conclude that admitting the firearms-identification evidence was non-prejudicial or harmless in light of other evidence against the defendant. In other words, courts are terming the legally sound, or unsound, admission of firearms-identification evidence--even when that evidence is presented with a greater degree of certainty than can be scientifically supported--as immaterial. This approach, however, overlooks a bundle of interrelated issues: jurors' inflated expectations of science, their comfort in alleged expert certainty, and their difficulty in engaging accurately with scientific evidence.

Numerous cases demonstrate courts employing this rationale. In *United States v. Perkins*,<sup>92</sup> the defendant challenged the admission of expert testimony showing that ammunition found at the crime scene was fired by two different weapons, which



had not been recovered.<sup>93</sup> After refusing to engage with the issue fully, as the defendant did not object to the admission of the evidence at trial, the United States Court of Appeals for the Tenth Circuit commented, “Moreover, this testimony was not of particular importance in this trial .... The expert testimony at issue here merely corroborated the evidence of the victims, the accomplice and the videotape. Without this tool mark evidence, the prosecution's case would still have been overwhelming.”<sup>94</sup>

Other cases are more troubling as they presume (1) that the adversarial system is effective at weeding out frailties in forensic evidence even when experts have made individualization claims (or claims close to individualization) and (2) that jurors engage with scientific testimony accurately.

*Jones v United States*<sup>95</sup> exemplifies the former issue. In that case, the defendant argued that the trial court should have at least precluded government experts from stating their conclusions with “absolute certainty excluding all other possible firearms.”<sup>96</sup> The court acknowledged that there was a “growing consensus that firearms examiners should testify only to a reasonable degree of certainty”<sup>97</sup> \*472 and assumed, without deciding, that experts should not be “permitted to testify that they are 100% certain of a match, to the exclusion of all other firearms.”<sup>98</sup> But the court noted that any such error in the instant case was harmless because counsel had thoroughly cross-examined the expert and was able to highlight weaknesses in the expert's levels of certainty, the expert's subjective conclusions, and the lack of demonstrative evidence.<sup>99</sup> In the court's view, “the jury's assessment of this evidence surely did not turn on the difference between a ‘100% certain’ conclusion and a ‘reasonably certain’ opinion.”<sup>100</sup> But such conclusions presume--perhaps too comfortably-- that cross-examination is an effective tool for presenting frailties in forensic evidence.

Although studies show that jurors can be sensitive to the relative strength of cross-examination of an expert,<sup>101</sup> this does not necessarily affect their perceptions of the quality of the evidence or their verdict. These studies should “give pause to anyone who believes that the traditional tools of the adversarial process will always undo the adverse effects of weak expert testimony.”<sup>102</sup>

The cases of *United States v. Otero*,<sup>103</sup> *Melcher v. Holland*,<sup>104</sup> and *United States v. Mouzone*<sup>105</sup> are examples of the latter issue.

In *Otero*, the court accepted the significance of firearms-identification testimony to a jury but still failed to engage in the problems that jurors have in digesting this evidence. The defendants moved to exclude firearms-identification testimony, claiming that it was not reliable because it was based on the examiner's subjective opinion, instead of being based on objective standards.<sup>106</sup> The court accepted that individualization claims “may well be somewhat overblown,”<sup>107</sup> but found testimony indicating a match to a \*473 “reasonable degree of professional certainty” was permissible.<sup>108</sup> One reason for this was that “the relevance of such testimony to the charges against Defendants is manifest. Clearly, the evidence will assist the trier of fact to determine a fact in issue,” i.e., the defendants' alleged involvement in an armed robbery.<sup>109</sup>

In *Melcher*, the defendant challenged the admission of expert testimony that involved the phrases “practical certainty” and the “impossibility of another source.”<sup>110</sup> Specifically, the trial court ordered that the expert should not testify that he was “one hundred percent” sure.<sup>111</sup> But the expert did, in fact, state that the “chances of another firearm creating [the] exact same pattern are so remote to be considered practically impossible.”<sup>112</sup> In response, the court recognized that other federal courts differed on the proper form of this testimony in light of varying levels of concern about the reliability of firearms-identification methodology<sup>113</sup> and acknowledged that the expert had come “close to the line” of expressing 100% certainty.<sup>114</sup> But the court said that this had been tempered by cross-examination and jury instructions about evaluating expert testimony.<sup>115</sup> Moreover, the court found that even if the expert's testimony should have been “reigned in”<sup>116</sup> to conform to *Diaz* or *Glynn*, no prejudice “stemmed from the form [the expert] did use.”<sup>117</sup> The court found the difference between “practical certainty” and “considered

practically impossible” “reasonable degree of certainty” or “more likely than not” would not tip the outcome of this case.<sup>118</sup> But the court did not explore *why* it would not tip the outcome.

\*474 Similarly, in *United States v. Mouzone*,<sup>119</sup> the government's expert testified beyond the scope of what a district-court judge had ordered was permissible.<sup>120</sup> The expert was ordered not to testify that it was a “practical impossibility” for different firearms to have fired the suspect casings or that he was “certain” about his conclusions.<sup>121</sup> At trial, however, the expert repeatedly testified that the casings found at two different murder scenes were “fired from the same firearm” and “there comes a point where it's a practical impossibility .... That's when I'm convinced that these two [cartridge cases] were marked by the same surface.”<sup>122</sup> Defense counsel's objections were overruled.<sup>123</sup> The defendants appealed, arguing that this testimony was prejudicial because it painted them as killers.<sup>124</sup> The Fourth Circuit disagreed, stating that the testimony only supported the notion that the same weapon fired the casings recovered at each murder scene. In other words, it potentially connected the firearm to both murders, thereby linking the murders to each other, but it did not prove that either defendant was responsible for the casings at either murder scene.<sup>125</sup> As such, the court found that “to the extent that the jury concluded that the Appellants were killers and allowed that conclusion to influence their final verdict, [the expert's] testimony was not the cause.”<sup>126</sup>

Courts have even rejected challenges--on the basis that admitting the evidence was harmless--in cases where the type of evidence used against the defendant has been officially discontinued. In 2011, the defendant in the case *In re Personal Restraint of Trapp*<sup>127</sup> presented newly discovered evidence that included a letter from the FBI indicating that the Comparative Bullet Lead Analysis<sup>128</sup> (CBLA) \*475 evidence offered against him at trial was “potentially ‘misleading’ and ‘not supported by science.’”<sup>129</sup> At trial, the State's expert successfully linked crime-scene bullets to a box of bullets in the defendant's vehicle using CBLA.<sup>130</sup> But the use of CBLA evidence was discontinued after a report questioning its validity was published in 2004.<sup>131</sup> The court rejected the defendant's application for relief because it found that he had not shown that the result would be different if the CBLA evidence was recanted.<sup>132</sup>

All of the aforementioned cases show courts rejecting challenges to firearms-identification evidence on the basis that the evidence was harmless or not verdict-changing. But the courts simultaneously neglect to make a meaningful assessment of how scientific evidence impacts jurors and how jurors digest it. This is an important consideration for multiple reasons.

First, and most significantly, the vast majority of jurors are not scientists.<sup>133</sup> Thus, many jurors have difficulty engaging with scientific evidence accurately and, in particular, determining the appropriate weight to afford to specific testimony. This is an especially relevant consideration in firearms-identification cases given the recent controversy surrounding how limits on expert testimony should be phrased.

For example, McQuiston-Surrett and Saks conducted a study examining the impact that variations in the presentation of a forensic expert's findings have on jurors. The study varied the language and concepts that the expert used to communicate the results of \*476 microscopic hair comparisons. The study found that jurors “inferred a higher probability that the defendant was the source of the crime scene hair when the expert testimony was presented in the form of ‘match’ ..., ‘similar-in-all-microscopic-characteristics’ ..., or as an objective single-probability ... than when it was presented in a subjective-probability ... or objective multiple-frequency format ... .”<sup>134</sup> It also found that the evidence had a significant impact on the jurors' determination of guilt.<sup>135</sup> The study further showed that jurors “tended to yield to comforting certainties of expression about the evidence being testified to;”<sup>136</sup> were “comfortable converting subjective probability evidence into findings of liability when the expert assert[ed] a personal interpretation of a conclusion;”<sup>137</sup> and had difficulties “understanding statistical, and especially probability, data, and underutilize[d] such information.”<sup>138</sup> Interestingly, the study found that judges were less influenced by the expert's testimony than jurors were and “arriv[ed] at [lower] probability estimates that the defendant was the source of the



crime scene evidence.”<sup>139</sup> Such findings raise the possibility that judges might substitute their own assessment of the evidence for that of jurors. Judges may be more comfortable labeling the admission of such evidence as harmless or finding that a jury could not have come to any particular conclusion in light of the record. The *Jones*, *Mouzone*, and *Trapp* cases might well be examples of this.

In addition, other scholars have noted that phrases such as “a reasonable degree of ballistic certainty” could be confusing to jurors. For instance, Bonnie Lanigan gives the example that “the phrase ‘ballistic certainty’--especially when ‘ballistics’ is not an accurate term as it encompasses all projectiles--may not sound that different to a juror from the phrase ‘scientific certainty.’”<sup>140</sup> These findings are important to consider given the results in cases such as *Otero*, *Trapp*, *Melcher*, and *Mouzone*, where courts effectively dismissed the impact of varying forms of expert testimony.

\*477 Second, there is ample evidence that jurors consider forensic evidence “especially critical to their ultimate decision about guilt.”<sup>141</sup> Jurors have a thirst for scientific evidence<sup>142</sup> and expect to see it, particularly in cases where the majority of the evidence is circumstantial.<sup>143</sup> This issue alone should foster pause in cases like *Trapp*, where the remaining evidence against the defendant was mostly circumstantial. In that case, the court arguably overlooked the significant impact the “scientific” CBLA evidence could have had on the jury, compared to various circumstantial evidence, and the jurors' ability to attach relative importance to it.

Third, scientific evidence has a high impact on jurors. “[R]esearch suggests that statements made by experts are given considerable deference by jurors and their impact is likely not to be undone by cross-examination or rebuttal witnesses.”<sup>144</sup> Jurors may place even more trust in an expert who is subject to a vigorous cross examination as opposed to being more skeptical about the reliability of the expert's evidence. As one study concluded:

One might have expected an explication of the examination process, emphasizing the guesswork involved, would have a sobering effect on fact finders, but it appears instead to lead fact finders to be more impressed by the examination. Similarly, since most jurors begin with an exaggerated view of the nature and capabilities of forensic identification, one might expect that information explicitly informing fact finders about the limitations of the expertise would temper the jurors' inferences. Such information had little effect on jurors' judgments.<sup>145</sup>

Moreover, jurors are not presented with the full picture. Instead, jurors “hear highly practiced alternative stories that only roughly \*478 approximate what might be termed reality.”<sup>146</sup> In terms of expert testimony, because of the adversarial model, “information that reaches the legal system [and hence the jury] does not represent the scientific field more generally.”<sup>147</sup> Very often, jurors are presented with experts at the “margins of their disciplines [who] are chosen ... because they are willing to be more extreme in the proponent's favor and thus come across as more certain of their conclusions.”<sup>148</sup> This approach suggests the scientific field is more polarized than it actually is.<sup>149</sup> This has implications for cases like *Jones* that presume the effectiveness of the adversarial system to weed out frailties and expose maverick experts.

In light of this, although preventing frivolous claims from flooding the system is a legitimate finality interest, challenges to firearms-identification evidence--especially those challenging the use of expert testimony that suggests “individualized” conclusions--may require a fresh assessment. This evidence likely has a high impact on already science-thirsty jurors, who find comfort in alleged expert certainty and find it difficult to engage scientific evidence accurately. Courts should recognize this problem when considering challenges to firearms-identification evidence. Before restricting post-conviction review, or other motions, on the basis that such evidence is harmless or lacking in verdict-changing capacity, courts should more meaningfully consider whether that truly is the case.

### *B. Incentivizing Defense Counsel*

Encouraging more efficient behavior by defense counsel is considered an “instrumental benefit” of finality.<sup>150</sup> When admitting firearms-identification evidence, many courts place emphasis on the ability of defense counsel to weed out frailties in forensic evidence via cross-examination. The criminal justice system “heavily depends upon the skill of counsel and in-court confrontation rather than out-of-court oversight and structural reform.”<sup>151</sup> By underscoring the role of defense counsel (and the adversarial system) when rejecting these challenges, the courts are reinforcing the idea that counsel should be preventing errors at trial level, along with the idea that allowing more \*479 lenient post-conviction review would effectively encourage counsel to engage in “sandbagging.”<sup>152</sup> However, this overlooks one significant issue: counsel cannot always challenge this evidence effectively.

For example, sometimes science has not yet provided counsel with the tools to challenge the evidence. In the 2012 case *Kulbicki v. State*,<sup>153</sup> the defendant, who was convicted in 1995, alleged that he was denied a fair trial because the CBLA evidence used against him was unreliable and the State had used “perjured, false, and misleading expert ballistics testimony.”<sup>154</sup> Using CBLA, the State's expert testified that bullet fragments taken from the victim and from Kulbicki's truck were “analytically-indistinguishable.”<sup>155</sup> The use of CBLA evidence was discontinued after the National Research Council concluded, in 2004, that it was unreliable to conclude that a CBLA “match” supported other factual assertions at trial, such as that “matching bullets came from the same box, the same manufacturer, were related in time or geography, or generally linked the defendant to the crime in some unspecified manner.”<sup>156</sup> Still, the court affirmed the conviction, concluding, “Kulbicki's criticisms of CBLA analysis concern the proper weight of the evidence, not its admissibility. It can hardly be said, therefore, that the adversarial system was not competent to uncover, recognize, and take due account of its shortcomings.”<sup>157</sup>

The problem, however, is that both of Kulbicki's convictions occurred a decade before CBLA evidence was discontinued. Unsurprisingly, therefore, counsel neither challenged the expert's credentials nor the reliability of his “science” on cross-examination. The simple fact is that defense counsel did not have the tools or knowledge to challenge the evidence.<sup>158</sup> Although defense counsel's \*480 failure to object to the CBLA evidence or undermine its reliability would, post-2004, be plainly erroneous, counsel's decisions were “ostensibly reasonable at the time they were made.”<sup>159</sup> Note that a similar issue can be seen in the case of *In re Trapp* discussed above.

Numerous other cases show defense counsel struggling to adequately challenge forensic-identification testimony. In *United States v. Perkins*,<sup>160</sup> the defendant argued that the government should have been precluded from presenting firearms-identification evidence. The expert was not certified by the AFTE and had never “had his competency objectively assessed. He did not testify about his error rates, the error rates of his laboratory, or the error rates of his field generally.”<sup>161</sup> Appellate counsel, relying on *Green*,<sup>162</sup> challenged the admissibility of the evidence on the basis that it did not satisfy *Daubert*. But because defense counsel made no objections at trial, the court found there was no occasion for a *Daubert* analysis.<sup>163</sup> The court stated that *Green* was not very helpful to Perkins because the court there emphasized that the “issue is not whether the field in general uses a reliable methodology, but the reliability of the expert's methodology *in the case at bar*.” Because no challenge was made at trial to the admissibility of the testimony now challenged here, the record provides no basis for this court to review the reliability of this expert's methodology in this case. We therefore neither accept nor reject the \*481 analysis of *Green*, as we simply conclude that the issues considered in that case are not before us.<sup>164</sup>

Defense counsel also displayed deficiencies in *United States v. Sebborn*.<sup>165</sup> Based on the criticisms detailed in the Forensic Science Report, particularly those aimed at the subjectivity of the AFTE Theory, the defendants argued that the State should

be precluded from presenting firearms-identification evidence. The court denied the motion and criticized the approach taken by counsel. The court noted the defendants' preclusion argument was "unsupported by any legal authority" and merely cited *Daubert*, *Green*, and *Glynn*.<sup>166</sup> *Daubert* had not been applied and the cases had not been discussed. The court then engaged with a plethora of relevant cases that the defense seemingly overlooked and concluded no case, including *Glynn* or *Green*, supported precluding the testimony.<sup>167</sup> The court acknowledged that these cases may support a request to limit the degree of confidence "which the expert can express with respect to his findings"<sup>168</sup> but then continued to underscore that this somewhat obvious route had been neglected:

However, while the headnote of Mr. Sebbert's motion argues that, "The Government's 'Expert' on Firearms Identification Should be Precluded or Limited," the rest of the motion neither makes further mention of, nor proposes, any limitations. Since the motion does not argue for a specific limitation and since the government's response does not address this issue, this Court cannot address it at this juncture.<sup>169</sup>

Similar deficiencies are showcased in *Thomas v. State*.<sup>170</sup> The defendant argued that the trial court erred in admitting evidence that suspect bullets had been fired by a gun recovered from his home on the basis that his counsel was not able to cross-examine the first \*482 expert analyst who made the comparison. The court rejected the appeal on the basis that defense counsel had not explored the issue at a pre-trial hearing to determine the admissibility of the firearms evidence.<sup>171</sup>

In *Jones v. United States*,<sup>172</sup> discussed above, defense counsel failed to present an opposing expert. The defendant argued that the trial court should have at least precluded the government's experts from stating their conclusions with "absolute certainty excluding all other possible firearms."<sup>173</sup> The court affirmed the defendant's conviction, reasoning that defense counsel had cross-examined the expert thoroughly and therefore had given the jury an opportunity to assess the evidence.<sup>174</sup> In fact, the court noted counsel had even used the expert's expressions of certainty to the defendant's advantage, suggesting that the expert was simply telling the jury to "trust me."<sup>175</sup> But significantly, the court pointed out that the defense failed to present its own expert evidence:

Defense counsel did not present an expert to explain the difference or to opine that the government examiners' confidence in their results was unjustifiably exaggerated. Nor did the defense put on an expert to point out any weaknesses in the methodology employed by the government experts. In fact, even though the trial court made it possible for the defense to conduct an independent test, it chose not to have an expert testify at all.<sup>176</sup>

All of the aforementioned cases show counsel having difficulties in challenging firearms-identification evidence. Counsel may not have couched their arguments effectively, as in *Perkins* and *Sebbert*, or failed to do something more specific, like hire an expert, make an objection, or cross-examine, as in *Thomas*, *Jones*, and *Sebbert*. These cases show that the courts are acknowledging counsels' deficiencies but not unpicking *why* counsel may have made these inadvertent mistakes or, indeed, strategic decisions. The reasons why, of course, may be many and varied, but one important rationale \*483 courts should not overlook--but seemingly do--is that counsel encounter specific difficulties when engaging with forensic science.

There are a number of reasons why this rationale might be significant. First, as Professor Frederic I. Lederer notes, "[L]awyers generally lack significant scientific training. This educational deficiency often places lawyers at a disadvantage when confronted with scientific evidence .... [L]awyers ... often fail to ask the right questions and uncritically accept scientific assertions."<sup>177</sup> The Forensic Science Report also recognized that this was a significant issue, stating--eleven times--that "lawyers and judges often have insufficient training and background in scientific methodology, and they often fail to fully comprehend the approaches employed by different forensic science disciplines and the reliability of forensic science evidence that is offered in trial."<sup>178</sup> This deficiency is often attributed to a science and math "black hole" in legal education--"a black hole that becomes harder

to close the more removed it is from law school.”<sup>179</sup> Consequently, “[a]s lawyers, we are ill-equipped to speak the language of science.”<sup>180</sup>

In light of this, it is unsurprising that lawyers fail to make appropriate objections, employ useful strategies, hire relevant experts, and ask potent questions on cross and direct examination or in admissibility hearings, as exemplified in the cases above. Of course, lawyers might rationally choose to not object to errors, “hoping for a favorable outcome from the flawed proceeding but calling foul if the attorneys are displeased with the results.”<sup>181</sup> But Kim argues that a careful analysis reveals the risk of strategic behavior to be an illusion visible only in hindsight. Granting relief from errors not objected to at trial can only encourage strategic behavior by attorneys if the \*484 attorneys know, ex ante, that their clients will have a reasonable likelihood of obtaining relief on appeal.<sup>182</sup>

Given the legal landscape, this sort of strategy does not make sense in firearms-identification cases. Legal authorities clearly indicate that appeals on such grounds are routinely denied, and courts underscore the utility of cross-examination to weed out frailties in forensic evidence. In addition, as discussed above, the application of harmless-error rules also makes this sort of strategy “highly irrational”<sup>183</sup> because courts tend to label even overstated firearms-identification evidence as non-prejudicial.

The above cases also demonstrate Professor Saks's point that counsel's inability to engage with science means that counsel can overlook the most accessible and vital information. Saks gives the following example:

The National Academy of Sciences was asked by the FBI to evaluate voice spectrography used for the purpose of identifying suspects, and the Academy assembled a diverse and first-rate panel of experts to examine the scientific evidence on the question. The Academy published a detailed report of their conclusions, which the FBI promptly adverted to. Lawyers in trials around the country failed to find and bring the report to the attention of judges, judges failed to find the report, and several courts which clearly knew of the report failed to learn from it.<sup>184</sup>

Saks concludes that “the adversarial process failed to motivate lawyers to find and offer the most important evidence on the subject at issue.”<sup>185</sup> The *Sebborn* case demonstrates this issue clearly in the context of firearms-identification evidence. In that case, appellate counsel did not locate clearly relevant legal authorities and therefore missed the opportunity to apply them in favor of his client. What is really concerning is that counsel neglected to identify vital *legal* sources--his bread and butter--rather than scientific literature, which is arguably less accessible. This issue may also be highlighted by the \*485 many lawyers who continue to apply for wholesale exclusion of firearms-identification evidence on the basis it is unreliable, rather than construct narrower arguments aimed at limiting expert testimony. The courts are clearly not persuaded that such evidence is inadmissible, but there is ample authority to couch an effective argument that such testimony should be limited.

A second reason why courts should not overlook the specific difficulties counsel may encounter with forensic science relates to resources. The availability of resources is important when discussing the restriction of post-conviction review on the basis that it incentivizes defense counsel to perform effectively at trial. As Kim explains, while “persuasive in the abstract, as a practical matter, reducing the number of trial errors would generally require attorneys to spend more time and resources representing each client.”<sup>186</sup> Most attorneys already ration the time they have with each client, so although restricted post-conviction review may make defense counsel *want* to provide enhanced representation, it “will generally have little effect on the actual representation they provide.”<sup>187</sup> Forensic experts can be expensive to hire and time-consuming to apply for; counsel cannot “magic up” these resources (along with an adequate scientific knowledge to engage competently with the expert) simply because post-conviction review is limited.<sup>188</sup>

A third reason why courts consider the specific difficulties counsel may encounter with forensic science is the limitations of the adversarial system itself. As discussed above, research shows that cross-examination and rebuttal witnesses do not dilute the impact of individualization testimony given by experts. As Saks and McQuiston-Surrett explain, “[U]nfortunately, cross-examination and the use of opposing experts do not appear to effectively counter expert testimony, regardless of the logical vulnerability of the initial expert testimony.”<sup>189</sup> There are similar findings in mock-jury studies:

\*486 For example, in mock jury studies about the effectiveness of cross-examination, it apparently made little difference whether the defense challenged the expert testimony; whether the defense pointed out in cross examination that the expert's conclusions were inconsistent with prior research and that the expert had not followed standard methodology; whether the defense not only cross-examined the prosecution expert, but also put on its own expert. Although the jurors discussed the expert evidence in their deliberations, and although there was a strong correlation between the prosecution expert's testimony and the jury's verdict preferences, the results did not vary among the first three conditions.<sup>190</sup>

For example, although the court highlighted that trial counsel in *Jones* did not provide relevant rebuttal experts, it is likely that any such testimony would not have overcome the State's case, especially as it likely accorded with “beliefs and expectations already held by the jurors.”<sup>191</sup> Jurors appear to have inflated expectations of the capabilities of forensic science to match suspects to crimes,<sup>192</sup> so given the expert in *Jones* connected the defendant's firearm to the crime with certainty, rebuttal expert evidence (and cross examination) may well have been fruitless. The adversarial process is not a cure for shaky expert forensic evidence.

Thus, defense counsel is tackling firearms-identification cases with blunt tools, including counsel's own scientific knowledge and ability to engage with scientific evidence, limited resources, and a low-impact and depleted adversarial arsenal. Courts should recognize these limitations when considering challenges to firearms-identification evidence. Before restricting post-conviction review, or other motions, on the basis that counsel should *get it right the first time*, courts should recognize that this is likely very difficult to do.

## V. CONCLUSION

By focusing on firearms-identification evidence, this Article has set out the controversy between finality and the impact of forensic- \*487 identification evidence in criminal cases. Two particular finality interests are prominent in court decisions rejecting challenges to firearms-identification evidence-- namely preventing frivolous claims from flooding the system and incentivizing defense counsel to perform more effectively. In relation to the former, courts often conclude that admitting firearms-identification evidence was non-prejudicial or harmless in light of other evidence against the defendant. In relation to the latter, the courts emphasize the importance of the adversarial system--defense counsels' ability to weed out frailties in forensic evidence via cross-examination.

Recent cases challenging firearms-identification evidence showcase the influence and implications of these finality interests on judicial decision-making. By rationalizing their decisions in this way, judges are overlooking important difficulties both lawyers and jurors have when engaging with forensic-identification evidence. Specifically, when terming the unsound admission of such evidence as harmless, courts are overlooking the high impact that scientific evidence has on already science-thirsty jurors who find comfort in alleged expert certainty, have inflated expectations of science, and have general difficulties engaging with scientific evidence accurately. Similarly, when emphasizing the role of defense counsel (and the adversarial system) to weed out frailties in forensic evidence, courts overlook that counsel is often equipped with only blunt tools in the form of counsel's own scientific knowledge and ability to engage with scientific evidence, limited resources, and a low-impact adversarial arsenal.

By choosing “finality at all costs,” the criminal justice system is “destined to court either scandal or injustice, and perhaps both.”<sup>193</sup> This statement should resonate in cases involving challenges to forensic-identification evidence, given 47% of the now 329 post-conviction DNA-evidence exonerations in America are attributable, in some way, to invalidated or unreliable forensic evidence.<sup>194</sup> In light of this, and the points raised in this Article, the courts should \*488 take new perspectives on these finality interests in such cases and more meaningfully consider the issues that arise when law consumes science.

Footnotes

- a1 Sarah Lucy Cooper is a Senior Lecturer in Law at the Centre for American Legal Studies at Birmingham City University in England. The author gives many thanks to Aimee Martin for her excellent research assistance, Amna Nazir for her ever-impressive citation skills, Marika Henneberg for her very helpful peer review and comments, and Dr. Haydn Davies and Terri Smith for their encouragement.
- 1 See Bonnie Lanigan, *Firearms Identification: The Need for a Critical Approach to, and Possible Guidelines for, the Admissibility of “Ballistics” Evidence*, 17 SUFFOLK J. TRIAL & APP. ADVOC. 54, 54 (2012).
- 2 See Donald E. Shelton, *Twenty-First Century Forensic Science Challenges for Trial Judges in Criminal Cases: Where the “Polybutadiene” Meets the “Bitumen,”* 18 WIDENER L.J. 309, 335-36 (2009).
- 3 Adina Schwartz, *Challenging Firearms and Toolmark Identification-- Part One*, CHAMPION, Oct. 2008, at 14.
- 4 COMM. ON IDENTIFYING THE NEEDS OF THE FORENSIC SCI. CMTY., NAT'L RESEARCH COUNCIL OF THE NAT'L ACADEMIES, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 7 (2009) [hereinafter FORENSIC SCIENCE REPORT].
- 5 *Id.* at 155.
- 6 See, e.g., *United States v. Glynn*, 578 F. Supp. 2d 567, 568-69 (S.D.N.Y. 2008); *United States v. Diaz*, No. CR 05-00167 WHA, 2007 WL 485967, at \*1, \*14 (N.D. Cal. Feb. 12, 2007); *United States v. Monteiro*, 407 F. Supp. 2d 351, 355-57 (D. Mass. 2006); *United States v. Green*, 405 F. Supp. 2d 104, 109-10 (D. Mass. 2005).
- 7 See cases cited *supra* note 6.
- 8 See generally Dep't of Justice Office of Pub. Affairs, *U.S. Departments of Justice and Commerce Name Experts to First-Ever National Commission on Forensic Science*, U.S. DEP'T OF JUST. (Jan. 10, 2014), <http://www.justice.gov/opa/pr/2014/January/14-at-029.html> (discussing the creation of the National Commission on Forensic Science, whose members “will work to improve the practice of forensic science and the criminal justice system” and “to develop policy recommendations for the U.S. Attorney General, including uniform codes for professional responsibility and requirements for formal training and certification”); Forensic Science and Standards Act of 2014, S. 2022, 113th Cong. (2014) (introducing a bill, which was not enacted, aimed at improving forensic science by encouraging research, adopting standards, and creating accreditation requirements).
- 9 See *United States v. Casey*, 928 F. Supp. 2d 397, 400 (D.P.R. 2013) (“allowing the unfettered testimony of qualified ballistics experts”).
- 10 Andrew Chongseh Kim, *Beyond Finality: How Making Criminal Judgments Less Final Can Further the “Interests of Finality,”* 2013 UTAH L. REV. 561, 563 (2013).
- 11 *Id.* at 568.
- 12 See *Id.* at 563 (preventing error, increasing certainty, and improving the quality of representation); Paul M. Bator, *Finality in Criminal Law and Federal Habeas Corpus for State Prisoners*, 76 HARV. L. REV. 441, 452 (1963) (ensuring justice has been done); Henry J. Friendly, *Is Innocence Irrelevant? Collateral Attack on Criminal Judgments*, 38 U. CHI. L. REV. 142, 159 (1970) (imposing heavier burdens to prove reversible error); Carrie Sperling, *When Finality and Innocence Collide*, in CONTROVERSIES IN INNOCENCE CASES IN AMERICA 139, 144 (Sarah Lucy Cooper ed., 2014) (conserving judicial and economic resources).



- 13     *See* Kim, *supra* note 10, at 568 (citing Bator, *supra* note 12, at 451-53).
- 14     *Id.* (footnote omitted).
- 15     *Id.*
- 16     *See* sources cited *supra* note 12.
- 17     *See* Kim, *supra* note 10, at 572-73.
- 18     *Id.* at 566.
- 19     Laurie L. Levenson, *Searching for Injustice: The Challenge of Postconviction Discovery, Investigation, and Litigation*, 87 S. CAL. L. REV. 545, 552-53 (2014).
- 20     Kim, *supra* note 10, at 573 (footnote omitted).
- 21     Dist. Attorney's Office v. Osborne, 557 U.S. 52, 72 (2009); *see also* *Id.* at 97 (Stevens, J., dissenting) (pointing out that the State would not test the evidence despite the defendant's offer to pay).
- 22     Levenson, *supra* note 19, at 551 (footnote omitted).
- 23     Kim, *supra* note 10, at 564, 620-21.
- 24     *Id.*
- 25     *Id.* at 578.
- 26     *See, e.g.*, United States v. Perkins, 342 F. App'x 403 (10th Cir. 2009).
- 27     *See, e.g., Id.* at 410.
- 28     Brandon Garrett & Peter Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions*, 95 VA. L. REV. 1, 25, 32 (2009).
- 29     Michael J. Saks & Roselle L. Wissler, *Legal and Psychological Bases of Expert Testimony: Surveys of the Law and of Jurors*, 2 BEHAV. SCI. & L. 435, 442-43 (1984).
- 30     *See* Erin Murphy, *The Mismatch Between Twenty-First-Century Forensic Evidence and Our Antiquated Criminal Justice System*, 87 S. CAL. L. REV. 633, 672 (2014).
- 31     DAVID L. FAIGMAN, *LEGAL ALCHEMY: THE USE AND MISUSE OF SCIENCE IN THE LAW* 53 (1999).
- 32     Kim, *supra* note 10, at 566-67.
- 33     FAIGMAN, *supra* note 31, at 66.
- 34     Garrett & Neufeld, *supra* note 28.
- 35     Lanigan, *supra* note 1, at 57-58.
- 36     293 F. 1013, 1014 (D.C. Cir. 1923).
- 37     Sarah Lucy Cooper, *The Collision of Law and Science: American Court Responses to Developments in Forensic Science*, 33 PACE L. REV. 234, 242 (2013).
- 38     509 U.S. 579 (1993).
- 39     *See* Cooper, *supra* note 37, at 242 n.47.

- 40 See Alice B. Lustre, Annotation, *Post-Daubert Standards for Admissibility of Scientific and Other Expert Evidence in State Courts*, 90 A.L.R. 5th 453 (2001) (listing states that follow *Daubert*, *Frye*, or another test).
- 41 *Daubert*, 509 U.S. at 595.
- 42 *Id.* at 593-94.
- 43 See Shelton, *supra* note 2, at 335-36.
- 44 See Schwartz, *supra* note 3. at 11-12 (discussing two distinct types of tool-marks that may be created when firing a gun: striations and impressions). *Striations* are similar to small scratches and are most often produced on the bullet as it passes through the gun barrel. *Id.* *Impressions* usually resemble dimples or craters and are typically produced on the cartridge as it comes into contact with the various internal parts of the firing chamber such as the firing pin, breach face, extractor, and ejector. *Id.*
- 45 *Id.* at 12.
- 46 *Id.*
- 47 *Id.*
- 48 See *Id.* (stating that subclass characteristics differ from individual characteristics because they are shared by more than one tool, but they cannot fall under class characteristics because every tool in that class does not share them).
- 49 *Id.*
- 50 Schwartz, *supra* note 3, at 14.
- 51 Cooper, *supra* note 37, at 250 (citing Ass'n of Firearms & Tool Mark Exam'rs, *Theory of Identification as It Relates to Toolmarks*, 30(1) AFTE J. 86 (1998)).
- 52 *Id.* (footnotes omitted) (citing Ass'n of Firearms & Tool Mark Exam'rs, *supra* note 51, at 86-87). “[T]he protocol anticipates that the combination of marks examined will cumulatively reveal which conclusion the examiner may reach regarding the weapon itself.” *Id.* at 250 n.99. “‘Sufficient agreement exists’ when the ‘agreement is of a quantity and quality that the likelihood another tool could have made the mark is so remote as to be considered a practical impossibility.’” *Id.* at 251 n.100 (quoting AFTE Criteria for Identification Comm., *Theory of Identification, Range of Striae Comparison Reports and Modified Glossary Definitions--an AFTE Criteria for Identification Committee Report*, 24(2) AFTE J. 336, 337 (1992)).
- 53 COMM. TO ASSESS THE FEASIBILITY, ACCURACY, AND TECHNICAL CAPABILITY OF A NAT'L BALLISTICS DATABASE, NAT'L RESEARCH COUNCIL OF THE NAT'L ACADEMIES, BALLISTIC IMAGING (Daniel L. Cork et al. eds., 2008) [hereinafter BALLISTIC IMAGING REPORT].
- 54 *Id.* at 3; see also *United States v. Taylor*, 663 F. Supp. 2d 1170, 1176 (D.N.M. 2009) (discussing the focus and scope of the Ballistic Imaging Report).
- 55 FORENSIC SCIENCE REPORT, *supra* note 4.
- 56 *Id.* at xix.
- 57 *Id.* at xix-xx.
- 58 *Id.* at 2.
- 59 See *Id.* at xx.
- 60 See *Id.* at 5-8 (arguing that challenges include the lack of mandatory standardization, certification, and accreditation; the interpretation of forensic evidence; the need for research; and the need for established limits and measures of performance).
- 61 *Id.* at 4 (stating that advances in DNA technology have “revealed that, in some cases, substantive information and testimony based on faulty forensic science analyses may have contributed to wrongful convictions of innocent people”).

- 62 *Id.* at 7.
- 63 *Id.* at 85.
- 64 *Id.* at 154.
- 65 *Id.*
- 66 *Id.* at 155.
- 67 *Id.* at 154. Studies have considered the degree of similarity that can be found between marks made by different tools and the variability in marks made by an individual tool. *Id.*
- 68 *Id.* at 155.
- 69 *Id.*
- 70 405 F. Supp. 2d 104, 109 (D. Mass. 2005).
- 71 *Id.*
- 72 *Id.*
- 73 407 F. Supp. 2d 351, 355, 358 (D. Mass. 2006).
- 74 *Id.* at 365.
- 75 *Id.* at 366.
- 76 *Id.* at 372.
- 77 No. 05-00167, 2007 WL 485967, at \*1 (N.D. Cal. Feb. 12, 2007).
- 78 *Id.* at \*1, \*14.
- 79 578 F. Supp. 2d 567 (S.D.N.Y. 2008).
- 80 *Id.* at 574-75.
- 81 *Id.* at 568-69.
- 82 663 F. Supp. 2d 1170 (D.N.M. 2009).
- 83 *Id.* at 1171-72.
- 84 *Id.* at 1177.
- 85 *Id.*
- 86 *Id.*
- 87 *Id.* at 1177-78 (explaining the issues surrounding the AFTE Protocol, the court noted an additional problem with firearms identification-- confirmatory bias). The court explained that it is typical practice for an examiner to be handed only one suspect weapon and the recovered ammunition, which creates "a potentially significant 'observer effect' whereby the examiner knows that he is testing a suspect weapon and may be predisposed to find a match." *Id.*
- 88 *Id.* at 1178.
- 89 *Id.* at 1180.
- 90 Cooper, *supra* note 37, at 287.

- 91 *Id.*
- 92 342 Fed. App'x 403 (10th Cir. 2009). Note that this is an arguably more benign example because, in this case, the expert testimony did not actually “match” the suspect ammunition to the defendant.
- 93 *Id.* at 409-10.
- 94 *Id.* at 410.
- 95 27 A.3d 1130 (D.C. 2011).
- 96 *Id.* at 1138.
- 97 *Id.* at 1139.
- 98 *Id.*
- 99 *Id.*
- 100 *Id.* at 1139-40.
- 101 See Margaret Kovera et al., *Expert Testimony in Child Sexual Abuse Cases: Effects of Expert Evidence Type and Cross-Examination*, 18 LAW & HUM. BEHAV. 653 (1994).
- 102 Dawn McQuiston-Surrett & Michael J. Saks, *Communicating Opinion Evidence in the Forensic Identification Sciences: Accuracy and Impact*, 59 HASTINGS L.J. 1159, 1188 (2008).
- 103 849 F. Supp. 2d 425 (D.N.J. 2012).
- 104 No. 12-0544, 2014 WL 31359 (N.D. Cal. Jan. 3, 2014).
- 105 687 F.3d 207 (4th Cir. 2012).
- 106 *Otero*, 849 F. Supp. 2d at 429.
- 107 *Id.* at 438.
- 108 *Id.* at 429.
- 109 *Id.* at 438.
- 110 *Melcher v. Holland*, No. 12-0544, 2014 WL 31359, at \*12 (N.D. Cal. Jan. 3, 2014).
- 111 *Id.* at \*5.
- 112 *Id.*
- 113 *Id.* at \*12.
- 114 *Id.* at \*13.
- 115 *Id.* at \*12 (“The court admonished the jury that this was [the expert's] opinion, and made it clear that he did not test fire every Glock in the world, state or city.”).
- 116 *Id.* at \*13.
- 117 *Id.*
- 118 *Id.*
- 119 687 F.3d 207 (4th Cir. 2012).

- 120 *Id.* at 216.
- 121 *Id.*
- 122 *Id.*
- 123 *Id.*
- 124 *Id.*
- 125 *Id.* at 216-17.
- 126 *Id.* at 217.
- 127 No. 65393-8-I, 2011 Wash. App. LEXIS 2700 (Nov. 28, 2011) (per curiam).
- 128 See John Solomon, *FBI's Forensic Test Full of Holes*, WASH. POST, Nov. 18, 2007, <http://www.washingtonpost.com/wp-dyn/content/article/2007/11/17/AR2007111701681.html> (“The [CBLA] technique used chemistry to link crime-scene bullets to ones possessed by suspects on the theory that each batch of lead had a unique elemental makeup.”).
- 129 *In re Trapp*, 2011 Wash. App. LEXIS 2700, ¶ 1 (discussing the letter submitted by the FBI).
- 130 *Id.* ¶ 12.
- 131 *Kulbicki v. State*, 53 A.3d 361, 377 (Md. Ct. Spec. App. 2012) (citing *United States v. Berry*, 624 F.3d 1031, 1037 (9th Cir. 2010)) (“The FBI commissioned the National Research Council ... to evaluate its use of CBLA, and, following the Council's 2004 report, discontinued its use of CBLA at trials.”), *rev'd*, 99 A.3d 730 (Md. 2014). See generally COMM. ON SCIENTIFIC ASSESSMENT OF BULLET LEAD ELEMENTAL COMPOSITION COMPARISON, NAT'L RESEARCH COUNCIL OF THE NAT'L ACADEMIES, FORENSIC ANALYSIS: WEIGHING BULLET LEAD EVIDENCE 112-13 (2004) (finding that experts' conclusions that different bullets came from the same source, based on CBLA, were not supported by appropriate scientific or statistical testing). For further discussion of *Kulbicki*, see *infra* notes 156-161 and accompanying text.
- 132 *In re Trapp*, 2011 Wash. App. LEXIS 2700, ¶ 31 (“But because significant evidence connected Trapp to Kent's murder, we disagree. The absence of CBLA testimony would not have changed the result of the trial.”).
- 133 FAIGMAN, *supra* note 31, at 53.
- 134 McQuiston-Surrett & Saks, *supra* note 102, at 1165.
- 135 See *Id.* at 1165-66.
- 136 *Id.* at 1188.
- 137 *Id.* at 1189.
- 138 *Id.*
- 139 *Id.* at 1188.
- 140 Lanigan, *supra* note 1, at 71.
- 141 Pete Frick, *Forensic Science in Court: Challenges in the Twenty-First Century*, 27 SYRACUSE J. SCI. & TECH. L. 145, 156 (2012); DONALD E. SHELTON, FORENSIC SCIENCE IN COURT: CHALLENGES IN THE TWENTY-FIRST CENTURY 102 (2011).
- 142 Donald E. Shelton et al., *A Study of Juror Expectations and Demands Concerning Scientific Evidence: Does the “CSI Effect” Exist?*, 9 VAND. J. ENT. & TECH. L. 331, 333 (2006).
- 143 Frick, *supra* note 141, at 157.

- 144 Jonathan J. Koehler & Michael J. Saks, *Individualization Claims in Forensic Science: Still Unwarranted*, 75 BROOK. L. REV. 1187, 1206 (2010).
- 145 McQuiston-Surrett & Saks, *supra* note 102, at 1188.
- 146 FAIGMAN, *supra* note 31, at 65.
- 147 *Id.*
- 148 *Id.* at 54.
- 149 *Id.*
- 150 Kim, *supra* note 10, at 563.
- 151 Murphy, *supra* note 30, at 672.
- 152 *See* Kim, *supra* note 10, at 586.
- 153 Kulbicki v. State, 53 A.3d 361 (Md. Ct. Spec. App. 2012), *rev'd*, 99 A.3d 730 (Md. 2014).
- 154 *Id.* at 364.
- 155 *Id.* at 368.
- 156 *Id.* at 377; *see supra* notes 130-35 and accompanying text.
- 157 *Id.* at 379 (quoting *United States v. Berry*, 624 F.3d 1031, 1042 (9th Cir. 2010)) (internal quotation marks omitted).
- 158 In August of 2014, Maryland's highest court reversed Kulbicki's conviction, holding that defense counsel performed deficiently by failing to challenge the expert's CBLA testimony. *Kulbicki v. State*, 99 A.3d 730, 743-44 (Md. 2014), *rev'g* 53 A.3d 361 (Md. Ct. Spec. App. 2012). The reversal was not based on the fact that the use of CBLA evidence was officially discontinued after Kulbicki's conviction--instead, the reversal was based on defense counsel's failure to discover that the particular expert used by the State had authored a report, published in 1991, that called the accuracy of CBLA into question. *Id.* at 739--41 (citing Ernest R. Peele et al., *Comparison of Bullets Using the Elemental Composition of the Lead Component*, in LAB. DIV., FED. BUREAU OF INVESTIGATION, PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON THE FORENSIC ASPECTS OF TRACE EVIDENCE: JUNE 24-28, 1991, at 57, 61 (1991)). Even though CBLA evidence was still widely accepted at the time of Kulbicki's conviction, defense counsel should have discovered that this particular expert had published a report that called the very science his testimony relied upon into question. *Id.* at 741-42. In some ways, the report published by this expert in 1991 presaged the NRC's 2004 report. *Id.* at 739.
- 159 Kim, *supra* note 10, at 585.
- 160 342 F. App'x 403 (10th Cir. 2009).
- 161 *See Id.* at 410.
- 162 *See supra* notes 73-75 and accompanying text.
- 163 *Perkins*, 342 F. App'x at 410.
- 164 *Id.* (citation omitted) (quoting *United States v. Green*, 405 F. Supp. 2d 104, 119 (D. Mass. 2005)).
- 165 *United States v. Sebborn*, No. 10 Cr. 87(SLT), 2012 WL 5989813 (E.D.N.Y. Nov. 30, 2012) (order denying motion to preclude expert testimony).
- 166 *Id.* at \*6.
- 167 *See Id.* at \*6-7.



- 168 *Id.* at \*7.
- 169 *Id.*
- 170 Thomas v. State, No. CR-11-1243, 2013 WL 3589291 (Ala. Crim. App. July 12, 2013).
- 171 *See Id.* at \*2-3.
- 172 27 A.3d 1130 (D.C. 2011).
- 173 *Id.* at 1138.
- 174 *Id.* at 1139.
- 175 *Id.*
- 176 *Id.* at 1140.
- 177 Frederic I. Lederer, *Scientific Evidence--An Introduction*, 25 WM. & MARY L. REV. 517, 519-20 (1984) (citing Howard T. Markey, *Jurisprudence or "Juriscience"?*, 25 WM. & MARY L. REV. 525, 529-32 (1984)).
- 178 *See* Jessica D. Gabel, *Forensiphilia: Is Public Fascination with Forensic Science a Love Affair or Fatal Attraction?*, 36 NEW ENG. J. ON CRIM. & CIV. CONFINEMENT 233, 258 (2010).
- 179 *Id.* at 257-58.
- 180 *Id.* at 258.
- 181 Kim, *supra* note 10, at 586.
- 182 *Id.*
- 183 *Id.*
- 184 Michael J. Saks, *Merlin and Solomon: Lessons from the Law's Formative Encounters with Forensic Identification Science*, 49 HASTINGS L.J. 1069, 1137 (1998).
- 185 *Id.*
- 186 Kim, *supra* note 10, at 564.
- 187 *Id.*
- 188 *See* Brandon L. Garrett, *Judging Innocence*, 108 COLUM. L. REV. 55, 126 (2008) ("Our system of criminal review certainly does not privilege factual claims. Locating an alibi witness, obtaining experts to challenge forensic evidence or undermine eyewitness identifications, or presenting evidence of defendants' lack of capacity requires substantial resources and time."). The depth of a defendant's pockets can be vital when it comes to presenting rebuttal evidence and experts. *See, e.g.*, RICHARD GABRIEL, ACQUITTAL: AN INSIDER REVEALS THE STORIES BEHIND TODAY'S MOST FAMOUS VERDICTS 87-88 (2014).
- 189 McQuiston-Surrett & Saks, *supra* note 102, at 1189.
- 190 Erica Beecher-Monas, *Reality Bites: The Illusion of Science in Bite-Mark Evidence*, 30 CARDOZO L. REV. 1369, 1407 (2009).
- 191 McQuiston-Surrett & Saks, *supra* note 102, at 1187.
- 192 *Id.* at 1188.
- 193 Murphy, *supra* note 30, at 672.

194 See *The Cases: DNA Exoneree Profiles*, INNOCENCE PROJECT, [http://www.innocenceproject.org/cases-false-imprisonment/front-page#c10=published&b\\_start=0&c4=Exonerated+by+DNA](http://www.innocenceproject.org/cases-false-imprisonment/front-page#c10=published&b_start=0&c4=Exonerated+by+DNA) (last visited Apr. 11, 2015) (noting that 155 out of 329 post-conviction DNA exonerations can be attributed, in whole or in part, to invalid or improper forensic science). For an excellent discussion about the intersection of innocence and finality, see Sperling, *supra* note 12, at 144.

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