

PREFERRING THE “WISE MAN” TO SCIENCE: THE FAILURE OF COURTS AND NON-LITIGATION MECHANISMS TO DEMAND VALIDITY IN FORENSIC MATCHING TESTIMONY

PROFESSOR JULES EPSTEIN¹

A single conversation with a wise man is better than ten years of study. Chinese Proverb

The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom. Isaac Asimov, *Isaac Asimov's Book of Science and Nature Quotations*, 1988.

INTRODUCTION

Forensic evidence is often critical in investigating cases and proving culpability. Studies from the 1980s “found [that] clearance rates of offenses with evidence scientifically analyzed were about three times greater than in cases where such evidence was not used[.]”² and this trend has continued.³ Notwithstanding both its importance and its utility, much forensic evidence other than DNA has been criticized for its lack of scientific validation,⁴ with the most significant and trenchant assessment coming from the National Research Council of the National Academy of Sciences (“NAS” or

1. Professor of Law, Widener University School of Law. The author thanks the School of Law for a 2013 summer research grant that funded the writing of this article, and colleague Professor John Nivala for his insights. The author also thanks science and law scholars Professors Edwin Imwinkelried, David Kaye, and Jennifer Mnookin for their patient responses to inquiries regarding the *Daubert* rule and its potential laxity.

2. Joseph Peterson et al., *The Role and Impact of Forensic Evidence in the Criminal Justice Process*, NAT'L INST. OF JUST. 1 (Sept. 2010), <https://www.ncjrs.gov/pdffiles1/nij/grants/231977.pdf>.

3. *Id.* at 1-2; John K. Roman et al., *The DNA Field Experiment: Cost-Effectiveness Analysis of the Use of DNA in the Investigation of High-Volume Crimes*, URBAN INST. 3-4 (Apr. 2008), <https://www.ncjrs.gov/pdffiles1/nij/grants/222318.pdf>; *Seeing the Invisible*, FED. BUREAU OF INVESTIGATION (Dec. 31, 2003), <http://www.fbi.gov/news/stories/2003/december/seeing123103>. (“From 1997 through July of [2003], the FBI Laboratory's latent prints experts—while using IAFIS—have identified 1,040 latent fingerprints of 863 persons in 601 criminal investigations.”).

4. Testimony offering conclusions unsupported by science are a documented problem. The May 2013 decision of the Mississippi Supreme Court to stay an order of execution was brought about by a United States Department of Justice (DOJ) concession that FBI analysts testified to match conclusions without scientific support. *Manning v. State*, 112 So. 3d 1082, 1082 (Miss. 2013). The DOJ acknowledged that at Manning's trial “the microscopic hair comparison analysis testimony or laboratory report presented in this case included additional statements that exceeded the limits of science and was, therefore, invalid.” Letter from John Crabb, Jr., Special Counsel to Deforest R. Allgood, Dist. Attorney's Office (May 4, 2013), http://www.reprive.org.uk/static/downloads/139767216-DOJ-Letter-Manning-case_re_hair_analysis2.pdf.

“Academy”) in its 2009 report “Strengthening Forensic Science in the United States: A Path Forward”⁵ (the “NAS Report”). There had been earlier criticisms, particularly from academics, questioning whether disciplines such as latent print and handwriting examinations were science and capable of “individualization,” the conclusion that the crime scene print came from one suspect to the exclusion of all other persons in the universe.⁶ There was even prompting from within the forensics practitioners communities for scientific research to validate (or confirm the self-perceived validity of⁷) their methodologies and outcomes.⁸

These earlier concerns voiced by academics and forensic practitioners notwithstanding, it was the issuing of the NAS Report that sounded a clarion call—in no small part due to the organization’s prestige. The NAS was established by Abraham Lincoln and has 300 Nobel laureates among its current 2,100 members.⁹ The Academy’s prestige is such that “[f]orensic scientists from all disciplines and from every corner of the nation were awaiting the report[.] . . .”¹⁰

The “clarion call,” sounded by the NAS Report had two facets critical to this article: (1) the report concluded that but for DNA, no forensic discipline had been shown to be scientifically valid in claims of “individualization,”¹¹ and

5. See generally *Strengthening Forensic Science in the United States: A Path Forward*, COMM’N ON IDENTIFYING THE NEEDS OF THE FORENSIC SCIS. CMTY., NAT’L RESEARCH COUNCIL (Aug. 2009), <https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf> [hereinafter NAS Report].

6. See, e.g., David L. Faigman, *Anecdotal Forensics, Phrenology, and Other Abject Lessons from the History of Science*, 59 HASTINGS L.J. 979, 992 (2007-08); Jennifer L. Mnookin, *The validity of latent fingerprint identification: confessions of a fingerprinting moderate*, 7 LAW, PROBABILITY AND RISK 127, 136 (2008); D. Michael Risinger et al., *Brave New “Post-Daubert World”—A Reply to Professor Moenssens*, 29 SETON HALL L. REV. 405, 441 & n.108 (1998); Michael J. Saks & Jonathan J. Koehler, *The Individualization Fallacy in Forensic Science Evidence*, 61 VAND. L. REV. 199, 200-01 (2008). See also Jennifer L. Mnookin, *The Courts, the NAS, and the Future of Forensic Science*, 75 BROOK. L. REV. 1209, 1209, 1210 & n.1 (2010) (collecting pre-NAS Report articles and books raising concerns about the scientific validity of forensic discipline testimony and conclusions).

7. At a conference following the release of the NAS Report, one speaker urged that “lack of validation is not the same thing as admissibility, nor is lack of validation the same thing as invalid.” Kenneth E. Melson et al., Comment to Session #5: The Prosecutors’ Perspective, The Future of Forensic Sciences Symposium, held by Cleveland Marshall Law School (Mar. 19, 2009), <http://mediasite.ulib.csuohio.edu/Mediasite/Play/c64a197e208f4c649dbb93d47ca9d1821d?catalog=215e4879-3b56-424c-8b37-46be4bec5d8d>.

8. Kenneth E. Melson, *Embracing the Path Forward: The Journey to Justice Continues*, 36 NEW ENG. J. ON CRIM. & CIV. CONFINEMENT 197, 199-203 (2010). The Consortium of Forensic Science Organizations, an umbrella group for the American Academy of Forensic Sciences, American Society of Crime Laboratory Directors, American Society of Crime Lab Directors – Laboratory Accreditation Board, International Association for Identification, National Association of Medical Examiners, and the Society of Forensic Toxicologists – American Board of Forensic Toxicology, was a moving force in convincing Congress to task the NAS to study and report on the state of forensic disciplines in the United States. *Id.* at 197 & n.2.

9. *Who We Are*, NAT’L ACADS., <http://www.nationalacademies.org/about/howweare/index.html> (last visited Dec. 23, 2013).

10. Melson, *supra* note 8, at 197.

11. “With the exception of nuclear DNA analysis, however, 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.” NAS Report,

(2) “the courts have been ‘utterly ineffective’ in addressing this problem.”¹² This article, accepting the dual premises of the NAS Report, examines (1) whether the judiciary has, post-Report, remedied its diagnosed affliction of being “utterly ineffective,” and (2) whether any other mechanism or entity has compensated for the judiciary’s failing. This article then demonstrates and concludes that, but for one forensic discipline involving impression or pattern¹³ evidence—ballistics and firearm identification—the answer for the judiciary is “no.” Even in regard to that discipline, the remediation by courts is modest at best.¹⁴ The failure to re-examine and respond to the question of validation may be attributable to three causes: (1) the relatively lax thresholds of both the *Frye*¹⁵ and *Daubert*¹⁶ admissibility tests as applied in criminal

supra note 5, at 7. A more detailed discussion of this and related findings is set forth in section 1. *See infra* p. 85.

12. NAS Report, *supra* note 5, at 109 (citation omitted). *See also* Joseph Sanders, “Utterly Ineffective”: Do Courts Have a Role in Improving the Quality of Forensic Expert Testimony?, 38 FORDHAM URB. L.J. 547, 549 (2010).

13. These terms, with some overlap, have been defined as follows: “Pattern and impression evidence includes any markings produced when one object comes into contact with another object, such as fingerprints, shoeprints, toolmarks, and tire treads. It also includes pattern analysis, such as is used when evaluating handwriting, typewriting, and writing instruments.” Law Enforcement Standards Office, *Pattern and Impression Evidence*, NAT’L INST. OF STANDARDS & TECH., http://www.nist.gov/oles/forensics/pattern_impression_evidence.cfm (last visited Dec. 24, 2013).

14. There has been some critical re-examination of non-impression, non-individualization disciplines or claims of expertise, particularly in the subject of shaken baby syndrome. *See, e.g., Ex parte Henderson*, 384 S.W.3d 833, 833-34 (Tex. Crim. App. 2012) (affirming grant of new trial where advances in biomechanics called into question earlier testimony that death was caused by deliberate shaking of infant). Another re-examined non-impression, non-individualization discipline or claim of expertise is arson causation testimony. *See, e.g., Lee v. Glunt*, 667 F.3d 397, 407-08 (3d Cir. 2012) (permitting habeas proceeding to go forward based on claim that “new developments in fire science . . . show[] that the fire expert testimony at Lee’s trial was fundamentally unreliable[.] . . .”). This article focuses on disciplines that claim the ability to individualize.

15. *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923). The key passage defining what came to be the Frye standard is:

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and 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.

Id. at 1014.

16. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993). In its most succinct form, the *Daubert* test requires that:

[T]he trial judge must determine at the outset[] . . . whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue. This entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue.

proceedings; (2) the lack of scientific training and education among the judiciary, corps of prosecutors, and defense counselors who are responsible for understanding and testing the limits of such proof—a problem compounded by often inadequate funding; and (3) a stasis or inertia resulting from decades or more of reliance on these disciplines and their perceived continued utility. To date, there has also been an inadequate response from institutions outside of the judiciary, be they scientific or expert working groups, forensic science commissions, or law enforcement.

Section 1 of this article provides a summary of the NAS Report findings, both in general terms and in regard to specific forensic disciplines. Section 2 examines a pre-NAS Report challenge to forensic evidence, the *Llera Plaza*¹⁷ litigation on the admissibility of latent print testimony. The case is used as a springboard to illustrate the limits of the *Daubert* and *Frye* tests in restricting the scope of forensic testimony, conclusions of individualization, and source attribution. Section 3 summarizes post-NAS Report decisional law in which the Report was cited and considered in challenges to forensic evidence. The third section compellingly demonstrates that the Report has had minimal impact, and that admissibility decisions remain largely consistent with those that preceded the Report's issuance.

In section 4, this article assesses alternative mechanisms, particularly non-litigation models (but for a brief assessment of what the article will colloquially term “activist judging”), and their utility in improving and refining the presentation of forensic evidence to ensure that it does not exceed in conclusions what current science shows to be valid. The article avers that these mechanisms—technical working groups, state forensic science commissions, and government law enforcement systemic reviews of errors in forensic testimony—have to date brought about minimal change, with one critical exception. When a crisis casts doubt on a discipline, to the point that it

Daubert, 509 U.S. at 592-93. *Daubert* set out to define the test under the then-extant version of Federal Rule of Evidence 702. *Id.* at 588-89. Subsequent amendments of that Rule sought to synthesize the *Daubert* formulation:

Rule 702. Testimony by Expert Witnesses

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.

FED. R. EVID. 702.

17. *United States v. Llera Plaza*, 179 F. Supp. 2d 492 (E.D. Pa. 2002), *vacated*, 188 F. Supp. 2d 549 (E.D. Pa. 2002).

is in the interest of those in the particular agency or discipline to get ‘ahead of the curve’ in working toward reform, greater change has been effectuated.¹⁸

The conclusions of this article are simple. The *Frye* and *Daubert* thresholds are inadequate to the task as they tolerate a lack of rigor, and are dependent upon lawyers’ and the judiciary’s understanding of scientific principles. Movement toward a scientifically-validated form of presenting forensic evidence is crisis-responsive and dependent on the pressures such crises generate. What may provide continued momentum for such change is the history of DNA exonerations, the development of innocence projects and their acceptance as credible “players” in the system deserving a voice at the table, and the lurking effect of the NAS Report.

SECTION 1 – THE NAS REPORT

That the NAS Report emerged from a comprehensive assessment of forensic disciplines cannot be questioned. The Committee, which met on eight occasions, heard testimony from numerous experts both from within the various disciplines and across science and law,¹⁹ read reports, and conducted independent research.²⁰ While emphasizing the significance and value of forensic evidence in solving crime and exonerating the wrongfully accused and/or convicted,²¹ the report catalogued the following concerns pertinent to this article:

- “Often there are no standard protocols governing forensic practice in a given discipline.”²²
- “[E]ven when protocols are in place[,] . . . they often are vague and not enforced in any meaningful way.”²³
- “With the exception of nuclear DNA analysis, . . . 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.”²⁴

These findings were not restricted to a general assessment of forensic discipline evidence of the types commonly found in criminal investigations and trials. The Committee assessed several disciplines, and identified weaknesses or limitations in each.

For latent print examination, the Report concluded as follows:

18. See *infra* Section 4. Section 4 also discusses, briefly, how “activist” judges and courts can make a modest difference when the understanding of science is clear.

19. The Committee heard from “federal agency officials; academics and research scholars; private consultants; federal, state, and local law enforcement officials; scientists; medical examiners; a coroner; crime laboratory officials from the public and private sectors; independent investigators; defense attorneys; forensic science practitioners; and leadership of professional and standard setting organizations. . . .” NAS Report, *supra* note 5, at 2.

20. *Id.*

21. *Id.* at 4-5.

22. *Id.* at 6.

23. *Id.*

24. *Id.* at 7.

- “In the United States, the threshold for making a source identification is deliberately kept subjective, so that the examiner can take into account both the quantity and quality of comparable details. As a result, the outcome of a friction ridge analysis is not necessarily repeatable from examiner to examiner.”²⁵
- “[C]laims that these analyses have zero error rates are not scientifically plausible.”²⁶

The NAS Report is not alone in this view of fingerprint analysis. As Scottish authorities concluded in 2011, the current model for latent print analysis, ACE-V,²⁷ “is not specific enough to qualify as a validated method for this type of analysis.”²⁸

Ballistics and firearm identification received less detailed treatment in the NAS Report, being addressed in a section on toolmark evidence,²⁹ but resulted in a similar discussion regarding limits:

- “[E]ven with more training and experience using newer techniques, the decision of the toolmark examiner remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates.”³⁰

The Report went on to adopt language from an earlier National Academies study:

- “The validity of the fundamental assumptions of uniqueness and reproducibility of firearms-related toolmarks has not yet been fully demonstrated. . . . A significant amount of research would be needed to scientifically determine the degree to which firearms-related toolmarks are unique or even to quantitatively characterize the probability of uniqueness.”³¹

Handwriting and “questioned document” analysis was described as needing a scientific foundation:

- “The scientific basis for handwriting comparisons needs to be strengthened.”³²

25. NAS Report, *supra* note 5, at 139.

26. *Id.* at 142.

27. “ACE-V” is the acronym for “Analysis, Comparison, Evaluation, and Verification,” a four-step process employed by many latent print analysts in the United States and internationally. *Id.* at 137. The step-by-step approach of ACE-V is detailed in the NAS Report. *See id.* at 137-38. *See also Latent Print Examination and Human Factors: Improving the Practice through a Systems Approach*, THE EXPERT WORKING GROUP ON HUMAN FACTORS IN LATENT PRINT ANALYSIS, NAT’L INST. OF STANDARDS AND TECH. ch. 1 (Feb. 2012) [hereinafter HUMAN FACTORS] (providing a detailed description of the ACE-V process), http://www.nist.gov/customcf/get_pdf.cfm?pub_id=910745. The ACE-V method has been described as that being used by “most examiners.” THE FINGERPRINT INQUIRY, THE FINGERPRINT INQUIRY SCOTLAND ch. 36 § 3 (Dec. 14, 2011) [hereinafter FINGERPRINT INQUIRY], *available at* http://www.the.fingerprintinquiryscotland.org.uk/inquiry/files/TheFingerprintInquiryReport_High_res.pdf.

28. FINGERPRINT INQUIRY, *supra* note 27, at ch. 36 § 96.

29. NAS Report, *supra* note 5, at 150-55.

30. *Id.* at 153-54.

31. *Id.* at 154 (quoting DANIEL L. CORK ET AL., BALLISTIC IMAGING 3 (2008)).

32. NAS Report, *supra* note 5, at 166.

- “Although there has been only limited research to quantify the reliability and replicability of the practices used by trained document examiners, the committee agrees that there may be some value in handwriting analysis.”³³

In sum, each of these disciplines was deemed wanting in both objective standards for individual examiners to apply when evaluating, comparing, and drawing conclusions; and in having a scientific basis for claims of individualization that excluded all other possible sources of the “match.”³⁴

The Report found fault as much with the ultimate end-use consumers of forensic evidence—judges and lawyers—as with the disciplines and their practitioners. It began with a general condemnation:

[T]he existing legal regime—including the rules governing the admissibility of forensic evidence, the applicable standards governing appellate review of trial court decisions, the limitations of the adversary process, and judges and lawyers who often lack the scientific expertise necessary to comprehend and evaluate forensic evidence—is inadequate to the task of curing the documented ills of the forensic science disciplines.³⁵

A specific concern and finding included that “the courts continue to rely on forensic evidence without fully understanding and addressing the limitations of different forensic science disciplines.”³⁶ Additionally:

The judicial system is encumbered by, among other things, judges and lawyers who generally lack the scientific expertise necessary to comprehend and evaluate forensic evidence in an informed manner, trial judges (sitting alone) who must decide evidentiary issues without the benefit of judicial colleagues and often with little time for extensive research and reflection, and the highly deferential nature of the appellate review afforded trial courts’ *Daubert* rulings.³⁷

The Report drew an ultimate conclusion that “[t]he adversarial process relating to the admission and exclusion of scientific evidence is not suited to the task of finding ‘scientific truth.’”³⁸ This article now turns to an assessment of that conclusion, first by examining the pre-NAS Report litigation on the

33. *Id.* at 167.

34. These deficiencies were not limited to these fields, which are highlighted here both because of their prominence in criminal investigations and trials and because they are the subject of most of the post-report litigation. Similar (if not more substantial) concerns were raised regarding other disciplines that produce “match” conclusions: footwear and tire mark impression evidence (“there is no consensus regarding the number of individual characteristics needed to make a positive identification”), *id.* at 149; hair comparison (“No scientifically accepted statistics exist about the frequency with which particular characteristics of hair are distributed in the population[,] [and] [t]here appear to be no uniform standards on the number of features on which hairs must agree before an examiner may declare a ‘match.’”), *id.* at 160; and forensic odontology (“bite mark”) evidence (“the scientific basis is insufficient to conclude that bite mark comparisons can result in a conclusive match”), *id.* at 175.

35. *Id.* at 85.

36. *Id.*

37. *Id.* at 110.

38. NAS Report, *supra* note 5, at 12.

admissibility of latent print expert evidence in *United States v. Llera Plaza*, and then by examining post-Report rulings in which the Report was raised as a ground to restrict the nature and scope of forensic evidence testimony.

SECTION 2 – THE *LLERA PLAZA* LITIGATION: A TALE OF TWO LATENT
PRINT RULINGS AND THE LIMITED GATEKEEPING UTILITY OF *DAUBERT*
AND *FRYE*

United States v. Llera Plaza was a capital prosecution of three defendants—Carlos Ivan Llera Plaza, Wilfredo Martinez Acosta, and Victor Rodriguez—for a series of drug-related murders in Puerto Rico and Philadelphia, Pennsylvania.³⁹ It was brought in the Eastern District of Pennsylvania. As a federal death penalty-eligible case, it was well-resourced. There were two attorneys per defendant, and an ample budget was available for, *inter alia*, expert assistance and expert witnesses.⁴⁰ It was also tried before one of the most eminent and scholarly jurists of his time, Judge Louis Pollak.⁴¹

As one of numerous pre-trial motions, the defense filed a challenge to the admissibility of expert testimony matching crime scene latent prints to the defendants. By agreement with the Government, the challenge would be based on testimony from an earlier Eastern District of Pennsylvania prosecution, *United States v. Mitchell*.⁴²

39. *United States v. Llera Plaza*, 179 F. Supp. 2d 444, 447 (E.D. Pa. 2001). As it pertains to the admission of latent print evidence, the District Court's original opinion limiting such evidence was dated January 7, 2002. The January 7 opinion was ultimately withdrawn. *United States v. Llera Plaza*, 179 F. Supp. 2d 492 (E.D. Pa. 2002) (depublished) [hereinafter *Llera Plaza I*], *vacated*, *United States v. Llera Plaza*, 188 F. Supp. 2d 549 (E.D. Pa. 2002) [hereinafter *Llera Plaza II*]. The author of this article was one of two counsel assigned to represent Mr. Llera-Plaza, and participated in the latent print challenges.

40. 18 U.S.C. § 3005, as amended by § 60026 of the Federal Death Penalty Act, provides as follows:

Whoever is indicted for treason or other capital crime shall be allowed to make his full defense by counsel; and the court before which the defendant is to be tried, or a judge thereof, shall promptly, upon the defendant's request, *assign 2 such counsel, of whom at least 1 shall be learned in the law applicable to capital cases*

Id. (emphasis added).

A 2010 study showed the median authorized cost for expert services in federal capital trials conducted between 1998 and 2004 to be \$83,029. Jon B. Gould & Lisa Greenman, *Report to the Committee on Defender Services, Judicial Conference of the United States, Update on the Cost and Quality of Defense Representation in Federal Death Penalty Cases* x (2010), <http://www.uscourts.gov/uscourts/FederalCourts/AppointmentOfCounsel/FDPC2010.pdf>.

41. Judge Pollak's distinguished career included serving as a member of the "brain trust" for Thurgood Marshall in the *Brown v. Board* litigation, his tenure as Dean of Yale Law School and of the Law School of the University of Pennsylvania, and arguing civil rights cases before the United States Supreme Court. Dennis Hevesi, *Louis H. Pollak, Civil Rights Advocate and Federal Judge, Dies at 89*, N. Y. TIMES, May 13, 2012, at A24.

42. *Llera Plaza I*, 179 F. Supp. 2d at 494 (referencing *United States v. Mitchell*, 199 F. Supp. 2d 262 (E.D. Pa.), and the agreement to proceed on the record from that case). Subsequent to Judge Pollak deciding *Llera Plaza*, the Third Circuit affirmed the holding in

In a January 7, 2002, Opinion that sent shock waves through the Government and the criminal law community,⁴³ Judge Pollak concluded that “no expert witness for any party will be permitted to testify that, in the opinion of the witness, a particular latent print is—or is not—the print of a particular person.”⁴⁴

The Opinion was all the more remarkable because Judge Pollak first made a determination that the two foundational aspects of latent print identification theory—that each person’s fingerprints are unique and that they are permanent in terms of their distinguishing features—are valid, and indeed so settled beyond dispute to the extent they qualify for judicial notice.⁴⁵ What proved critical was Judge Pollak’s vigorous reading of the *Daubert* mandate of reliability, which he described as requiring that “the proposed expert’s opinion must actually be based on what Rule 702 terms ‘scientific knowledge.’”⁴⁶

Applying the *Daubert* criterion of whether the technique “can be and has been tested,”⁴⁷ Judge Pollak held that: “[E]ven 100 years of ‘adversarial’ testing in court cannot substitute for scientific testing when the proposed expert testimony is presented as scientific in nature. . . . [T]he government had little success in identifying scientific testing that tended to establish the reliability of fingerprint identifications.”⁴⁸

As to the second criterion, peer review, the critique was even more trenchant:

It is the case that there are numerous writings that discuss the fingerprint identification techniques employed by fingerprint examiners. But it is not apparent that their publication constitutes “submission to the scrutiny of the scientific community” in the *Daubert* sense. Even those who stand at the top of the fingerprint identification field—people like David Ashbaugh and Stephen Meagher—tend to be skilled professionals who have learned their craft on the job and without any concomitant advanced academic training. It would thus be a misnomer to call fingerprint examiners a “scientific community” in the *Daubert* sense.⁴⁹

Mitchell approving the admission of latent print individualization testimony. United States v. Mitchell, 365 F.3d 215, 219 (3d Cir. 2004).

43. See Andy Newman, *Judge Rules Fingerprints Cannot Be Called a Match*, N. Y. TIMES, Jan. 11, 2002, at A14; Joseph A. Slobodzian, *Fingerprint experts are pointed toward the courthouse door; Prosecutors worry about a federal judge's ruling in Philadelphia*, PHILA. INQUIRER, Jan. 27, 2002, at C3.

44. *Llera Plaza I*, 179 F. Supp. 2d at 518.

45. *Id.* at 502.

46. *Id.* at 503. The opinion went on to detail the core: “*Daubert* factors’: (1) whether the technique ‘can be (and has been) tested,’ (2) whether the technique has been ‘subjected to peer review and publication,’ (3) ‘the known or potential rate of error . . . and the existence and maintenance of standards controlling the technique’s operation,’ and (4) ‘general acceptance.’” *Id.* (quoting *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 593-94 (1993)).

47. *Id.* at 504.

48. *Id.* at 506. The District Court cited to substantial expert testimony from the *Mitchell* proceedings confirming the dearth of scientific testing. *Id.* at 507-08 (citing to and quoting testimony by forensic scientists David Stoney and James Starrs).

49. *Llera Plaza I*, 179 F. Supp. 2d at 509 (footnote omitted).

For the third *Daubert* criterion of “error rate,” Judge Pollak accepted as an assumption that the error rate of the *methodology* of latent print examination and comparison was “zero,” and that the point of focus should be *practitioner* error rate. Based upon the *Mitchell* record, he could conclude only that the Government evidence was “(modestly) suggestive of a discernible level of practitioner error.”⁵⁰ He also found that “no one standard” controlled the “technique’s operation,” nor were there controlling standards which governed either “the matching of a latent print to a known fingerprint” or the qualification standards for print examiners.⁵¹

Recognizing that “general acceptance” was part of the discarded *Frye* analysis but still a potential consideration under *Daubert* and Rule 702, Judge Pollak gave little weight to this fourth criterion because, although generally accepted *among latent print examiners*, “fingerprint examiners[] . . . do not constitute a ‘scientific community’”⁵² He further determined that reliability was a precondition of giving weight to general acceptance. “The failure of fingerprint identifications fully to satisfy the first three *Daubert* factors militates against heavy reliance on the general acceptance factor.”⁵³

The outcome of this analysis was a partial exclusion of latent print testimony. Identifying common features between crime scene or evidentiary latent prints and those of one or more defendants would be permitted, as “objective” and “descriptive” testimony, proof of indisputable relevance and strong reliability.⁵⁴ The only restriction was that regarding individualization: there would be no testimony “that a particular latent print is in fact the print of a particular person.”⁵⁵ That decision would be left to the triers of fact, the jurors.⁵⁶

There was (and remains) strong academic support for this important but short-lived holding, with it being described as “well-reasoned . . . [and] a correct application of the *Daubert* and *Kumho Tire* principles”⁵⁷ The Opinion was hailed as one that “fully analyze[s] the scientific validity of fingerprints under the true tenets of the *Daubert-Kumho* standard”⁵⁸ and as an opinion that “clearly reveals[] this does not satisfy *Daubert*.”⁵⁹ However, it

50. *Id.* at 513.

51. *Id.* at 513-14.

52. *Id.* at 515.

53. *Id.*

54. *Id.* at 516.

55. *Llera Plaza I*, 179 F. Supp. 2d. at 516.

56. *Id.*

57. Tara Marie La Morte, *Sleeping Gatekeepers: United States v. Llera Plaza and the Unreliability of Forensic Fingerprinting Evidence Under Daubert*, 14 ALB. L.J. SCI. & TECH. 171, 173, 175 (2003).

58. Tamara F. Lawson, *Can Fingerprints Lie?: Re-weighing Fingerprint Evidence In Criminal Jury Trials*, 31 AM. J. CRIM. L. 1, 36 (2003).

59. D.H. Kaye, *The Nonscience of Fingerprinting: United States v. Llera-Plaza*, 21 QUINNIPIAC L. REV. 1073, 1087 (2003). *But see* Mark P. Denbeaux & D. Michael Risinger, *Kumho Tire and Expert Reliability: How the Question You Ask Gives the Answer You Get*, 34 SETON HALL L. REV. 15, 73 (2003) (“To give Judge Pollak his due, he at least attempted to take on a hard issue, and it is only fair to note that Judge Pollak is hardly alone in failing to frame the fingerprint reliability issue in the case before him with the specificity required by *Kumho Tire*.”).

was not so perceived by the Government, which promptly sought and was granted rehearing and the opportunity to present live testimony (with the corresponding right being granted to the defense).⁶⁰

The new evidentiary hearing took place in February 2002, with an international and highly-credentialed array of witnesses:

[For the Government,] Stephen Meagher, Unit Chief of Latent Print Unit 3 of the Forensic Analysis Section of the FBI Laboratory; and Kenneth O. Smith, Senior Forensic Latent Print Analyst of the U.S. Postal Inspection Service. [For the defense,] Allan Bayle, a London-based consultant on fingerprint identification, with lengthy prior service as a fingerprint examiner at New Scotland Yard; Janine Arvizu, a laboratory quality auditor serving as Senior Technical Consultant at Consolidated Technical Services, Inc., a New Mexico firm; and Dr. Ralph Norman Haber, a psychometrician at Human Factors Consultants, a California firm.⁶¹

Included in the testimony was substantial criticism of the proficiency tests⁶² used by the FBI, described by one witness as “not testing their ability. It doesn't test their expertise. I mean I've set these tests to trainees and advanced technicians. And if I gave my experts these tests, they'd fall about laughing.”⁶³

Notwithstanding this and similar testimony, Judge Pollak reversed course with a new guiding principle. “In adjusting the focus of inquiry from ACE-V's status as a ‘scientific’ discipline to its status as a ‘technical’ discipline, one modifies the angle of doctrinal vision.”⁶⁴ Judge Pollak added that “the test of reliability is ‘flexible[]’”⁶⁵ Proceeding from these premises, he elevated the “general acceptance” by practitioners within the latent print community to a validation of the technique’s reliability.⁶⁶ As to error rate, Judge Pollak transformed the inquiry into one that looked at the absence of proof of erroneous identifications by latent print examiners, and concluded from this negative finding that “there is no evidence that the error rate of certified FBI fingerprint examiners is unacceptably high.”⁶⁷ As to standards, because it was shown that the FBI method of fingerprint analysis and evaluation corresponded with that in Great Britain, “the standards which control the opining of a competent fingerprint examiner are sufficiently widely agreed upon to satisfy *Daubert's* requirements.”⁶⁸

60. United States v. Llera Plaza, 188 F. Supp. 2d 549, 553 (E.D. Pa. 2002) [hereinafter *Llera Plaza II*].

61. *Id.* at 554.

62. A “proficiency test” is one designed to measure, with casework-like samples, a latent print examiner’s capabilities. See *SWGFAST: Guidelines for Latent Print Proficiency Testing Programs*, 54 J. FORENSIC IDENTIFICATION 353, 353 (2004).

63. *Llera Plaza II*, 188 F. Supp. 2d at 558 (testimony of Allan Bayle).

64. *Id.* at 562.

65. *Id.* (quoting *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 594 (1993)).

66. *Id.* at 563-64.

67. *Llera Plaza II*, 188 F. Supp. 2d at 566.

68. *Id.* at 571.

The transformation was completed in the Judge's concluding statement: "[b]ased on the foregoing considerations, I have concluded that arrangements which, subject to careful trial court oversight, are felt to be sufficiently reliable in England, ought likewise to be found sufficiently reliable in the federal courts of the United States, subject to similar measures of trial court oversight."⁶⁹ That "careful trial court oversight" would assess two factors: (1) the expertise of the testifying examiner; and (2) whether the latent print at issue had sufficient clarity to permit an evaluation and comparison.⁷⁰

What can be said of this sea change in a several week period? Judge Pollak properly concluded that latent print analysis was a technique and not a science, but arguably ignored the dilemma that the opinion testimony he was permitting was essentially scientific—a statement of individualization that can only be validated scientifically. That type of source attribution proof is akin to the statistical evidence in a DNA case. However, it is one made without the scientific population studies and stated at a higher degree of likelihood ("this print came from this individual to the exclusion of all others on the planet") than traditional "random match probability" testimony ("the likelihood that a person picked at random from the population would have this same profile is 1 in xxxxx") used when there is biological evidence that permits the capture of a DNA profile.⁷¹ As David Kaye noted shortly after the second *Llera Plaza* decision, what is lacking is "research into the validity of the claims of the examiners who testify that a defendant is the only person on earth whose hand could have been the source of the partial fingerprint found at the crime scene."⁷²

Yet Judge Pollak may not have erred in his application of *Daubert*. The *Daubert* "gate-keeping" function is one of questionable stringency, ultimately described by the Court as a determination of "evidentiary reliability."⁷³ More particularly, the Court defined "the requirement that an expert's testimony pertain to 'scientific knowledge' [as] establish[ing] a standard of evidentiary reliability."⁷⁴ While some scholars have argued that this is intended to set a high threshold,⁷⁵ there is substantial support for a contrary assessment—one

69. *Id.* at 576.

70. *Id.*

71. See SWGDAM Interpretation Guidelines for Autosomal STR Typing by Forensic DNA Testing Laboratories, SWGDAM, <http://www.fbi.gov/about-us/lab/biometric-analysis/codis/swgdam-interpretation-guidelines> (last visited Jan. 4, 2014). A working definition for "random match probability" is "[t]he probability that the DNA in a random sample from the population has the same profile as the DNA in the evidence sample." *Glossary*, DNA INITIATIVE, <http://www.dna.gov/glossary/> (last visited Jan. 4, 2014).

72. Kaye, *supra* note 59, at 1087. Kaye also emphasized that the FBI uses "scientific sounding names for the process of comparing latent and rolled prints—terms like 'ridgeology' and ACE-V . . ." *Id.* at 1080.

73. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 590 (1993).

74. *Daubert*, 509 U.S. at 590.

75. See, e.g., David E. Bernstein, *The Admissibility of Scientific Evidence After Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 15 CARDOZO L. REV. 2139, 2139 (1994); Randolph N. Jonakait, *The Meaning of Daubert and What That Means for Forensic Science*, 15 CARDOZO L. REV. 2103, 2110 (1994) (emphasizing that trial judges must determine whether "scientific testimony is indeed scientific . . ."). TAL GOLAN, LAWS OF MEN AND LAWS OF NATURE: THE HISTORY OF

permitting loose hands on the admissibility reins. As described by Professor Robinson:

Law is most effective in guiding judicial behavior when the law has a relatively clear rule, a relatively clear substantive meaning, or where judges face meaningful appellate oversight. *Daubert* decisions fit none of these criteria. As a decision rule, *Daubert* does not dictate how an admissibility determination should be carried out. The opinion easily supports contrasting views on the appropriate stringency of the courts towards admitting borderline expert testimony; it also supports contrasting views on the epistemology of science that judges should adopt.⁷⁶

The potential laxity of this “evidentiary reliability” standard comes, first, from the use of “pertains” as the linkage between reliability and scientific knowledge. The Court’s elaborative footnote makes this more clear:

We note that scientists typically distinguish between "validity" (does the principle support what it purports to show?) and "reliability" (does application of the principle produce consistent results?). . . . [O]ur reference here is to *evidentiary* reliability—that is, trustworthiness. Cf., e.g., Advisory Committee's Notes on Fed. Rule Evid. 602, 28 U.S.C. App., p. 755 (“[T]he rule requiring that a witness who testifies to a fact which can be perceived by the senses must have had an opportunity to observe, and must have actually observed the fact’ is a ‘most pervasive manifestation’ of the common law insistence upon ‘the most reliable sources of information’” (citation omitted)); Advisory Committee's Notes on Art. VIII of Rules of Evidence, 28 U.S.C. App., p. 770 (hearsay exceptions will be recognized only “under circumstances supposed to furnish guarantees of trustworthiness”). In a case involving scientific evidence, *evidentiary reliability* will be based upon *scientific validity*.⁷⁷

SCIENTIFIC EXPERT TESTIMONY IN ENGLAND AND AMERICA 264 (2004), describes *Daubert* as “serv[ing] to affirm . . . more vigorously[]” an “exclusionary spirit” and saw the decision as “follow[ing] the twentieth-century trend towards ever-greater judicial scrutiny of scientific evidence.”

76. Robert Robinson, *Daubert v. Merrell Dow Pharmaceuticals and the Local Construction of Reliability*, 19 ALB. L.J. SCI. & TECH. 39, 42-43 (2009). Robinson’s review of *Daubert* rulings showed a wide range of variability, “finding some evidence that admissibility standards have tightened in civil cases while remaining unchanged in criminal ones.” *Id.* at 43 (footnote omitted). This variability was documented by Professor Risinger, who showed that:

[A]s to proffers of asserted expert testimony, civil defendants win their *Daubert* reliability challenges to plaintiffs’ proffers most of the time, and that criminal defendants virtually always lose their reliability challenges to government proffers. And, when civil defendants’ proffers are challenged by plaintiffs, those defendants usually win, but when criminal defendants’ proffers are challenged by the prosecution, the criminal defendants usually lose.

D. Michael Risinger, *Navigating Expert Reliability: Are Criminal Standards of Certainty Being Left on the Dock?*, 64 ALB. L. REV. 99, 99 (2000). See also David M. Flores et al., *Examining the Effects of the Daubert Trilogy on Expert Evidence Practices in Federal Civil Court: An Empirical Analysis*, 34 S. ILL. U. L.J. 533, 539-40, 562-63 (2009) (reviewing studies and confirming a greater tendency for the defense in civil cases to use *Daubert* to challenge and exclude expert testimony).

77. *Daubert*, 509 U.S. at 590 n.9.

That the science need only “support” what it “purports” to show confirms the modest threshold for the reliability finding, one that need be established only by a preponderance of the evidence.⁷⁸ The Court referring to Rule 602 “personal knowledge” is also illustrative, as the Advisory Committee Notes for that Rule make clear that it is *apparent* knowledge that suffices. “[P]ersonal knowledge is not an absolute but may consist of what the witness *thinks he knows* from personal perception.”⁷⁹

The *Daubert* Court went further in setting a low threshold for scientific validity at the level of evidentiary reliability. It rejected an argument that having judges perform a gate-keeping role will stifle science and be “inimical to the search for truth[]” by noting that the proper function of the judge will be to exclude “conjecture.”⁸⁰ The Court championed a broader admissibility standard than *Frye*’s “general acceptance” test in the face of concerns that trials would be pervaded by “absurd and irrational pseudoscientific assertions[]” by emphasizing “the capabilities of the jury and of the adversary system generally.”⁸¹ “Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.”⁸² If “conjecture” and “absurd and irrational pseudoscientific assertions” are the outliers the gatekeeper is to guard against, and to guard against in light of the adversarial trial protections, then the *Daubert* standard is decidedly lenient and consistent with Judge Pollak’s approach in *Llera Plaza II*. As Professor Kaye noted, “*Kumho Tire* arguably permits this outcome—the opinion is quite malleable”⁸³

Indeed, the Court’s subsequent Rule 702 jurisprudence shows the malleability and laxity of the *Daubert* standard. In *General Electric v. Joiner*, the Court confirmed that “the Federal Rules of Evidence allow district courts to admit a somewhat broader range of scientific testimony than would have been admissible under *Frye*[.] . . .”⁸⁴ In doing so, the court emphasized the propriety of excluding evidence where it is only “opinion evidence that is connected to existing data only by the *ipse dixit* of the expert.”⁸⁵ No language in *Joiner* approved, or intimated approval of, excluding evidence slightly more satisfactory or “reliable” than that born of *ipse dixit* reasoning. The third case in the Rule 702 trilogy, *Kumho Tire Co. v. Carmichael*, emphasized that with either scientific or technical expert evidence, “the law grants a district court the same broad latitude when it decides how to determine reliability as it enjoys in respect to its ultimate reliability determination.”⁸⁶ While *Kumho*

78. *Id.* at 592 n.10.

79. FED. R. EVID. 602 advisory committee’s note (emphasis added).

80. *Daubert*, 509 U.S. at 596-97.

81. *Id.* at 595-96.

82. *Id.* at 596.

83. Kaye, *supra* note 59, at 1087.

84. *Gen. Electric Co. v. Joiner*, 522 U.S. 136, 142 (1997).

85. *Joiner*, 522 U.S. at 146.

86. *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 142 (1999) (emphasis omitted).

affirmed the exclusion of evidence, its broad discretion equally embraces the decision to permit expert testimony.

Reading the Court's admissibility threshold as a lenient one is compatible with its treatment of eyewitness identification testimony and the Due Process reliability standard, which described the admissibility issue as one of "evidentiary interest"⁸⁷ that requires only a level of reliability from which a factfinder *might* conclude that it is correct. Pre-dating *Daubert* by two decades, the Court used strikingly similar language in extolling the ability of the adversarial trial process to judge weak evidence. "We are content to rely upon the good sense and judgment of American juries, for evidence with some element of untrustworthiness is customary grist for the jury mill. Juries are not so susceptible that they cannot measure intelligently the weight of identification testimony that has some questionable feature."⁸⁸

The conclusion that *Daubert* is inherently tolerant in its admissibility threshold is not uniformly held. The Court itself wrote in 2000 of "the exacting standards of reliability [expert] evidence must meet[.]"⁸⁹ albeit without adding any new criteria or highlighting how District Court judges were to be "exacting" in applying a liberal admissibility test. Also, many scholars have claimed that *Daubert* has stringent standards and instead decried what they consider lax application, but have often done so without extensive discussion of what "evidentiary reliability" means.⁹⁰ Others acknowledge *Daubert's*

87. *Manson v. Brathwaite*, 432 U.S. 98, 113 (1977). See also Jules Epstein, *Irreparable Misidentifications and Reliability: Reassessing the Threshold for Admissibility of Eyewitness Identification*, 58 VILL. L. REV. 69, 70 (2013).

88. *Manson*, 432 U.S. at 116; Epstein, *supra* note 87, at 70 (quoting *Manson*, 432 U.S. at 116).

89. *Weisgram v. Marley Co.*, 528 U.S. 440, 455 (2000).

90. See, e.g., Thomas L. Bohan, *Scientific Evidence and Forensic Science Since Daubert: Maine Decides to Sit out the Dance*, 56 ME. L. REV. 101, 103 (2004) ("[T]he significance of *Daubert* lies not in its discarding of *Frye* and its emphasis on Rule 702, but rather in its exhorting of trial judges to exercise their "gatekeeper" role with respect to scientific evidence, something that many had been fairly lax about previously."); Edward K. Cheng, *Independent Judicial Research in the Daubert Age*, 56 DUKE L.J. 1263, 1265 (2007) ("[T]he *Daubert* regime requires that judges critically examine an expert's methodology and conclusions with 'exacting standards.'"); Craig M. Cooley & Gabriel S. Oberfield, *Increasing Forensic Evidence's Reliability and Minimizing Wrongful Convictions: Applying Daubert Isn't the Only Problem*, 43 TULSA L. REV. 285, 285 (2007) (bemoaning the failure of trial judges to adhere to *Daubert's* "exacting standards"); James Aaron George, *Offender Profiling and Expert Testimony: Scientifically Valid or Glorified Results?*, 61 VAND. L. REV. 221, 235 (2008) ("Although *Daubert* initially appeared to chart a permissive course for the admission of scientific testimony, its progeny gradually moved toward a broader and stricter test than *Frye*."); Paul C. Giannelli, *The Supreme Court's "Criminal" Daubert Cases*, 33 SETON HALL L. REV. 1071, 1082 (2003) (emphasizing movement toward "exacting standards" for admissibility); Paul C. Giannelli & Kevin C. McMunigal, *Prosecutors, Ethics, and Expert Witnesses*, 76 FORDHAM L. REV. 1493, 1531 (2007) ("*Daubert v. Merrell Dow Pharmaceuticals, Inc.* has been transformed from a case that most courts and commentators believed lowered the barriers to the admissibility of scientific evidence to one that the Court now describes as imposing an 'exacting' standard.") (footnote omitted); Jane Campbell Moriarty, *Symposium Foreword*, 43 TULSA L. REV. 229, 229-30 (2007) (listing scholars who contend that judges have been lax in their gatekeeping role); Marc T. Treadwell, *Evidence*, 54 MERCER L. REV. 1487, 1495 (2003) (describing "[t]he exacting and demanding character of the gatekeeper role assigned to district courts by *Daubert* . . .").

flexibility and permissiveness.⁹¹ Yet without resolving what the Court intended, it is clear that in application there has been a strong preference for admissibility of forensic evidence, particularly from prosecutors. As was noted nearly a decade ago:

A review of federal criminal court cases reveals that 92% of prosecution experts survive defense challenges, while only 33% of defense experts survive challenges by federal prosecutors. A recent study of federal appellate criminal cases found that more than 95% of prosecutors' experts are admitted at trial, while fewer than 8% of defense experts are allowed to testify.⁹²

In light of both the permissiveness inherent in the “abuse of discretion” standard of review for *Daubert*/Rule 702 admissibility decisions, and the historic record of liberal admissibility of prosecution-offered forensic evidence,⁹³ it cannot be said that *Daubert* will be an efficacious preventative against flawed or insufficiently validated forensic evidence.⁹⁴

Although the *Daubert* Court indicated that its standard was more inclined toward admissibility than the “austere” test developed in *Frye*,⁹⁵ the latter has

91. See, e.g., Maxine D. Goodman, *A Hedgehog on the Witness Stand—What’s the Big Idea?: The Challenges of Using Daubert to Assess Social Science and Nonscientific Testimony*, 59 AM. U. L. REV. 635, 646 (2010) (“The Supreme Court described the *Daubert/Kumho* standard as liberal and permissive, giving courts wide latitude in terms of allowing expert testimony and deciding how to test expert testimony.”); Michael H. Graham, *The Daubert Dilemma: At Last A Viable Solution?*, 179 F.R.D. 1, 7 (1998) (“The Supreme Court sought to encourage liberal admissibility . . . [by] abolishing a strict *Frye* test . . .”).

92. Joëlle Anne Moreno, *What Happens When Dirty Harry Becomes an (Expert) Witness for the Prosecution?*, 79 TUL. L. REV. 1, 3 (2004) (footnote omitted). See also Peter J. Neufeld, *The (Near) Irrelevance of Daubert to Criminal Justice and Some Suggestions for Reform*, 95 AM. J. OF PUB. HEALTH S107, S110 (2005) (“In the first 7 years after *Daubert*, there were a mere 211 reported challenges to prosecution experts in state court, and the prosecution defeated the challenge 161 times. From August 1999 through August 2000, there were only 50 reported challenges to admissibility citing *Daubert* in state criminal cases”); Sandra Guerra Thompson, *Judicial Gatekeeping of Police-Generated Witness Testimony*, 102 J. CRIM. L. & CRIMINOLOGY 329, 333 (2012) (“[T]rial courts generally have either been unwilling or unable to perform competent reliability screening in criminal cases.”); NAS Report, *supra* note 5, at 97 (“[R]eported opinions also indicate that appellate courts routinely deny appeals contesting trial court decisions admitting forensic evidence against criminal defendants.”).

93. There is some support for the proposition that *Daubert* and the Amendment to Federal Rule of Evidence 702 led to more stringent control over admissibility decisions, and an increase in the exclusion of expert witnesses, in *civil* cases. See, e.g., Joe S. Cecil, *Ten Years of Judicial Gatekeeping Under Daubert*, 95 AM. J. OF PUB. HEALTH S74, S74-S79 (2005). However, this pattern is not found in criminal cases.

94. As noted by Professor Raeder, the ultimate harm here is inaccuracy in factfinding. “Can interpretation of the rules contribute to jury inaccuracy? Again, the answer is yes, in part, because expansive admission of evidence permits jurors to base their opinions on unreliable information leading to unwarranted inferences.” Myrna Raeder, *What does Innocence Have to Do With It?: A Commentary on Wrongful Convictions and Rationality*, 2003 MICH. ST. L. REV. 1315, 1320 (2003).

95. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 588-89. The Court emphasized the *Frye* test’s stringency, describing it as “a rigid general acceptance requirement [that] would be at odds with the liberal thrust of the Federal Rules and their general approach of relaxing the traditional barriers to opinion testimony.” *Id.* at 588 (internal quotations and citation omitted).

its own vagaries and elasticity. It has been described as the “more lenient” standard,⁹⁶ perhaps because “where the scientific foundation is weak and general acceptance is high, *Daubert* excludes while *Frye* admits.”⁹⁷ More fundamentally, *Frye* lacks overall stringency because of its failure to define what constitutes general acceptance in the particular field, and the absence of “standards defining which field to consult . . . leaves the law at the mercy of the practitioners of the respective fields.”⁹⁸ The malleability of *Frye* was disparaged by the Third Circuit:

[T]he vague terms included in the standard have allowed courts to manipulate the parameters of the relevant “scientific community” and the level of agreement needed for “general acceptance.” Thus, some courts, when they wish to admit evidence, are able to limit the impact of *Frye* by narrowing the relevant scientific community to those experts who customarily employ the technique at issue.⁹⁹

Finally, *Frye* is often deemed applicable only to “novel” scientific theories, leaving a gap that precludes re-examination of expert testimony previously deemed admissible but now subject to scrutiny because of questions concerning validity and reliability.¹⁰⁰

The doubtful efficacy of the *Daubert* and *Frye* standards to ensure that courtroom evidence is limited to scientifically valid propositions is not merely a function of each test’s language; each standard’s laxity is either contributed to or aggravated by additional factors. First among equals is the knowledge deficit of the practitioner and judicial communities. As expressed succinctly by David Faigman in 2006, “[l]awyers, of which judges are merely a subset, generally lack good training in the methods of science. Most lawyers do not speak the language of science.”¹⁰¹ Faigman was echoing a perception that has been known for decades, following Professor Jonakait’s documented assertion in 1991 that “lawyers and judges usually lack high levels of scientific training and are thus unable to challenge or evaluate science.”¹⁰² The deficit remains

96. Mark S. Brodin, *Behavioral Science Evidence in the Age of Daubert: Reflections of a Skeptic*, 73 U. CIN. L. REV. 867, 893 (2005).

97. David W. Barnes, *General Acceptance Versus Scientific Soundness: Mad Scientists in the Courtroom*, 31 FLA. ST. U. L. REV. 303, 327 (2004).

98. DAVID L. FAIGMAN ET AL., SCIENCE IN THE LAW: STANDARDS, STATISTICS AND RESEARCH ISSUES 8-9 (2002).

99. *United States v. Downing*, 753 F.2d 1224, 1236 (3d Cir. 1985). Given that general acceptance remains a permissible factor in a *Daubert* assessment of admissibility, these criticisms confirm as well the potential lack of stringency under Rule 702.

100. E.g., *Commonwealth v. Puksar*, 951 A.2d 267, 275 (Pa. 2008) (limiting *Frye* to novel science). Some jurisdictions have permitted re-examination of previously accepted expert testimony under *Frye*. *Armstead v. State*, 673 A.2d 221, 243 (Md. 1996) (“[D]ue process considerations require [trial] courts to intervene if scientific opinion shifts so dramatically that previously accepted methods are considered unreliable[]”); see also *Ramirez v. State*, 810 So. 2d 836, 844 (Fla. 2001).

101. David L. Faigman, *Judges as “Amateur Scientists”*, 86 B.U. L. REV. 1207, 1211 (2006).

102. Randolph N. Jonakait, *Forensic Science: The Need for Regulation*, 4 HARV. J.L. & TECH. 109, 167-68 (1991). The problem continued to draw attention:

today,¹⁰³ and was emphasized by the NAS Report: “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.”¹⁰⁴ The outcome is that bemoaned by Michael Saks: “[A]s a result of the tradition and education of lawyers and judges, they are poorly prepared to evaluate the claims of forensic science, or any empirical claims. Lawyers and judges come from the world of literary interpretation, not from the world of empirical testing.”¹⁰⁵

Education, alone, however, does not explain the NAS Report finding that: “Unlike the extremely well-litigated civil challenges, the criminal defendant's challenge is usually perfunctory. Even when the most vulnerable forensic sciences—hair microscopy, bite marks, and handwriting—are attacked, the courts routinely affirm admissibility citing earlier decisions rather than facts established at a hearing.”¹⁰⁶

The contrast between civil and criminal challenges must be attributed, in large part, to the limited funding available for the latter.¹⁰⁷ The overwhelming

[I]n 1993, the Carnegie Commission's Task Force on Judicial and Regulatory Decision Making . . . recommended judicial education on science and technology issues, creation of institutional partnerships between the scientific and legal communities, and establishment of a council for science and justice consisting of lawyers and scientists working together to monitor the development of high-tech litigation.

Patricia E. Lin, *Opening the Gates to Scientific Evidence in Toxic Exposure Cases: Medical Monitoring and Daubert*, 17 REV. LITIG. 551, 587 (1998). See also Peter J. Neufeld & Neville Colman, *When Science Takes the Witness Stand*, SCI. AM., May 1990, at 46, 49 (detailing lawyers' inadequate scientific backgrounds); ANDRE A. MOENSSSENS ET AL., SCIENTIFIC EVIDENCE IN CRIMINAL CASES 7 (3d ed. 1986) (“[L]awyers as a group evidence an appalling degree of scientific illiteracy, which ill equips them to educate and guide the bench in its decisions on admissibility of evidence proffered through expert witnesses.”) (footnote omitted).

103. 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, 250 (2010) (“[L]awyers offering and opposing such evidence must be equipped to address the realities and the shortcomings of the evidence. Unfortunately, most are either ill-prepared to do so or unaware of the burden placed on them.”).

104. NAS Report, *supra* note 5, at 27.

105. Michael J. Saks, *Banishing Ipse Dixit: The Impact of Kumho Tire on Forensic Identification Science*, 57 WASH. & LEE L. REV. 879, 888 (2000). Even when a rigorous inquiry is conducted, this lack of scientific education on the part of the judge and lawyers may lead to a poor or inadequate framing of what the admissibility inquiry should be focused on. See Denbeaux & Risinger, *supra* note 59, at 66-74 (explaining how the inquiry in *Llera-Plaza* concentrated too much on the global question of admitting latent print testimony and missed the more critical inquiry of where are the scientific limits on accuracy when the particular print at issue is of limited size and quality). See also Erica Beecher-Monas, *The Heuristics of Intellectual Due Process: A Primer for Triers of Science*, 75 N.Y.U. L. REV. 1563, 1568, 1570 (2000) (questioning courts' ability to comprehend genuine scientific inquiry).

106. NAS Report, *supra* note 5, at 107 (quoting Neufeld, *supra* note 92, at S109-10).

107. As Professor Giannelli wrote:

The notion that expert testimony in criminal and civil cases should be treated differently does not seem, at least to me, to be a remarkable proposition. The issues are very

majority of criminal cases involve indigent defendants; a “study of the 100 most populous counties in the United States found that 82 percent of indigent clients were handled by public defenders, 15 percent by assigned counsel attorneys, and 3 percent by contract attorneys.”¹⁰⁸ That services and funding do not match this need cannot be disputed. “The vast majority of criminal defendants in the United States are too poor to afford a lawyer, yet adequate funding and resources for defense counsel remains an elusive goal.”¹⁰⁹ The underfunding problem is magnified by excessive caseload. A 2007 study determined that “15 of 19 state public defender systems reported caseloads above national standards. . . . [B]etween 1999 and 2000, public defender caseloads increased by 20%, while staffing increased by only four percent. And 73% of county public defenders exceeded national caseload standards.”¹¹⁰

The underfunding and excessive caseloads are attributes of institutional providers of indigent defense, which at least are staffed with lawyers with a greater proficiency in criminal law. A compounding factor for criminal defense challenges to forensic evidence arises from the use of individual “assigned counsel” to represent a substantial percentage of the indigent defendant population, as “defendants with assigned counsel receiving outcomes that, on the whole, are less favorable compared to defendants with public defenders or private attorneys.”¹¹¹ This poorer performance evinces an even lesser skill set and, again, a reduced access to the funding necessary to effectively prepare and litigate a challenge to forensic evidence.

The “perfunctory” challenges to forensic evidence described by the NAS Report—arising from this combination of inadequate scientific knowledge and training, and insufficient funding—presumably have a reinforcing effect on

different. Instead of worrying about the “hired gun” phenomenon as in civil litigation, the criminal defense lawyer often lacks money for any “gun.”

Giannelli, *supra* note 90, at 1072 (footnote omitted).

108. *OJP Fact Sheet: Indigent Defense*, OFFICE OF JUSTICE PROGRAMS (Dec. 2011), http://www.ojp.gov/newsroom/factsheets/ojpfs_indigentdefense.html.

109. *Expert Working Group Report: International Perspectives on Indigent Defense*, U.S. DEPT OF JUSTICE 1 (Sept. 2011), <https://ncjrs.gov/pdffiles1/nij/236022.pdf>.

110. *Id.* at 7. The caseload varied further depending on the type of public defender office:

State-based public defender programs reported receiving a median of 82 felony (non-capital) cases, 217 misdemeanor cases, and two appeals case[s] per full-time equivalent litigating attorney. County-based public defender offices reported receiving an average of 100 felony (non-capital) cases and 146 misdemeanor cases per full-time equivalent litigating attorney.

Lynn Langton & Donald J. Farole, Jr., *Bureau of Justice Statistics Selected Findings: Census of Public Defender Offices, 2007*, U.S. DEPT OF JUSTICE 2 (June 17, 2010), <http://bjs.gov/content/pub/pdf/pdo07st.pdf>.

111. Thomas H. Cohen, *Who’s Better at Defending Criminals? Does Type of Defense Attorney Matter in Terms of Producing Favorable Case Outcomes* 23, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1876474 (unpublished manuscript). Roughly 25 percent of indigent defendants are assigned to court-appointed counsel, rather than receiving representation from institutional public defenders. *Id.* at 14.

judicial acceptance of long-relied-upon forensic evidence of longstanding. The weaker or less articulate the challenge, the less reason to reconsider a long history of acceptance. And that long history has its own dynamic of tolerance, creating a stasis or inertia. The perception is that expert testimony, which has been used in court in a seemingly-accurate way for decades, or longer, should not be lightly tossed aside. As one court rationalized:

Used successfully in criminal trials for over 100 years, fingerprint identification analysis has withstood the scrutiny and testing of the adversarial process. Those of a "scientific" bent certainly can take issue with whether the judges and lawyers have the education or training to engage in "scientific" testing and with whether the courtrooms provide the sterile, laboratory-like and objective atmosphere associated with and probably conducive to scientific analysis. Even so, it seems an unreasonable stretch simply to discard this experiential testing as wholly unreliable and to relegate the testifying opinions of all these fingerprint examiners to *ipse dixit*.¹¹²

This language is not an isolated view, but instead reflects a recurring comfort with grandfathering the “tried and true” expertise of pattern and impression evidence.¹¹³ It makes even the most diligent and well-resourced challenge to forensic evidence a formidable undertaking.

Thus, even though courts occasionally speak of a heightened gatekeeping function for judges,¹¹⁴ structurally, and as applied, neither *Frye* nor *Daubert* places substantial obstacles in the way of admitting non-validated forensic evidence. This limited scrutiny was well-described by Judge Friendly, albeit in a civil litigation context, more than forty years ago.

There is no bright line that divides evidence worthy of consideration by a jury, although subject to heavy counter-attack, from evidence that is not. Especially because of the guaranty of the Seventh Amendment, a federal court must be exceedingly careful not to set the threshold to the jury room too high. Yet it is the jury system itself that requires the common law judge, in his efforts to prevent the jury from being satisfied by matters of slight value, capable of being exaggerated by prejudice and hasty reasoning . . . to exclude matter which does not rise to a clearly sufficient degree of value; something more than a minimum of probative value is required.¹¹⁵

A threshold of “more than a minimum of probative value” is not an exacting one. This article shows next that, notwithstanding the prestige of the NAS and the clarion call of the Report, this unexacting threshold remains the

112. *United States v. Cline*, 188 F. Supp. 2d 1287, 1294-95 (D. Kan. 2002) (citation and footnote omitted).

113. Brodin, *supra* note 96, at 892-93 (discussing and documenting “the prevalence of ‘grandfathering in’ evidence previously admitted in the jurisdiction under less stringent standards[.]”).

114. *See, e.g., Sargon Enters., Inc. v. Univ. of S. Cal.*, 288 P.3d 1237, 1250 (Cal. 2012) (“Under California law, trial courts have a substantial ‘gatekeeping’ responsibility.”).

115. *Herman Schwabe, Inc. v. United Shoe Mach. Corp.*, 297 F.2d 906, 912 (2d Cir. 1962) (internal quotations omitted).

norm and unvalidated claims of individualization continue to be admitted almost entirely without exception.

SECTION 3 – POST-NAS DECISIONAL LAW¹¹⁶

As of April 30, 2013, sixty-five reported decisions cited to, and in many instances discussed, the NAS Report.¹¹⁷ Notwithstanding the Report's conclusion that judges "continue to rely on forensic evidence without fully understanding and addressing the limitations of different forensic science disciplines[.]"¹¹⁸ courts have overwhelmingly declined to revisit admissibility determinations or circumscribe the proposed testimony in pattern and impression evidence cases where the expert testifies to source attribution.

Despite repeated challenges to the admission of latent print expert opinion evidence, courts continue to admit this testimony in an unqualified fashion. The trial in *United States v. Watkins*,¹¹⁹ predated the issuance of the Report. Nonetheless, the appellate court concluded that the admissibility decision was proper, even in light of the Report's conclusions and the fact that the expert testified that the error rate for this discipline is "zero."¹²⁰ The court explained that, "assuming arguendo that the ACE-V method is not error-free, the fact that the fingerprint examiner testified that it was 100% accurate does not by itself mean that the district court erred in determining that the ACE-V method was scientifically valid."¹²¹ This unqualified acceptance of latent prints was also affirmed by Federal District Courts in Georgia, Michigan, California, and Virginia.¹²² The same response has followed in *Frye* jurisdictions.¹²³

The Virginia decision deserves examination because of the proof offered to support the challenge. The defense presented testimony from Professor Jennifer Mnookin, a law professor and scholar in science and the law. As described by the District Court:

116. Jules Epstein, *The NAS and the Courts: A Three-Year Perspective*, in SCIENTIFIC EVIDENCE REVIEW: ADMISSIBILITY AND USE OF EXPERT EVIDENCE IN THE COURTROOM, MONOGRAPH NO. 9 ch. 8, at 459 (Cynthia H. Cwik et al. eds., 2013).

117. LEXIS search parameters "strength! w/5 forensic w/5 science w/12 path and date aft 1/1/2009" conducted April 30, 2013, in "federal and state cases, combined." Occasionally the Report was cited regarding issues unrelated to the subject of this article, such as whether lab reports constitute testimonial hearsay. *See, e.g.*, *Commonwealth v. Greineder*, 984 N.E.2d 804, 808 (Mass. 2013).

118. NAS Report, *supra* note 5, at 85.

119. 450 F. App'x 511, 515 (6th Cir. 2011).

120. *Watkins*, 450 F. App'x at 513, 515.

121. *Watkins*, 450 F. App'x at 515.

122. *United States v. Campbell*, Cr. Case No. 1:11-cr-00460-AT-RGV, 2012 U.S. Dist. LEXIS 86799, at *16, 19 (N.D. Ga. Apr. 19, 2012); *United States v. Stone*, 848 F. Supp. 2d 714, 718 (E.D. Mich. 2012) (rejecting call for outright exclusion); *United States v. Love*, No. 10cr2418-MMM, 2011 U.S. Dist. LEXIS 58390, at *28-29 (S.D. Cal. June 1, 2011); *United States v. Council*, 777 F. Supp. 2d 1006, 1011 (E.D. Va. 2011).

123. *People v. Luna*, 989 N.E.2d 655, 673 (Ill. App. Ct. 2013) ("[U]nder the *Frye* framework in Illinois, various critiques that defendant highlights from the NRC Report go to the weight of the evidence, not to its admissibility . . ."); *State v. Dixon*, 822 N.W.2d 664, 674, 676 (Minn. Ct. App. 2012) (same, and approving expert testifying to a conclusion "to a reasonable scientific certainty[]").

Her research focuses on scientific evidence, particularly forensic science evidence and the validation of the scientific processes underlying forensic science evidence. She is currently a member of a working group of the National Institute of Justice and the National Institute of Standards and Technology that studies the effect of human factors on friction ridge analysis.¹²⁴

Professor Mnookin testified that “ACE-V does not describe a scientific process ACE-V lacks objective criteria to determine whether a print is fit for analysis and comparison and, therefore, relies almost entirely on the experience and intuition of the examiner.”¹²⁵ The District Court acknowledged that “Dr. Mnookin's criticisms of ACE-V's scientific validity track the conclusions offered by the NRC report.”¹²⁶ Nevertheless, the testimony was ruled admissible: “[E]ven widening the circle to include commentators such as Dr. Mnookin and the members of the committee that drafted the NRC report barely changes the balance of opinion. Adding those commentators to the equation does not outweigh the acceptance friction ridge analysis has gained”¹²⁷

While the challengers in the cited federal cases sought outright exclusion of the latent print testimony, it is unclear whether more limited challenges, such as to examiners reporting an individualization to the exclusion of all others or barring testimony claiming a zero error rate, would have resulted in a different outcome—particularly in courts that view the concerns as more appropriate

124. *Council*, 777 F. Supp. 2d at 1009.

125. *Id.* at 1010.

126. *Id.*

127. *Id.* at 1011. The resistance to admissibility challenges has been extended to the exclusion at trial of expert testimony explaining the limits of the current state of knowledge in the field of latent print analysis. In *People v. Gonzalez*, E052000, 2012 Cal. App. Unpub. LEXIS 1294 (Cal. Ct. App. Feb. 22, 2012), the defense sought leave to present Professor Simon Cole, whose doctorate is in science and technology studies, to testify that fingerprint evidence is not reliable.

Cole's belief that fingerprint evidence is not reliable is based upon several factors. The first is that he has searched for but found no studies validating the accuracy of fingerprint identification. In addition, he noted that there are no accepted standards for determining a match. The second is the conclusions of the prepublication version of a report from the National Academy of Sciences entitled "Strengthening Forensic Science in the United States."

Gonzalez, 2012 Cal. App. Unpub. LEXIS 1294, at *6-7. Cole's testimony was excluded because it "would not assist the jurors[.]" a decision upheld on appeal. *Id.* at *7, 8.

for cross-examination.¹²⁸ Overall, the Report has had virtually no impact on trial court acceptance of latent print evidence.¹²⁹

Essentially the same is true with questioned document (handwriting) evidence. Prior to the issuance of the Report, some federal judges limited the conclusions a handwriting expert could draw. As one court directed: “I find [the expert’s] testimony meets Fed. R. Evid. 702’s requirements to the extent that she restricts her testimony to similarities or dissimilarities between the known exemplars and the robbery note. However, she may not render an ultimate conclusion on who penned the unknown writing.”¹³⁰ This response was not uniform, however, as other courts held a contrary view prior to the NAS Report.¹³¹ This accepting view of handwriting expertise has continued unabated even after the Report’s findings. In 2012, and after consideration of the Report, one court approved of the “match” testimony in handwriting (albeit under a *Frye* “general acceptance” standard), and explicitly “reject[ed] appellant’s argument that the NRC Report represents a scientific consensus as to handwriting identification materially different from that established at the evidentiary hearing.”¹³² To date, no reported decision has relied on the NAS Report to restrict a handwriting analyst’s conclusion.¹³³

This categoric approval of impression and pattern evidence is replicated in toolmark identification cases; one court approved testimony by “a tool mark expert that the two sets of [garbage] bags contained markings revealing that they were produced with the same tools and therefore on the same extrusion

128. *See, e.g.*, *United States v. Stone*, 848 F. Supp. 2d 714, 719 (E.D. Mich. 2012) (“Defendants’ criticisms of the ACE-V procedure and concerns about the risks of error such as false positive identifications go to the weight of the evidence and can be explored on cross-examination and/or through presentation of competing evidence.”).

129. In one decision reported in the news media, a state trial judge limited latent print testimony in Florida in 2012. David Ovalle, *Miami-Dade judge rules fingerprint evidence should be restricted*, MIAMI HERALD, Oct. 28, 2012, <http://www.miamiherald.com/2012/10/28/3071658/miami-dade-judge-rules-fingerprint.html> (precluding expert from testifying to a conclusive match). An appellate court subsequently held that the judge should have recused himself and not addressed the latent prints motion because the judge had “acknowledged having preconceived opinions on the subject of fingerprints[]” *State v. Borrego*, 105 So. 3d 616, 619 (Fla. Dist. Ct. App. 2013).

130. *United States v. Hines*, 55 F. Supp. 2d 62, 70-71 (D. Mass. 1999) (limiting expert conclusion and collecting cases with similar rulings).

131. *E.g.*, *United States v. Prime*, 431 F.3d 1147, 1154 (9th Cir. 2005) (permitting the ultimate opinion that the defendant authored the note in question); *United States v. Mooney*, 315 F.3d 54, 63 (1st Cir. 2002) (affirming the district court’s acceptance of handwriting expert “match” testimony and that court’s decision to not follow *Hines*); *United States v. Yass*, No. 08-40008-JAR, 2008 U.S. Dist. LEXIS 102963, at *7 (D. Kan. Dec. 19, 2008) (noting that “every appellate court to have considered the issue of handwriting testimony has held that the expert’s ultimate opinion was admissible”).

132. *Pettus v. United States*, 37 A.3d 213, 226 (D.C. 2012).

133. *See, e.g.*, *United States v. Tarantino*, 08-CR-655 (JS), 2011 U.S. Dist. LEXIS 30662, at *22 (E.D.N.Y. Mar. 23, 2011) (“[T]he [d]efendant’s request to preclude the Government’s handwriting expert is denied, subject to further *voir dire* at trial of the expert’s qualifications and methodologies.”); *State v. Rancipher*, No. 38244-0-II, 2010 Wash. App. LEXIS 594, at *6 (Wash. Ct. App. Mar. 23, 2010) (“Rancipher fails to show how the courts’ longstanding use of handwriting analysis for the purpose of comparing writing samples is improper.”).

line.”¹³⁴ It is only where the particular “expert” has insufficient training that such matching testimony has been disallowed post-Report.¹³⁵

The only category of pattern and impression evidence where there has been modest judicial scrutiny and restriction has been in the field of firearms identification—the matching of ballistics evidence (a fired projectile or cartridge case) to a particular firearm as the source. The greater stringency of the admissibility standard in this field is in one respect ironic, as there has been significant, rigorous study attempting to show that each firearm does leave unique, identifiable markings.¹³⁶ At the same time, the explanation may be found in the amorphous and decidedly subjective threshold used by firearms examiners, which allows testimony as to a match when there is “sufficient” correspondence of features.¹³⁷

Yet even with this non-quantifiable standard of “sufficient,” courts have placed only modest restrictions on firearms identification evidence and rebuffed challenges to its admissibility. As to the latter, one California appellate court upheld a lower court decision which found the NAS Report did not raise sufficient concerns to justify a pre-trial hearing on admissibility.¹³⁸ In *Melcher*, however, the trial court did preclude the expert from saying that no other gun in the world could have left the same markings, but permitted testimony that “the chance of another weapon creating the same pattern was so remote as to be ‘practically impossible.’”¹³⁹

This modest limit on the absoluteness or certainty of the expert’s conclusion is found in some, but not all, of the post-Report firearms evidence

134. *State v. McGuire*, 16 A.3d 411, 429, 437 (N.J. Super Ct. App. Div. 2011) (“[C]onclud[ing] the trial court did not err in admitting the tool mark testimony of [the expert] and his opinion matching the two sets of garbage bags.”). See also *Rodriguez v. State*, 30 A.3d 764, 768-70 (Del. 2011) (approving the admission of tire track and footprint match evidence where the testifying expert was trained primarily in latent print comparison, accepting the trial judge’s assessment that the expert had a “trained eye”).

135. *United States v. Smallwood*, 456 F. App’x 563, 566 (6th Cir. 2012).

136. See, e.g., James E. Hamby et al., *The Identification of Bullets Fired from 10 Consecutively Rifled 9mm Ruger Pistol Barrels: A Research Project Involving 507 Participants from 20 Countries*, 41 ASS’N FIREARM & TOOL MARK EXAM’RS J. 99 (2009). As one study was described:

Bunch and Murphy reported in 2003 on a study in which 10 consecutively manufactured Glock semiautomatic pistol slides were obtained from the factory in Austria. The manufacturing process of the 10 slides - which contain the breechface - was observed and the slides then used to produce test fired cartridge cases for a comprehensive validity study by examiners in the FBI Laboratory’s Firearms-Toolmark Unit (FTU). Using breechface marks, the examiners were able to correctly identify cartridge cases fired by each of the different slides.

Id. at 103.

137. “The theory of identification as it pertains to toolmarks enables opinions of common origin to be made when the unique surface contours of two toolmarks are in sufficient agreement.” *AFTE Theory of Identification*, NAT’L INST. OF JUSTICE, FIREARMS EXAMINER TRAINING, http://www.nij.gov/training/firearms-training/module09/fir_m09_t05_05.htm (last visited Dec. 7, 2013) (account required) (on file with Widener Law Review).

138. *People v. Melcher*, A125507, 2011 Cal. App. Unpub. LEXIS 7222, at *29 (Cal. Ct. App. Sept. 23, 2011).

139. *Id.* at *30.

cases. One court permitted the expert to opine that the cartridge and bullet fragment found at the crime scene were fired by the suspect's weapon, but did so in a context where the expert would not be permitted to express his opinions with any degree of certainty.¹⁴⁰ A slightly greater restriction was imposed in *United States v. Taylor*, where ballistics "match" testimony was permitted, but not to a degree of scientific certainty, nor to the absolute or practical exclusion of all other firearms.¹⁴¹ The permissible qualifier was that the opinion was "within a reasonable degree of certainty in the firearms examination field."¹⁴² Some other courts have responded similarly.¹⁴³

Yet even this type of minimal circumscribing of expert testimony has not been deemed essential. As the New Jersey District Court explained in *United States v. Otero*:

The Court recognizes, as did the National Research Council in *Strengthening Forensic Science in the United States: A Path Forward*, that the toolmark identification procedures discussed in this Opinion do indeed involve some degree of subjective analysis and reliance upon the expertise and experience of the examiner. The Court further recognizes, as did the National Research Council's report, that claims for absolute certainty as to identifications made by practitioners in this area may well be somewhat overblown. The role of this Court, however, is much more limited than determining whether or not the procedures utilized are sufficient to satisfy scientists that the expert opinions are virtually infallible. If that were the requirement, experience-based expert testimony in numerous technical areas would be barred. Such an approach would contravene well-settled precedent on the district court's role in evaluating the admissibility of expert testimony.¹⁴⁴

Otero accepts the lax view for gatekeeping under *Daubert* and Rule 702 and shows the low threshold for gatekeeping forensic opinion "match" evidence. It confirms that if some strictures are to be placed on the definitiveness of forensic match evidence or the level of certainty that experts may use when providing opinion evidence, a mechanism other than the criminal trial process will be necessary. This article next surveys some possible alternatives.

SECTION 4 – ALTERNATIVES TO 'CASE-AND-CONTROVERSY' LITIGATION

140. *United States v. Willock*, 682 F. Supp. 2d 512, 535-36 (D. Md. 2010). In *Willock*, however, the limitation regarding degree of certainty was not imposed by the court but agreed to by the parties. *Id.*

141. *United States v. Taylor*, 663 F. Supp. 2d 1170, 1180 (D.N.M. 2009) (holding that the proffered expert opinion testimony with respect to firearms identification is admissible, but subject to certain limitations and qualifiers).

142. *Id.*

143. *See, e.g.*, *United States v. Willock*, 696 F. Supp. 2d 536, 549 (D. Md. 2010). *Cf.* *Jones v. United States*, 27 A.3d 1130, 1139 (D.C. 2011) ("In light of the government's representation and the growing consensus that firearms examiners should testify only to a reasonable degree of certainty[] . . . we will assume, without deciding, that such experts should not be permitted to testify that they are 100% certain of a match, to the exclusion of all other firearms.").

144. 849 F. Supp. 2d 425, 438 (D.N.J. 2012).

Several mechanisms, other than *Frye/Daubert* challenges in the context of a specific prosecution, have at least the potential for ensuring that forensic evidence is not overstated, but instead presented within the limits of its current knowledge and scientific validity. These modalities—technical working groups, state forensic science commissions, government law enforcement systemic reviews of errors in forensic testimony, and judicial forays into policy and procedure—avoid the tension of adversarial litigation. However, their responsiveness to concerns about accuracy in forensic evidence presentations is often crisis driven. These mechanisms are often created or respond reactively when events cast serious doubt on a category of forensic evidence to a point that it is in the interest of the stakeholders and practitioners to oversee the particular forensic discipline and cabin its efforts.

In one sense the most powerful tool, yet one exercised only rarely, is that of the judiciary—the ultimate consumer of forensic evidence—in setting policy and practice in forensic cases. This occurs when a court, either through rule-making power or in the context of a single case or appeal, establishes a protocol for all future cases involving a specific category of evidence. To date, only two prominent examples responding to the NAS Report can be identified.

The more far-reaching, yet simultaneously limited, move was that of United States District Court Judge Nancy Gertner in 2010, establishing a protocol for all lawyers presenting, or confronted with, “trace” evidence testimony in a criminal case. Judge Gertner established a protocol, albeit one limited to cases in which she was presiding judge, that lawyers:

- “identify whether or not they seek to introduce trace evidence;
- state whether or not either party seeks a *Daubert/Kumho* hearing prior to trial; and,
- state the witnesses required for the *Daubert/Kumho* hearing and the exhibits that the parties seek to admit.”¹⁴⁵

Judge Gertner’s Order also directed court-appointed counsel to notify the court well before trial “whether expert funds are sought to deal with the trace evidence[]”¹⁴⁶

The premise for this order was drawn directly from the NAS Report.

The NAS report suggests a different calculus—that admissibility of such evidence ought not to be presumed; that it has to be carefully examined in each case, and tested in the light of the NAS concerns, the concerns of *Daubert/Kumho* case law, and Rule 702 of the Federal Rules of Evidence. This order is entered to accomplish that end.¹⁴⁷

Nonetheless, although astonishing in its forthrightness and creation of what is essentially an invitation for opponents of such evidence to litigate challenges, the protocol has not resulted in any reported challenge to forensic

145. Procedural Order: Trace Evidence, Case 1:08-cr-10104-NG, at 1 (D. Mass. Mar. 2010) (Gertner, J.), *available at* <http://www.mad.uscourts.gov/boston/pdf/ProcOrderTraceEvidenceUPDATE.pdf> (last visited Dec. 7, 2013).

146. *Id.*

147. *Id.* at 3.

evidence. Judge Gertner retired from the bench in 2011,¹⁴⁸ and she personally acknowledged the limited efficacy of her directive:

But the order is not enough. Counsel have to learn that advocacy in cases involving forensic evidence requires familiarity with the kind of issues the NAS Report raised. And further, courts need to make it clear that such familiarity may be one of the benchmarks in evaluating when assistance of counsel is constitutionally ineffective. To be sure, cases that do so are the exception and not the rule.¹⁴⁹

More subdued, but potentially more consequential, is the decision of the Supreme Judicial Court of Massachusetts in *Commonwealth v. Pytou Heang*.¹⁵⁰ While rejecting a challenge to a murder conviction and, more particularly, rejecting a challenge to “expert forensic ballistics testimony identifying a particular firearm as the one used in the shootings[.]”¹⁵¹ the Massachusetts high court elected to “offer the following guidelines to ensure that expert forensic ballistics testimony appropriately assists the jury in finding the facts but does not mislead by reaching beyond its scientific grasp.”¹⁵² Those “guidelines,” actually in the form of mandates, require that in all future ballistics evidence cases the examiner must:

- document the findings or observations underlying the ultimate opinion;
- provide the documentation during discovery;
- “explain to the jury the theories and methodologies underlying the field of forensic ballistics[.]” *before* an opinion is tendered; and
- when “matching” ballistics evidence to a particular firearm, limit the conclusion to one based upon a “reasonable degree of ballistic certainty.”¹⁵³

Although not a part of the protocol established for such cases, the court emphasized that “[t]he lack of a firm scientific basis proving the uniqueness of individual characteristic toolmarks is a proper subject for both direct examination and cross-examination.”¹⁵⁴

The protocol established for Massachusetts is, by its terms, applicable to one forensic discipline, and thus offers no assurance of strictures in other categories of cases. It also barely circumscribes such testimony, limiting it only in terms of the degree of certainty the examiner may utilize. Thus, while the *Pytou Heang* protocol does much to regularize the mechanics of presenting forensic evidence, and ensure greater amounts of information for both factfinders and lawyers, it leaves largely intact the right of the forensic firearms community to testify as it always has—to an actual match. This resolution is

148. *Harvard Law School appoints Nancy Gertner and Stephen Shay as Professors of Practice*, HARV. L. SCH. (Feb. 4, 2011), http://www.law.harvard.edu/news/2011/02/4_practice.html.

149. Judge Nancy Gertner, *Commentary on The Need for a Research Culture in the Forensic Sciences*, 58 UCLA L. REV. 789, 792 (2011).

150. 942 N.E.2d 927 (Mass. 2011).

151. *Id.* at 932.

152. *Id.* at 944.

153. *Pytou Heang*, 942 N.E.2d at 944-945.

154. *Id.* at 945 n.28.

incompatible with the court's acknowledgment of the NAS Report and the fact that "there is little scientific proof supporting the theory that each firearm imparts 'unique' individual characteristic toolmarks onto projectiles and cartridge cases."¹⁵⁵ This caveat—that the match is only to a "reasonable degree of ballistic certainty"—is likely to fall on deaf ears, as a jury of non-scientists will have no basis for quantifying what "ballistics certainty" is, or is not. Judicial protocols, then, have not proved to be an effective or rigorous mechanism for ensuring that forensic evidence be restricted to its scientifically-validated conclusions—even when courts are willing to impose them.¹⁵⁶

State forensic science commissions have come into being in the recent past; thirteen states have created permanent forensic science oversight bodies by statute, and two other states have had such agencies established by their attorneys general.¹⁵⁷ Yet these commissions are unlikely vehicles for change in the presentation of forensic testimony in court, as their primary focus is on lab performance, with a secondary focus on exposing or responding to fraud. The statutory mandate for New York's commission is illustrative:

The commission shall develop minimum standards and a program of accreditation for all forensic laboratories in New York state, including establishing minimum qualifications for forensic laboratory directors and such other personnel as the commission may determine to be necessary and appropriate, and approval of forensic laboratories for the performance of specific forensic methodologies.¹⁵⁸

In only one reported instance has a forensic science commission even acknowledged the concerns of the NAS Report and the limits of some disciplines in match evidence. A June 2012 meeting of stakeholders in forensic evidence issues, organized by the Texas Forensic Science Commission, resulted in a report that discussed "[p]seudo/junk-science," defined as "'science' introduced as evidence with a lack of adequate underlying research, poor documentation of testing, no repeatable results, no manner of replicating testing, little or insufficient peer review, and an 'individualized'

155. *Id.* at 941.

156. The Massachusetts high court stands out for its willingness to consider and impose protocols, having also done so in cases involving eyewitness identification. *Commonwealth v. Silva-Santiago*, 906 N.E.2d 299, 312 (Mass. 2009) (proposing a protocol to be used by police when showing a witness a photographic array).

157. Robert J. Norris et al., *"Than That One Innocent Suffer": Evaluating State Safeguards Against Wrongful Convictions*, 74 ALB. L. REV. 1301, 1325 (2010-11).

158. N.Y. EXEC. LAW § 995-b(1) (McKinney 2013). The Missouri statute authorizes its commission to assess needs, investigate "allegations of serious negligence or misconduct" and issue reprimands. MO. ANN. STAT. § 650.059(8) (West, Westlaw through end of 2013 First Reg. Sess. of 97th Gen. Assemb.). Minnesota directs its commission to investigate "professional negligence or misconduct that would substantially affect the integrity of the results of a forensic analysis conducted by a laboratory, facility, or entity . . ." MINN. STAT. ANN. § 299C.156(2)(3) (West, Westlaw through end of 2013 First Special Sess.). In Texas, the commission's attention is restricted to "professional negligence or misconduct." TEX. CODE CRIM. PROC. ANN. art. 38.01 (West, Westlaw through end of 2013 Third Called Sess. of 83rd Legis.).

approach to analysis.”¹⁵⁹ The category also includes cases in which scientific principles are overstated in testimony beyond the bounds of scientific integrity, resulting in communication of materially misleading information to a trier of fact. The Texas commission’s report also applied this term to instances where forensic practitioners “overstated in testimony beyond the bounds of scientific integrity, resulting in communication of materially misleading information to a trier of fact.”¹⁶⁰

Having identified concerns, the stakeholders reached no resolution. Instead, they focused on the incapacity of current institutions to address such problems:

There are many limitations in the current adversarial process that make it challenging to identify possible pseudo/junk science. First, defense lawyers are not always competent enough to raise the issues. Second, judges are sometimes reluctant to exclude evidence, and they make poor calls on reliance and reliability. Third, there can be legal precedents in appellate court decisions directly impacting a lower court’s ability to act in pseudo/junk science cases.¹⁶¹

Thus, at most, a science commission might provide a forum for raising issues concerning the limitations of forensic disciplines. The limited authority conferred on such bodies makes further action unlikely, if not off limits entirely.

Scientific and technical or expert working groups (SWGs) are of two types: those with a permanent status that seek to set guidelines and standards within a discipline,¹⁶² and those organized for a particular task such as writing a report¹⁶³ or creating an educational document.¹⁶⁴ One limitation of the

159. *Texas Forensic Science Commission Stakeholder Roundtable Report*, TEXAS FORENSIC SCIENCE COMMISSION 16 (June 6, 2012), <http://www.fsc.state.tx.us/documents/StakeholderRoundtableReport-June62012.pdf>.

160. *Id.*

161. *Id.* at 17.

162. As explained by the Federal Bureau of Investigation:

Since the early 1990s, the FBI Laboratory has led the way in sponsoring Scientific Working Groups (SWG) to improve discipline practices and build consensus with our federal, state, and local forensic community partners. Currently, the FBI Laboratory sponsors eight SWGs:

SWGDAM—DNA Analysis
SWGDE—Digital Evidence
SWGDOC—Questioned Documents
SWGFAST—Latent Fingerprints
SWG GUN—Firearms and Toolmarks
SWGIBRA—Illicit Business Records
SWGIT—Imaging Technologies
SWG MAT—Materials

Dwight E. Adams & Kevin L. Lothridge, *Forensic Science Communications*, FED. BUREAU OF INVESTIGATION (July 2000), <http://www.fbi.gov/about-us/lab/forensic-science-communications/fsc/july2000/swgroups.htm>.

163. *E.g.*, HUMAN FACTORS, *supra* note 27, at vii–viii.

“permanent” groups is membership—it may be drawn entirely from the practitioner community,¹⁶⁵ thereby excluding academic and other critics and/or consumers of the discipline’s output. This insularity brings with it the risk of narrowness in perspective and a diminished propensity to adjust, absent a strong external imperative.¹⁶⁶ The permanent groups are self-regulating as well, and thus not compelled to weigh or respond to evolving science or law.¹⁶⁷ This last point is not intended to diminish the seriousness with which these groups accept their responsibility. Some SWG members have collaborated with academic critics to urge that forensic disciplines be science based.¹⁶⁸ However, neither diversity in membership, nor any legal mandate, propels the SWGs to address scientific limitations in their respective fields.¹⁶⁹

This shortcoming is apparent in the SWGs’ varying treatment of individualization testimony. The SWG for firearms and toolmarks

164. See, e.g., *DNA for the Defense Bar*, DNA INITIATIVE, NAT’L INST. OF JUSTICE (June 2012), <https://www.ncjrs.gov/pdffiles1/nij/237975.pdf>.

165. The members of SWGFAST, the working group on latent prints, are almost exclusively practitioners. See *SWGFAST Members*, SWGFAST (Mar. 27, 2013), <http://www.swgfast.org/Members.htm> (listing members, with only two academic researchers). The members of SWGGUN (firearms and toolmarks) are all practitioners. *SWGGUN Members*, SWGGUN, http://www.swggun.org/swg/index.php?option=com_content&view=article&id=46&Itemid=3 (last visited Jan. 19, 2014). The members of SWGDOC, the forensic document examination group, are all government or private entity examiners. *Members*, SWGDOC, <http://www.swgdoc.org/index.php/about-us/members> (last visited Jan. 19, 2014). Albeit scientists, all members of SWGDAM, but one, are employed in local, state or federal crime laboratories or medical examiner offices. See *SWGDAM Membership 2013*, SWGDAM, <http://www.swgdam.org/members.html> (last visited Jan. 19, 2014).

166. “[I]nsularity [is] another effect of immersion in a narrow field. People come to see the decisions they make from the perspective of the field in which they work and give little weight to other perspectives.” Lawrence Baum, *Probing the Effects of Judicial Specialization*, 58 DUKE L.J. 1667, 1677 (2009) (footnote omitted).

167. The bylaws of SWGGUN, for example, express one purpose of the organization as “[t]o develop a series of consensus guidelines for the firearm and toolmark discipline.” *SWGGUN Bylaws*, SWGGUN, http://www.swggun.org/swg/index.php?option=com_content&view=article&id=44&Itemid=2 (last visited Jan. 19, 2014). Its objectives include discussing and sharing “ideas regarding forensic analysis methods, protocols and research[]” and “monitor[ing] and disseminat[ing] research and technology related to the discipline.” *Id.*

168. Jennifer L. Mnookin et al., *The Need for a Research Culture in the Forensic Sciences*, 58 UCLA L. REV. 725 (2011). Two of the authors of this collaborative piece, Glenn Langenburg and David Stoney, are members of SWGFAST.

169. One SWG, SWGGUN, has taken issue with an earlier NAS Report which stated that “[t]he validity of the fundamental assumptions of uniqueness and reproducibility of firearms-related toolmarks has not yet been fully demonstrated.” NAS Report, *supra* note 5, at 154. The SWGGUN response to the 2004 report was to defend its “science.” “The NAS Committee’s viewpoint is one that has been the subject of countless Daubert hearings throughout state and federal courts. These hearings have concluded that the science of firearm and toolmark identification is valid and well-established within the scientific community.” *SWGGUN NAS Ballistic Study Report Document*, SWGGUN, http://www.swggun.org/swg/index.php?option=com_content&view=article&id=38:nas-ballistic-studydocument&catid=13:other&Itemid=23 (last visited Jan. 19, 2014). This defensive posture, affirming that ballistics is a validated science, was repeated after the 2009 NAS Report. “The reliability of the science has been demonstrated and supported through proficiency tests and validity studies over many decades.” *SWGGUN Systemic Report*, SWGGUN, http://www.swggun.org/swg/index.php?option=com_content&view=article&id=3&Itemid=10 (last visited Jan. 19, 2014).

(SWGgun) continues to endorse individualization testimony and source attribution based upon “sufficient agreement” between the tool and the marked object.¹⁷⁰ The SWG for questioned documents (SWGDOC) also permits source attribution when a document examiner concludes that there is an “identification.”¹⁷¹ The SWG for latent fingerprints (SWGFAST) has tempered its source attribution in latent print cases, concluding that “[t]he ability of a latent print examiner to individualize a single latent impression, with the implication that they have definitely excluded all other humans in the world, is not supported by research and was removed from SWGFAST’s definition of individualization.”¹⁷² However, latent print examiners are still permitted to attest that “the likelihood the impression was made by another (different) source is so remote that it is considered as a practical impossibility[.]”¹⁷³ SWGFAST has proposed only that certain terminology—to the “[e]xclusion of all others” rendered with “100% certainty (as an absolute fact)” by a discipline with “[z]ero error rate” or “infallible method”—should not be used in reports and testimony.¹⁷⁴ Only in DNA analysis is there qualified identification testimony, that of the random match probability—a statement of the probability that another person, randomly selected, would have this combination of genetic markers.¹⁷⁵ The forensic discipline with the greatest scientific support for its conclusions uses the most tempered language in presenting “match” evidence, and, to the extent that the NAS Report

170.

The Theory of Identification as it pertains to the comparison of toolmarks enables opinions of common origin to be made when unique surface contours of two toolmarks are in ‘sufficient agreement’. Agreement is significant when the agreement in individual characteristics exceeds the best agreement demonstrated between toolmarks known to have been produced by different tools and is consistent with the agreement demonstrated by toolmarks known to have been produced by the same tool.

The Foundations of Firearm and Toolmark Identification, SWGGUN, http://www.swggun.org/swg/index.php?option=com_content&view=article&id=66:the-foundations-of-firearm-and-toolmark-identification&catid=13:other&Itemid=43 (last visited Jan. 19, 2014).

171. “The examiner has no reservations whatever, and although prohibited from using the word ‘fact,’ the examiner is certain, based on evidence contained in the handwriting, that the writer of the known material actually wrote the writing in question.” *SWGDOC Terminology for Expressing Conclusions of Forensic Document Examiners*, SWGDOC 1, <http://www.swgdoc.org/images/documents/standards/SWGDOC%20Terminology%20for%20Expressing%20Conclusions%20of%20Forensic%20Document%20Examiners.pdf> (last visited Jan. 19, 2014).

172. *Individualization/Identification Position Statement (Latent/Tenprint)*, SWGFAST 1 (Jan. 6, 2013), <http://www.swgfast.org/Comments-Positions/130106-Individualization-ID-Position-Statement.pdf>.

173. *Id.*

174. *Guideline for the Articulation of the Decision-Making Process for the Individualization in Friction Ridge Examination (Latent/Tenprint)*, REVISED DRAFT FOR COMMENT, SWGFAST 6 (Apr. 27, 2013), http://www.swgfast.org/documents/articulation/130427_Articulation_1.0.pdf [hereinafter SWGFAST Guideline].

175. *SWGDM Interpretation Guidelines for Autosomal STR Typing by Forensic DNA Testing Laboratories*, *supra* note 71; Glossary, *supra* note 71 (“The probability that the DNA in a random sample from the population has the same profile as the DNA in the evidence sample.”).

conclusions as to a lack of scientific validation of match conclusions in pattern and impression evidence are correct, scientific working groups have not acknowledged or accepted the same.

One instance where practitioners within a discipline have engaged with academics, critics, and experts from scientific disciplines has been in the expert working group that produced *Latent Print Examination and Human Factors: Improving the Practice through a Systems Approach*.¹⁷⁶ This working group met over a three year period, with the charge to “examine human factors in latent print analysis and to develop recommendations to reduce the risk of error and improve the practice of latent print analysis.”¹⁷⁷ Operating in a consensus process,¹⁷⁸ the working group concluded the following in terms of “individualization”:

In sum, the existing practice of latent print experts is to provide a firm opinion regarding whether a named individual is the source of a questioned print (either a universal individualization or an exclusion) or to give no opinion (by stating that the unknown impression is insufficient for a definitive comparison or that the comparison is inconclusive). But other ways to describe the possible association include statements about the strength of the evidence (the likelihoods) or the posterior probability. . . . Given the current state of scientific and professional knowledge, however, it is best to avoid testimony based on the theory of global general uniqueness. Recommendation 3.7, that examiners not testify to an identification to the exclusion of all other individuals in the world, requires other, more conservative methods for conveying the probative value of a match. For that reason, this chapter identifies a broad spectrum of alternatives. The Working Group did not reach a consensus on which of these alternatives to universal-individualization testimony is best.¹⁷⁹

What can be seen here are both the power and limitation of the expert working group model. Consensus achieved at least a modest breakthrough: a repudiation of testimony claiming “source attribution to the exclusion of all others in the world.”¹⁸⁰ However, this language in no way contradicts the International Association for Identification¹⁸¹ practice of testimony as to “the likelihood the impression was made by another (different) source is so remote that it is considered as a practical impossibility[.]”¹⁸² which is essentially the same in the eyes and ears of factfinders, and remains without a clear scientific

176. HUMAN FACTORS, *supra* note 27, at vii. The author of this article served as a member of this expert working group.

177. *Id.*

178. *Id.* at viii.

179. HUMAN FACTORS, *supra* note 27, at 138. Recommendation 3.7 reads: “Because empirical evidence and statistical reasoning do not support a source attribution to the exclusion of all other individuals in the world, latent print examiners should not report or testify, directly or by implication, to a source attribution to the exclusion of all others in the world.” *Id.* at 72.

180. *Id.*

181. The International Association for Identification is “the oldest and largest forensic association in the world[.]” and its members “assemble[] to educate, share, critique and publish methods, techniques and research in the physical forensic science disciplines.” *See The International Association for Identification*, <http://www.theiai.org/> (last visited Jan. 19, 2014).

182. SWGFAST Guideline, *supra* note 174, at 5.

foundation. Also, at least one expert group member has endorsed the concept of uniqueness (and implicitly the ability to perform source attribution to the exclusion of all others in the world) in a guide to latent print examination published almost contemporaneously with the Human Factors report.¹⁸³ In sum, the Human Factors report, as a consensus document, offered only modest limitations on expert testimony and has only exhortatory status.

The final principal mechanism for reforming forensic testimony is found in internal law enforcement policy changes. These have historically been crisis-driven, only occurring after years of resistance to challenges or uncritical acceptance of exaggerated or inaccurate claims. Paradigmatic is the FBI response to comparative bullet lead analysis (CBLA), a forensic technique in which analyses were conducted since the 1960s¹⁸⁴ “to determine the concentrations of seven elements—arsenic, antimony, tin, copper, bismuth, silver, and cadmium—in the bullet lead alloy of both the crime-scene and suspect’s bullets.”¹⁸⁵ While the metallurgic analysis of the components was a valid science, the statistical projections and significance were unjustified. The National Research Council (NRC) identified three deficiencies:

- “The available data do not support any statement that a crime bullet came from a particular box of ammunition. In particular, references to “boxes” of ammunition in any form should be avoided as misleading under Federal Rule of Evidence 403.
- Compositional analysis of bullet lead data alone also does not permit any definitive statement concerning the date of bullet manufacture.
- Detailed patterns of the distribution of ammunition are unknown, and as a result, experts should not testify as to the probability that the crime scene bullet came from the defendant. Geographic distribution data on bullets and ammunition are needed before such testimony can be given.”¹⁸⁶

What prompted the NRC review was, essentially, an act of whistleblowing by a former FBI lab scientist who published articles and began offering testimony to challenge the statistical evidence offered by the Government.¹⁸⁷ Coupled with this was the determination that an FBI analyst had lied—under

183. John R. Vanderkolk, *Examination Process*, in THE FINGERPRINT SOURCEBOOK, NAT’L INST. OF JUSTICE ch. 9, at 9-4, <https://www.ncjrs.gov/pdffiles1/nij/225320.pdf> (last visited Jan. 19, 2014).

184. FORENSIC ANALYSIS: WEIGHING BULLET LEAD EVIDENCE, NAT’L RESEARCH COUNCIL OF THE NAT’L ACADS. 1 (2004) [hereinafter NRC FORENSIC ANALYSIS], *available at* http://www.nap.edu/catalog.php?record_id=10924 (account required) (on file with Widener Law Review).

185. Paul C. Giannelli, *Comparative Bullet Lead Analysis: A Retrospective 1* (Case Research Paper Series in Legal Studies, Working Paper No. 2011-21, Sept. 2011), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1920984.

186. NRC FORENSIC ANALYSIS, *supra* note 184, at 7.

187. Giannelli, *supra* note 185, at 2 (citing Edward J. Imwinkelried & William A. Tobin, *Comparative Bullet Lead Analysis (CBLA) Evidence: Valid Inference or Ipse Dixit?*, 28 OKLA. CITY U. L. REV. 43, 63 (2003)).

oath—concerning a CBLA analysis.¹⁸⁸ As a consequence, the FBI requested the NRC assessment.¹⁸⁹

The FBI response was significant, albeit at times inconsistent or slow. In 2005, it announced, “after extensive study and consideration, it [would] no longer conduct the examination of bullet lead.”¹⁹⁰ The Bureau undertook an internal investigation of the 2,500 cases (approximately) where CBLA evidence was used in the investigation, and in cases where such testimony was presented in court, the Bureau sent letters to notify prosecutors that testimony from its experts “exceeds the limits of the science and cannot be supported by the FBI[]”¹⁹¹ The pace of notification was criticized, particularly because of the failure to ensure defendants received notification and the time limits imposed by many states for claims based upon newly-discovered evidence.¹⁹² Furthermore, the content of the notification was challenged as misleading and incomplete.¹⁹³ Ultimately, however, the FBI entered into a collaborative effort

188. *Ragland v. Commonwealth*, 191 S.W.3d 569, 580-81 (Ky. 2006).

189. NRC FORENSIC ANALYSIS, *supra* note 184, at 2. The Federal Bureau of Investigation (FBI) asked the National Research Council to conduct an impartial scientific assessment of the soundness of the principles underlying CABL, the optimal manner for conducting an examination with CABL, and the scientifically valid conclusions that can be reached with CABL. *Id.*

190. Press Release, Fed. Bureau of Investigation, FBI Laboratory Announces Discontinuation of Bullet Lead Examinations (Sept. 1, 2005), *available at* <http://www.fbi.gov/news/pressrel/press-releases/fbi-laboratory-announces-discontinuation-of-bullet-lead-examinations>.

191. Associated Press, *Discredited bullet evidence: 5 years in, FBI still hasn't finished review of 2,500 cases*, CLEVELAND.COM (Jan. 18, 2010), http://www.cleveland.com/nation/index.ssf/2010/01/discredited_bullet_evidence_5.html.

192. John Solomon, *FBI's Forensic Test Full of Holes; Lee Wayne Hunt is one of hundreds of defendants whose convictions are in question now that FBI forensic evidence has been discredited*, WASH. POST, Nov. 18, 2007, at A1. Many states impose strict and abbreviated time limits for asserting claims of newly-discovered evidence. Daniel S. Medwed, *Up the River Without a Procedure: Innocent Prisoners and Newly Discovered Non-DNA Evidence in State Courts*, 47 ARIZ. L. REV. 655, 660 n.27 (2005); *see also* *Herrera v. Collins*, 506 U.S. 390, 410-11 (1993) (listing state statutes of limitation). A compounding problem is that many jurisdictions require that the new evidence “must not have been available at the time of trial with due diligence.” Brandon L. Garrett, *Claiming Innocence*, 92 MINN. L. REV. 1629, 1671 (2008). Claims seeking new trials based on the questionable CBLA testimony have been rejected on this or related grounds. *E.g.*, *United States v. Higgs*, 663 F.3d 726, 743 (4th Cir. 2011) (rejecting claim and characterizing this as “merely impeachment evidence”); *Commonwealth v. Kretchmar*, 971 A.2d 1249, 1256 (Pa. Super. Ct. 2009) (deeming claim untimely as an earlier (2004) NRC report should have put the incarcerated inmate on notice of the alleged deficiencies in CBLA evidence, making later FBI statements irrelevant in the timeliness assessment). *But see* *Wyatt v. State*, 71 So. 3d 86, 99 (Fla. 2011) (finding a petition timely when filed after receipt of the FBI letter, but ultimately denying that the letter warranted a new trial).

193. One such letter, sent by the FBI in 2010, stated that:

Science does not support the statement or inference that bullets, shot pellets, or bullet fragments can be linked to a particular box of bullets. Further, any testimony stating bullets came from the same source of lead is potentially misleading without additional information regarding approximate numbers of other “analytically indistinguishable” bullets that also originated from that same source. . . .

with the National Association of Criminal Defense Lawyers and the Innocence Project to review such cases and ensure notification to defendants.¹⁹⁴ A similar process is now being deployed in cases where examiners testified to hair comparison evidence,¹⁹⁵ testimony since brought into question by DNA exonerations.¹⁹⁶

However significant the FBI response, it remains subject to criticism for reasons extending beyond its halting, and less than complete remediation, of the problem. It does not stand as proof that internal mechanisms can, and will, catch flawed or over-stated forensic matching testimony. The FBI was aware, as early as 1991, that there was questionable validity to the type of statements its experts were offering in trials. In that year, an internal study cast doubt on the significance of its experts' testimony in cases where crime scene evidence and bullets seized from a suspect had the same metallurgic composition. Two flaws were identified: (1) the FBI study found that bullets packaged 15 months apart (and thus likely from different 'batches') had the

After reviewing the testimony of the FBI's examiner, it is the opinion of the FBI Laboratory that the examiner properly testified that the examination revealed that the evidentiary specimen(s) probably came from the same melt of lead. However, the reviewers felt that the examiner did not provide sufficient information to the jury to allow them to understand the number of bullets (or shot pellets) made from the melt. Without having evidence concerning the approximate number of the bullets produced from a single melt, the jury could have misunderstood the probative value of this evidence.

Motion for Appropriate Relief, N.C. OFFICE OF INDIGENT DEF. SERVS., www.ncids.com/forensic/firearms/CBLA_MAR.doc (last visited Jan. 19, 2014). An earlier criticism of such letters was that they "were minimizing the significance of the error in the first place[. . .]. The letters said that 'our science wasn't really inaccurate. Our interpretation was wrong. But the interpretation is everything.'" Solomon, *supra* note 192.

194. *Three Freed, and FBI Continues to Review Ballistic Cases*, INNOCENCE BLOG, INNOCENCE PROJECT (Jan. 19, 2010, 5:40 PM), http://www.innocenceproject.org/Content/Three_Freed_and_FBI_Continues_to_Review_Ballistic_Cases.php.

195. In 2012, the FBI announced that:

The validity of the science of microscopic hair comparison is not at issue; however, based on recent cases, the FBI and Department of Justice are committed to undertaking a review of historical cases that occurred prior to the regular use of mitochondrial DNA testing to ensure that FBI testimony at trial properly reflects the bounds of the underlying science.

Press Release, Fed. Bureau of Investigation, FBI Clarifies Reporting on Microscopic Hair Comparisons Conducted by the Laboratory (July 13, 2012), *available at* <http://www.fbi.gov/news/pressrel/press-releases/fbi-clarifies-reporting-on-microscopic-hair-comparisons-conducted-by-the-laboratory>. The announcement of the review confirmed that it would involve a collaboration with the Innocence Project and the National Association of Criminal Defense Lawyers. Spencer S. Hsu, *Flawed forensics spur case reviews*, WASH. POST, July 11, 2012, at A1.

196. A review of 137 DNA exoneration cases with available transcripts showed that "[s]ixty-five of the trials examined involved microscopic hair comparison analysis. Of those, 25—or 38%—had invalid hair comparison testimony. Most (18) of these cases involved invalid individualizing claims." Brandon L. Garrett & Peter J. Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions*, 95 VA. L. REV. 1, 47 (2009).

same composition, calling into question the theory that each batch was unique; and (2) it found that bullets in a single box often had varying compositions—a finding the report noted could have “significant impact on interpretation of results in forensic cases.”¹⁹⁷ Continuing a practice for a dozen years until an insider speaks out and voices the concerns in public repudiates the idea that internal mechanisms are a viable tool to “police” forensic evidence. What prompted internal corrective measures were crises: a well-credentialed insider attack on the purported science, and a massive accumulation of DNA exonerations confirming the invalidity of individualization testimony and the resulting convictions.

CONCLUSION

The proverb quoted at the beginning of this article, “[a] single conversation with a wise man is better than ten years of study,” captures the consequence of how the judiciary and non-judicial bodies have, for the most part, addressed non-validated forensic evidence testimony. Without crises—particularly internal whistleblowers and a critical mass of DNA exonerations—a tolerance of prevailing “wise man” testimony is the norm.

Absent a reinvigoration of the *Daubert* and *Frye* standards, as applied in criminal cases, or judicial acceptance of the call for heightened scrutiny for categories of evidence that have been shown to result in erroneous or wrongful convictions,¹⁹⁸ it seems unlikely that any institution, as currently constituted, will propel the forensic disciplines to constrain their testimony and conclusions in a manner consistent with the determinations of the NAS Report. That there is some possibility of change cannot be denied, particularly as organizations such as Innocence Projects continue to have a “seat at the table” and gain visibility and credibility.¹⁹⁹ To be watched are two entities/endeavors. The first is the Subcommittee on Forensic Science (SoFS) of the White House’s National Science and Technology Council, which was tasked in 2012 to “create a White Paper that summarizes the SoFS’s recommended path forward for achieving the NRC report’s goals.”²⁰⁰ The second is the “National Commission on Forensic Science,” an entity intended

197. Solomon, *supra* note 192.

198. Keith A. Findley, *Judicial Gatekeeping of Suspect Evidence: Due Process and Evidentiary Rules in the Age of Innocence*, 47 GA. L. REV. 723, 772 (2013) (calling for the United States Supreme Court to “reconceive its due process framework” and/or for courts nationally to “employ the rules of evidence (either as currently drafted or amended) to demand rigorous, empirically based pretrial review of reliability and to construct remedies that courts might actually implement[.]”).

199. The importance of the Innocence Projects cannot be doubted. In addition to their collaborations with the FBI on hair microscopy and CBLA cases, *see supra* notes 190-94, a member of the Innocence Project was an invited observer/participant in the expert working group that produced the Human Factors report on latent prints. *See HUMAN FACTORS*, *supra* note 27, at xi (identifying “Sarah Chu, Innocence Project” as a contributor).

200. *Charter of the Subcomm. on Forensic Sci.*, COMM. ON SCI., NAT’L SCI. & TECH. COUNCIL 1, http://www.whitehouse.gov/sites/default/files/sofs_charter_2012_signed.pdf (last visited Jan. 19, 2014). The Charter referenced draft reports, “each focused on a specific NRC report recommendation and approved by the SoFS membership[.]” prepared by an earlier incarnation of this Subcommittee. *Id.* Those draft reports are not yet public.

to “recommend strategies for enhancing quality assurance in forensic science unit[,] . . . [including] developing proposed guidance concerning the intersection of forensic science and the courtroom”²⁰¹ Yet the modest language, to develop “proposed guidance,” shows the lack of legal authority the Commission will have. Without another crisis, we may remain in the straits described by Asimov—that of scientific knowledge surpassing, but not being accepted as, societal wisdom.

201. Notice of Establishment of the Nat’l Comm’n on Forensic Sci. & Solicitation of Applications for Comm’n Membership, 78 Fed. Reg. 12355 (Feb. 22, 2013). On January 10, 2014, the United States Department of Justice announced the commissioners, who will include “federal, state and local forensic science service providers; research scientists and academics; law enforcement officials; [and] prosecutors, defense attorneys and judges[]. . . .” *U.S. Departments of Justice and Commerce Name Experts to First-ever National Commission on Forensic Science*, U.S. DEPT’ OF JUSTICE (Jan. 10, 2014), <http://www.justice.gov/opa/pr/2014/January/14-at-029.html>. The author of this Article is one of the thirty Commissioners. The opinions expressed herein are in no way meant to represent the opinion of the Commission.