

DAUBERT AND FORENSIC SCIENCE: THE PITFALLS OF LAW ENFORCEMENT CONTROL OF SCIENTIFIC RESEARCH

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In 2009, the National Academy of Sciences (NAS) published a landmark report on forensic science: Strengthening Forensic Science in the United States: A Path Forward. The Report represents one of the most important developments in forensic science since the establishment of the crime laboratory in the 1920s. Within months, Justice Scalia cited the Report in Commonwealth v. Melendez-Diaz, noting that “[s]erious deficiencies have been found in the forensic evidence used in criminal trials” and “[f]orensic evidence is not uniquely immune from the risk of manipulation.” After two years of studying fingerprints, handwriting, ballistics, and other common forensic techniques, the Academy concluded that “some forensic science disciplines are supported by little rigorous systematic research to validate the discipline’s basic premises and techniques.” Indeed, “only nuclear DNA analysis has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between an evidentiary sample and a specific individual or source.”

The NAS Report’s centerpiece is a proposal to establish an independent federal agency, the National Institute of Forensic Science, to control funding and research in the field. This proposal, which is now before Congress, wrests control of forensic science from law enforcement and was attacked by government agencies before the Report was even released. Although the Report made clear that the Department of Justice, through the FBI Crime Laboratory and National Institute of Justice, had failed in its obligation to improve forensic science, the Report did not provide details of this failure. This Article supplies those details, documenting how government agencies manipulated science at the expense of both science and justice. As the Report notes, basic research in the forensic sciences is weak. Yet, the on-

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ly agency currently capable of funding that research, the Department of Justice, has hindered efforts to conduct independent scientific studies.

“Forensic evidence is not uniquely immune from the risk of manipulation.”—Justice Scalia (2009)¹

I. INTRODUCTION

The National Academy of Sciences (NAS) Report on forensic science provides a searing critique of the field.² Released in 2009, the Report’s findings are disturbing: “Among existing forensic methods, only nuclear DNA analysis has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between an evidentiary sample and a specific individual or source.”³ Moreover, “some forensic science disciplines are supported by little rigorous systematic research to validate the discipline’s basic premises and techniques. There is no evident reason *why* such research cannot be conducted.”⁴

Coming after a congressionally-funded two-year study, which included a review of fingerprint examinations, handwriting comparisons, firearm identifications (ballistics), and other common forensic techniques, these findings by one of the nation’s most prestigious scientific organizations are riveting. After all, fingerprints have been admitted as evidence since 1911.⁵ Soon afterwards handwriting⁶ and ballistics⁷ were

1. *Melendez-Diaz v. Massachusetts*, 129 S. Ct. 2527, 2536 (2009). The Court also observed: “Serious deficiencies have been found in the forensic evidence used in criminal trials.” *Id.* at 2537.

2. NAT’L RESEARCH COUNCIL, NAT’L ACAD. OF SCIS., STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD (2009) [hereinafter NAS FORENSICS REPORT]. On November 22, 2005, the Science, State, Justice, Commerce, and Related Agencies Appropriations Act of 2006 became law. Pub. L. No. 109-108, 119 Stat. 2290 (2005). The statute authorized “the National Academy of Sciences to conduct a study on forensic science, as described in the Senate report.” H.R. REP. NO. 109-272, at 121 (2005) (Conf. Rep.). The Senate Report states:

While a great deal of analysis exists of the requirements in the discipline of DNA, there exists little to no analysis of the remaining needs of the community outside of the area of DNA. Therefore . . . the Committee directs the Attorney General to provide [funds] to the National Academy of Sciences to create an independent Forensic Science Committee. This Committee shall include members of the forensics community representing operational crime laboratories, medical examiners, and coroners; legal experts; and other scientists as determined appropriate.

S. REP. NO. 109-88, at 46 (2005). The Committee was appointed in the fall of 2006. NAS FORENSICS REPORT, *supra*, at 2.

3. NAS FORENSICS REPORT, *supra* note 2, at 100.

4. *Id.* at 22 (emphasis added).

5. See *People v. Jennings*, 96 N.E. 1077, 1082 (Ill. 1911). See generally 1 PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, JR., SCIENTIFIC EVIDENCE ch. 16 (4th ed. 2007) (discussing the scientific and legal issues associated with fingerprint identification).

6. See D. Michael Risinger et al., *Exorcism of Ignorance as a Proxy for Rational Knowledge: The Lessons of Handwriting Identification “Expertise,”* 137 U. PA. L. REV. 731, 762 (1989). Handwriting comparison testimony was used extensively at the Lindbergh kidnapping trial in 1935. *Id.* at 770. See generally 2 GIANNELLI & IMWINKELRIED, *supra* note 5, ch. 21 (discussing the scientific and legal issues associated with questioned document examinations).

7. The Sacco and Vanzetti trial in 1921 was one of the earliest cases to rely on firearms identification evidence. See G. LOUIS JOUGHIN & EDMUND M. MORGAN, THE LEGACY OF SACCO AND

judicially sanctioned as well. Yet, the NAS Report found that (1): “Sufficient studies [on firearms identification] have not been done to understand the reliability and repeatability of the methods,”⁸ (2) “[t]he scientific basis for handwriting comparisons needs to be strengthened,”⁹ (3) research is needed “[t]o properly underpin the process of friction ridge [fingerprint] identification,”¹⁰ and (4) “testimony linking microscopic hair analysis with particular defendants is highly unreliable.”¹¹ These problems are exacerbated by “exaggerated” testimony,¹² such as claims of perfect accuracy,¹³ infallibility,¹⁴ and zero error rates.¹⁵ The lack of standards in examining evidence was also considered troubling: “Often there are no standard protocols governing forensic practice in a given discipline. And, even when protocols are in place . . . , they often are vague and not enforced in any meaningful way.”¹⁶ In addition, a technique’s limitations need to be acknowledged in both court testimony and laboratory reports.¹⁷

The Report’s capstone is a proposal to create an independent federal agency, the National Institute of Forensic Science (NIFS), to control funding and research in the field.¹⁸ The NAS Committee “strongly believe[d] that the greatest hope for success in [reform] will come with the creation of the [NIFS] to oversee and direct the forensic science community. The remaining recommendations in th[e] report are crucially tied to the creation of NIFS.”¹⁹ Among other tasks, the NIFS would be respon-

VANZETTI 10, 14–16 (1948); *see also* James E. Starrs, *Once More unto the Breach: The Firearms Evidence in the Sacco and Vanzetti Case Revisited: Part II*, 31 J. FORENSIC SCI. 1050 (1986). *See generally* 1 GIANNELLI & IMWINKELRIED, *supra* note 5, ch. 14 (discussing the scientific and legal issues associated with firearms and tool mark identifications).

8. NAS FORENSICS REPORT, *supra* note 2, at 154.

9. *Id.* at 166.

10. *Id.* at 144.

11. *Id.* at 161. The Report also states: “There is no science on the reproducibility of the different methods of [bite mark] analysis that lead to conclusions about the probability of a match.” *Id.* at 174.

12. *Id.* at 4 (“[I]mprecise or exaggerated expert testimony has sometimes contributed to the admission of erroneous or misleading evidence.”).

13. *Id.* at 47 (“The insistence by some forensic practitioners that their disciplines employ methodologies that have perfect accuracy and produce no errors has hampered efforts to evaluate the usefulness of the forensic science disciplines.”).

14. *Id.* at 104.

15. *Id.* at 143 (“Some in the latent print community [assert] that the method itself, if followed correctly . . . has a zero error rate. Clearly, this assertion is unrealistic The method, and the performance of those who use it, are inextricably linked, and both involve multiple sources of error (e.g., errors in executing the process steps, as well as errors in human judgment).”); *see also id.* at 142.

16. *Id.* at 6.

17. *Id.* at 21–22 (“Forensic reports, and any courtroom testimony stemming from them, must include clear characterizations of the limitations of the analyses, including measures of uncertainty in reported results and associated estimated probabilities where possible.”).

18. *Id.* at 19–20 (Recommendation 1). This agency would have an “administrator and an advisory board with expertise in research and education, the forensic science disciplines, physical and life sciences, forensic pathology, engineering, information technology, measurements and standards, testing and evaluation, law, national security, and public policy.” *Id.* at 19.

19. *Id.* at 20. Other recommendations include the accreditation of crime laboratories, funding research to determine the reliability of forensic evidence, and undertaking studies on the consequences of human observer bias. *Id.* at 22–25.

sible for: (1) “establishing and enforcing best practices for forensic science professionals and laboratories”; (2) setting standards for the mandatory accreditation of crime laboratories and the mandatory certification of examiners; (3) “promoting scholarly, competitive peer-reviewed research and technical development” in the forensic sciences; and (4) “developing a strategy to improve forensic science research.”²⁰ This proposal wrests control of forensic science from law enforcement, a controversial but needed reform. A related recommendation urges the removal of crime laboratories from the administrative control of the police.²¹

While the NAS Report made clear that the Department of Justice (DOJ), through the FBI Crime Laboratory and National Institute of Justice (NIJ), had failed in its obligation to improve forensic science—thus creating the need for a new independent agency—it did not provide evidence to support this critical judgment. The Report did state that forensic evidence should be equally available to the police, prosecutors, and defense and that there was the “potential” for conflicts of interest between the needs of law enforcement and those of forensic science.²² But these reasons by themselves would not justify an entirely new entity.²³ The Committee also found that “the research funding strategies of DOJ have not adequately served the broad needs of the forensic science community.”²⁴ This concern, however, could also have been addressed without the creation of the NIFS.

The Report came closer to the mark when it determined that some federal entities are “too wedded” to the status quo and “have failed to pursue a rigorous research agenda to confirm the evidentiary reliability of methodologies used in a number of forensic science disciplines.”²⁵ As a result, these “agencies are not good candidates to oversee the overhaul of the forensic science community.”²⁶ There is little question that the Committee was referring to the NIJ and the FBI Laboratory. The Report noted that, although both had provided “modest leadership” in forensic science, “neither entity has recognized, let alone articulated, a need for change or a vision for achieving it.”²⁷ Consequently, “advancing

20. *Id.* at 19–20.

21. *Id.* at 24 (Recommendation 4). See generally Paul C. Giannelli, *Independent Crime Laboratories: The Problem of Motivational and Cognitive Bias*, 2010 UTAH L. REV. 247 (discussing the controversy surrounding the NAS recommendation for the removal of crime laboratories from the administrative control of law enforcement agencies).

22. NAS FORENSICS REPORT, *supra* note 2, at 17.

23. For example, there are other ways to provide defense expertise. See Paul C. Giannelli, *Ake v. Oklahoma: The Right to Expert Assistance in a Post-Daubert, Post-DNA World*, 89 CORNELL L. REV. 1305, 1416–18 (2004).

24. NAS FORENSICS REPORT, *supra* note 2, at 18.

25. *Id.*

26. *Id.*

27. *Id.* at 16. The Report also stated: “Neither has the full confidence of the larger forensic science community. And because both are part of a prosecutorial department of the government, they

science in the forensic science enterprise is not likely to be achieved within the confines of DOJ.”²⁸ These are conclusions, however. The Committee gave no explanation of how it reached them.²⁹

This Article argues that there is more than adequate support for the Report’s conclusions that meaningful reform requires an independent agency. Scientific values are often antithetical to law enforcement values—or at least frequently perceived to be so by prosecutors and police. In particular, the notion of transparency has repeatedly been trumped by an adversarial process that favors trial by ambush. As Sheila Jasanoff has reminded us: “Science and secrecy do not sit comfortably together.”³⁰ The DOJ, the FBI Crime Laboratory, and some prosecutors have attempted to shape science by controlling the research agenda, hiding unwelcomed test results, attacking legitimate studies that were considered unfavorable, harassing scientists who disagreed with them, and “spinning” these issues in the press. Indeed, the NIJ attempted to subvert the recent NAS Report before it was even released.³¹ This conduct is troubling precisely because it involves the government. Paradoxically, these are the very agencies of government that are entrusted to be “ministers of justice.”³² The problem is exacerbated by the fact that the DOJ and FBI Laboratory control the funding of research in forensic science.

An understanding of the NAS Report requires some appreciation of the developments that led Congress to authorize the NAS study in the first place, a subject addressed in Part II of this Article. Parts III through V examine law enforcement manipulation of science in three areas—DNA profiling, fingerprinting, and comparative analysis of bullet lead.³³

could be subject to subtle contextual biases that should not be allowed to undercut the power of forensic science.” *Id.*

28. *Id.* at 18.

29. Perhaps, in drawing a blueprint for the future, the NAS Committee wanted to avoid unnecessary controversy. The Report’s title emphasizes this point—“A Path Forward.”

30. Sheila Jasanoff, *Transparency in Public Science: Purposes, Reasons, Limits*, 69 *LAW & CONTEMP. PROBS.* 21, 21 (2006).

31. *See infra* Part VI.

32. In a famous passage, the Supreme Court wrote:

The United States Attorney is the representative not of an ordinary party to a controversy, but of a sovereignty whose obligation to govern impartially is as compelling as its obligation to govern at all; and whose interest, therefore, in a criminal prosecution is not that it shall win a case, but that justice shall be done. As such, he is in a peculiar and very definite sense the servant of the law, the twofold aim of which is that guilt shall not escape or innocence suffer. He may prosecute with earnestness and vigor—indeed, he should do so. But, while he may strike hard blows, he is not at liberty to strike foul ones. It is as much his duty to refrain from improper methods calculated to produce a wrongful conviction as it is to use every legitimate means to bring about a just one.

Berger v. United States, 295 U.S. 78, 88 (1935).

33. These are not the only examples. Government-sponsored research into handwriting comparisons provides another illustration. Professor Michael Saks “has repeatedly requested the data from those [handwriting] studies for purposes of re-examination, and has repeatedly been denied, despite the fact that the youngest of the data sets is now well over three years old and hence well beyond the usual two-year presumptive period of exclusive use.” D. Michael Risinger & Michael J. Saks, *Rationality, Research and Leviathan: Law Enforcement-Sponsored Research and the Criminal Process*, 2003 *MICH. ST. L. REV.* 1023, 1045 (citation omitted). These authors also write: “Various strategies appear to have been used to insure that any positive results will be exaggerated and any negative results will

Part VI discusses NIJ efforts to undermine the NAS Report. This Article concludes by urging Congress to establish the NIFS, as recommended by the NAS.

II. THE PARADIGM SHIFT IN FORENSIC SCIENCE

The advent of DNA profiling in the late 1980s,³⁴ followed by the U.S. Supreme Court's decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.* in 1993,³⁵ drastically altered the legal landscape for scientific evidence—triggering a “paradigm shift” in the view of some commentators.³⁶ DNA evidence became the “gold standard” in forensic science,³⁷ and *Daubert* revolutionized how courts scrutinized expert testimony.³⁸

A. *The Impact of DNA Profiling*

The battles over the admissibility of DNA evidence³⁹ led to two studies by the NAS, which issued reports noting the importance of certain practices. For example, “[n]o laboratory should let its results with a new DNA typing method be used in court, unless it has undergone . . . proficiency testing via blind trials.”⁴⁰ This requirement was unheard of in forensic science, and commentators did not wait long to point out the possible far-reaching implications that DNA profiling might have for other forensic techniques. Citing DNA profiling, Professors Saks and Koehler wrote in 1991 that

be glossed over.” *Id.* at 1042; see also D. Michael Risinger et al., *Brave New “Post-Daubert World”—A Reply to Professor Moenssens*, 29 SETON HALL L. REV. 405, 430–33 (1998) (discussing early refusals to share data from government-funded research on handwriting).

34. See *infra* notes 91–95 and accompanying text.

35. 509 U.S. 579 (1993). The Court followed with *General Electric Co. v. Joiner*, 522 U.S. 136 (1997), and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999), to make up what is known as the *Daubert* trilogy. *Daubert* is one of the most important evidence cases ever decided. See *United States v. Alatorre*, 222 F.3d 1098, 1100 (9th Cir. 2000) (“*Daubert* has become ubiquitous in federal trial courts.”); *United States v. Barnette*, 211 F.3d 803, 815 (4th Cir. 2000) (“In *Daubert*, the Supreme Court radically changed the standard for admissibility of scientific testimony.”).

36. Michael J. Saks & Jonathan J. Koehler, Review, *The Coming Paradigm Shift in Forensic Identification Science*, 309 SCIENCE 892, 894–95 (2005).

37. See Michael Lynch, Review, *God's Signature: DNA Profiling, the New Gold Standard in Forensic Science*, 27 ENDEAVOUR 93 (2003); Joseph L. Peterson & Anna S. Leggett, *The Evolution of Forensic Science: Progress Amid the Pitfalls*, 36 STETSON L. REV. 621, 654 (2007) (“The scientific integrity and reliability of DNA testing have helped DNA replace fingerprinting and made DNA evidence the new ‘gold standard’ of forensic evidence.”).

38. See David L. Faigman, *Is Science Different for Lawyers?*, 297 SCIENCE 339, 340 (2002) (“*Daubert* initiated a scientific revolution in the law.”).

39. See generally William C. Thompson, *Evaluating the Admissibility of New Genetic Identification Tests: Lessons from the “DNA War,”* 84 J. CRIM. L. & CRIMINOLOGY 22 (1993) (discussing the controversy surrounding DNA admissibility and lessons to be derived from the debate).

40. NAT'L RESEARCH COUNCIL, NAT'L ACAD. OF SCIS., DNA TECHNOLOGY IN FORENSIC SCIENCE 55 (1992) [hereinafter NAS DNA REPORT I]. A second report followed. See NAT'L RESEARCH COUNCIL, NAT'L ACAD. OF SCIS., THE EVALUATION OF FORENSIC DNA EVIDENCE (1996) [hereinafter NAS DNA REPORT II]. The FBI requested and funded both reports. The second report also recommended proficiency testing. *Id.* at 88 (“Recommendation 3.2: Laboratories should participate regularly in proficiency tests, and the results should be available for court proceedings.”).

[F]orensic scientists, like scientists in all other fields, should subject their claims to methodologically rigorous empirical tests. The results of these tests should be published and debated. Until such steps are taken, the strong claims of forensic scientists must be regarded with far more caution than they traditionally have been.⁴¹

In addition to establishing a new gold standard, DNA evidence had two other important consequences. First, it focused attention on the lack of regulation of crime laboratories. In 1989, Eric Lander, a prominent molecular biologist who became enmeshed in the early DNA admissibility disputes, wrote: “At present, forensic science is virtually unregulated—with the paradoxical result that clinical laboratories must meet higher standards to be allowed to diagnose strep throat than forensic labs must meet to put a defendant on death row.”⁴²

Second, the use of DNA profiling to exonerate innocent convicts led to a reexamination of the types of evidence admitted to secure their convictions.⁴³ Some studies indicated that, after eyewitness testimony, forensic identification evidence was the most common type of testimony that jurors relied on in returning erroneous verdicts.⁴⁴ Flawed forensic analyses played a significant role in many of these miscarriages of justice.⁴⁵ For example, although bite mark evidence had been admitted at

41. Michael J. Saks & Jonathan J. Koehler, *What DNA “Fingerprinting” Can Teach the Law About the Rest of Forensic Science*, 13 *CARDOZO L. REV.* 361, 372 (1991). Professor Zabell would later note that “DNA identification has not only transformed and revolutionized forensic science, it has also created a new set of standards that have raised expectations for forensic science in general.” Sandy L. Zabell, *Fingerprint Evidence*, 13 *J.L. & POL’Y* 143, 143 (2005). Similarly, Professor Mnookin observed that “[o]ne consequence of DNA profiling and its admissibility into court is that it has opened the door to challenging fingerprinting.” Jennifer L. Mnookin, *Fingerprint Evidence in an Age of DNA Profiling*, 67 *BROOK. L. REV.* 13, 43 (2001).

42. Eric S. Lander, Commentary, *DNA Fingerprinting on Trial*, 339 *NATURE* 501, 505 (1989). Even today, only a few states require accreditation. See N.Y. EXEC. LAW § 995b (McKinney 1996 & Supp. 2010) (requiring accreditation by the state Forensic Science Commission); OKLA. STAT. ANN. tit. 74, § 150.37 (West Supp. 2009) (requiring accreditation by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) or the American Board of Forensic Toxicology); TEX. CODE CRIM. PROC. ANN. art. 38.35 (West Supp. 2009) (requiring accreditation by the Department of Public Safety). Texas also created a Forensic Science Commission. TEX. CODE CRIM. PROC. ANN. art. 38.01 (West Supp. 2009).

43. See Samuel R. Gross et al., *Exonerations in the United States: 1989 Through 2003*, 95 *J. CRIM. L. & CRIMINOLOGY* 523, 527–31, 542–46 (2005).

44. A study of 200 DNA exonerations found that expert testimony regarding forensic evidence (57%) was the second leading type of evidence (after eyewitness identifications, 79%) used in the wrongful conviction cases. The study indicated that forensic evidence was introduced in 113 trials with serological analysis of blood or semen the most common (79 cases), followed by expert comparison of hair evidence (43 cases), soil comparison (5 cases), DNA tests (3 cases), bite mark evidence (3 cases), fingerprint evidence (2 cases), dog scent identification (2 cases), spectrographic voice evidence (1 case), shoe prints (1 case), and fiber comparison (1 case).

Brandon L. Garrett, *Judging Innocence*, 108 *COLUM. L. REV.* 55, 76, 78, 81 (2008). This data does not necessarily mean that the forensic evidence was improperly used. For example, serological testing at the time of many of these convictions was simply not as discriminating as DNA profiling. Consequently, a person could be included using these serological tests but be excluded by DNA analysis. Some evidence, however, was clearly misused.

45. See Brandon L. Garrett & Peter J. Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions*, 95 *VA. L. REV.* 1, 14–15 (2009) (“Of the 100 cases involving serology in which transcripts were located, 57 cases, or 57%, had invalid forensic science testimony. Of the 65 cases involv-

trial for over forty years, DNA evidence exonerated convicts, some on death row, whose convictions were based on bite mark testimony.⁴⁶ Similarly, microscopic hair analysis was often used—and misused—in the wrongful conviction cases.⁴⁷

B. *The Impact of Daubert*

The impact of DNA profiling was reinforced by the *Daubert* decision, which enunciated a new reliability test for expert testimony. *Daubert* listed several factors that trial judges should consider in assessing reliability. The first and foremost *Daubert* factor is testability.⁴⁸ Citing scientific authorities, the Supreme Court noted that a hallmark of science is empirical testing.⁴⁹ The other factors listed by the Court are generally supplementary. For example, the second factor, peer review and publication,⁵⁰ is a means to verify the results of the testing mentioned in the first factor, and in turn, verification can lead to general acceptance of the technique within the scientific community.⁵¹ Similarly, another factor, an error rate,⁵² is derived from testing.

The first significant post-*Daubert* admissibility challenge occurred in 1995 and involved handwriting analysis. In *United States v. Starzecpyzel*,⁵³ the district court concluded that “forensic document examination, despite the existence of a certification program, professional journals and other trappings of science, cannot, after *Daubert*, be regarded as ‘scientific

ing microscopic hair comparison in which transcripts were located, 25 cases, or 38%, had invalid forensic science testimony.”); Paul C. Giannelli, *Wrongful Convictions and Forensic Science: The Need to Regulate Crime Labs*, 86 N.C. L. REV. 163, 166–70 (2007).

46. See Paul C. Giannelli, *Bite Mark Analysis*, 43 CRIM. L. BULL. 930, 939–40 (2007).

47. See Paul C. Giannelli, *Microscopic Hair Comparisons: A Cautionary Tale*, 46 CRIM. L. BULL. 531 (2010) (discussing the DNA exoneration cases in which hair evidence was used to convict the innocent); Clive A. Stafford Smith & Patrick D. Goodman, *Forensic Hair Comparison Analysis: Nineteenth Century Science or Twentieth Century Snake Oil?*, 27 COLUM. HUM. RTS. L. REV. 227, 231 (1996) (“If the purveyors of this dubious science cannot do a better job of validating hair analysis than they have done so far, forensic hair comparison analysis should be excluded altogether from criminal trials.”).

48. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 593 (1993) (“Ordinarily, a key question to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact will be whether it can be (and has been) tested.”).

49. See CARL G. HEMPEL, *PHILOSOPHY OF NATURAL SCIENCE* 49 (1966) (“[T]he statements constituting a scientific explanation must be capable of empirical test.”); KARL R. POPPER, *CONJECTURES AND REFUTATIONS: THE GROWTH OF SCIENTIFIC KNOWLEDGE* 37 (5th ed. 1989) (“[T]he criterion of the scientific status of a theory is its falsifiability, or refutability, or testability.” (emphasis omitted)).

50. *Daubert*, 509 U.S. at 593 (“[S]ubmission to the scrutiny of the scientific community is a component of ‘good science,’ in part because it increases the likelihood that substantive flaws in methodology will be detected.”).

51. *Id.* at 594 (“Widespread acceptance can be an important factor in ruling particular evidence admissible, and ‘a known technique which has been able to attract only minimal support within the community,’ may properly be viewed with skepticism.” (quoting *United States v. Downing*, 753 F.2d 1224, 1238 (1985))).

52. *Id.*

53. 880 F. Supp. 1027 (S.D.N.Y. 1995).

ic . . . knowledge.”⁵⁴ *Starzecpyzel* soon prompted more challenges to handwriting evidence, attacks that further exposed the lack of empirical validation in the field.⁵⁵ These challenges had some success—with several courts restricting the reach of a questioned document examiner’s opinion, permitting expert testimony about similarities and dissimilarities between exemplars but not an ultimate conclusion that the defendant was the author (“common authorship” opinion) of the questioned document.⁵⁶ In a few cases, specific types of evidence were excluded.⁵⁷ More importantly, the handwriting cases opened the door to attacks on other techniques. Indeed, some courts viewed *Daubert* and its progeny as inviting a “reexamination even of ‘generally accepted’ venerable, technical fields.”⁵⁸

If *Starzecpyzel* unsettled document examiners, *United States v. Llera Plaza*⁵⁹ “sent shock waves through the community of fingerprint ana-

54. *Id.* at 1038 (quoting FED. R. EVID. 702). The court further stated that “while scientific principles may relate to aspects of handwriting analysis, they have little or nothing to do with the day-to-day tasks performed by [Forensic Document Examiners]. . . . [T]his attenuated relationship does not transform the FDE into a scientist.” *Id.* at 1041. Nevertheless, the court did not exclude handwriting comparison testimony. Instead, the court admitted the testimony as “technical” evidence. *Id.* at 1047. This aspect of the opinion, however, was later undercut by *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 149 (1999), in which the Supreme Court ruled that *Daubert*’s reliability test applied to all expert testimony, thereby abolishing the distinction between “scientific” and “technical” expertise.

55. See, e.g., *United States v. Hidalgo*, 229 F. Supp. 2d 961, 967 (D. Ariz. 2002) (“Because the principle of uniqueness is without empirical support, we conclude that a document examiner will not be permitted to testify that the maker of a known document is the maker of the questioned document. Nor will a document examiner be able to testify as to identity in terms of probabilities.”); *United States v. Lewis*, 220 F. Supp. 2d 548, 554 (S.D.W. Va. 2002) (“[Expert’s] bald assertion that the ‘basic principle of handwriting identification has been proven time and time again through research in [his] field,’ without more specific substance, is inadequate to demonstrate testability and error rate.”); *United States v. Saelee*, 162 F. Supp. 2d 1097, 1103 (D. Alaska 2001) (“There is little known about the error rates of forensic document examiners. The little testing that has been done raises serious questions about the reliability of methods currently in use. As to some tasks, there is a high rate of error and forensic document examiners may not be any better at analyzing handwriting than laypersons.”).

56. See *United States v. Oskowitz*, 294 F. Supp. 2d 379, 384 (E.D.N.Y. 2003) (“Many other district courts have similarly permitted a handwriting expert to analyze a writing sample for the jury without permitting the expert to offer an opinion on the ultimate question of authorship.”); *United States v. Rutherford*, 104 F. Supp. 2d 1190, 1194 (D. Neb. 2000) (“[T]he Court concludes that FDE Rauscher’s testimony meets the requirements of Rule 702 to the extent that he limits his testimony to identifying and explaining the similarities and dissimilarities between the known exemplars and the questioned documents. FDE Rauscher is precluded from rendering any ultimate conclusions on authorship of the questioned documents and is similarly precluded from testifying to the degree of confidence or certainty on which his opinions are based.”); *United States v. Hines*, 55 F. Supp. 2d 62, 70–71 (D. Mass. 1999) (admitting expert testimony concerning the general similarities and differences between a defendant’s handwriting exemplar and a stick up note, but not the specific conclusion that the defendant was the author).

57. See, e.g., *Lewis*, 220 F. Supp. 2d at 554 (excluding testimony); *United States v. Fujii*, 152 F. Supp. 2d 939, 940 (N.D. Ill. 2000) (“Handwriting analysis does not stand up well under the *Daubert* standards. Despite its long history of use and acceptance, validation studies supporting its reliability are few, and the few that exist have been criticized for methodological flaws.”).

58. *Hines*, 55 F. Supp. 2d at 67 (discussing handwriting comparison); see also *Hidalgo*, 229 F. Supp. 2d at 966 (“Courts are now confronting challenges to testimony [such as handwriting comparison], as here, whose admissibility had long been settled.”).

59. (*Llera Plaza I*), 179 F. Supp. 2d 492 (E.D. Pa. 2002), vacated, motion granted on reconsideration, 188 F. Supp. 2d 549 (E.D. Pa. 2002).

lysts.”⁶⁰ In that case, Judge Pollak ruled that fingerprint experts would not be permitted to testify that two sets of prints “matched”—that is, a positive identification to the exclusion of all other persons.⁶¹ This was the first time in nearly one hundred years that such a decision had been rendered.⁶² On rehearing, however, Judge Pollak reversed himself,⁶³ and later cases would continue to uphold the admissibility of fingerprint evidence.⁶⁴ Yet the spotlight could not be switched off.⁶⁵ News reports,⁶⁶ mainstream publications,⁶⁷ scientific journals,⁶⁸ and television shows covered the case.⁶⁹ A spate of legal articles followed,⁷⁰ with many commentators believing that *Llera Plaza I* was more faithful to *Daubert* than *Llera Plaza II*.⁷¹

60. See D.H. Kaye, *The Nonscience of Fingerprinting: United States v. Llera-Plaza*, 21 QUINNIPIAC L. REV. 1073, 1073 (2003).

61. *Llera Plaza I*, 179 F. Supp. 2d at 518 (“But 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.”).

62. The first reported fingerprint case was decided in 1911. *People v. Jennings*, 96 N.E. 1077 (Ill. 1911). As Professor Mnookin has noted, however, “fingerprints were accepted as an evidentiary tool without a great deal of scrutiny or skepticism.” Mnookin, *supra* note 41, at 17. She elaborated:

Even if no two people had identical *sets* of fingerprints, this did not establish that no two people could have a *single* identical print, much less an identical *part* of a print. These are necessarily matters of probability, but neither the court in *Jennings* nor subsequent judges ever required that fingerprint identification be placed on a secure statistical foundation.

Id. at 19.

63. *United States v. Llera Plaza (Llera Plaza II)*, 188 F. Supp. 2d 549, 575–76 (E.D. Pa. 2002). *Llera Plaza II* was not a total victory for the prosecution. The rigor of proficiency testing was drawn into question. See *infra* Part IV.A.

64. See, e.g., *United States v. Mitchell*, 365 F.3d 215, 246 (3d Cir. 2004); *United States v. Crisp*, 324 F.3d 261, 268–70 (4th Cir. 2003); *United States v. Sullivan*, 246 F. Supp. 2d 700, 704 (E.D. Ky. 2003).

65. In *State v. Rose*, No. K06-0545 (Md. 2007), a trial judge excluded fingerprint evidence. See James E. Starrs, *Will Wonders Never Cease? Fingerprinting Denied Its Day in Maryland Trial Court*, SCI. SLEUTHING REV., Fall 2007, at 1 (discussing case).

66. E.g., Associated Press, *Fingerprint Reliability Under Fire—As a Forensic Tool, It’s Not Fool-proof, Critics Argue in Federal Court*, SUN-SENTINEL, Feb. 25, 2002, at 3A; Andy Newman, *Judge Who Ruled Out Matching Fingerprints Changes His Mind*, N.Y. TIMES, Mar. 14, 2002, at A27; Joseph A. Slobodzian, *Court Ruling Blurs the Future for Fingerprint Experts: Linking of Print to Person Not Credible, Federal Judge Says*, MILWAUKEE J. SENTINEL, Feb. 17, 2002, at A2; Richard Willing, *Judge Challenges Fingerprint Identification*, USA TODAY, Jan. 10, 2002, at 3A.

67. E.g., Michael Specter, *Do Fingerprints Lie? The Gold Standard of Forensic Evidence Is Now Being Challenged*, NEW YORKER, May 27, 2002, at 96, 102–05 (discussing *Llera Plaza*, including an interview with Judge Pollak).

68. See Faigman, *supra* note 38, at 339–40.

69. *60 Minutes: Fingerprints* (CBS television broadcast Jan. 5, 2003).

70. E.g., Simon A. Cole, *Grandfathering Evidence: Fingerprint Admissibility Rulings from Jennings to Llera Plaza and Back Again*, 41 AM. CRIM. L. REV. 1189 (2004); Robert Epstein, *Fingerprints Meet Daubert: The Myth of Fingerprint “Science” Is Revealed*, 75 S. CAL. L. REV. 605 (2002); Nathan Benedict, Note, *Fingerprints and the Daubert Standard for Admission of Scientific Evidence: Why Fingerprints Fail and a Proposed Remedy*, 46 ARIZ. L. REV. 519 (2004); Tara Marie La Morte, Comment, *Sleeping Gatekeepers: United States v. Llera Plaza and the Unreliability of Forensic Fingerprinting Evidence Under Daubert*, 14 ALB. L.J. SCI. & TECH. 171 (2003); Kristin Romandetti, Note, *Recognizing and Responding to a Problem with the Admissibility of Fingerprint Evidence Under Daubert*, 45 JURIMETRICS 41 (2004); Jessica M. Sombat, Note, *Latent Justice: Daubert’s Impact on the Evaluation of Fingerprint Identification Testimony*, 70 FORDHAM L. REV. 2819 (2002).

71. E.g., Jennifer L. Mnookin, *Fingerprints: Not a Gold Standard*, ISSUES SCI. & TECH., Fall 2003, at 47, 47 (“Judge Pollak’s first opinion [restricting latent fingerprint individualization testimony] was

Llera Plaza was soon eclipsed by a more sensational event—the FBI’s misidentification of Brandon Mayfield as the source of the crime scene prints in the terrorist train bombing in Madrid on March 11, 2004.⁷² More than any other event, the Mayfield affair exposed the myth of fingerprint infallibility.⁷³ The misidentification resulted in investigations by the Bureau⁷⁴ and the Inspector General of the DOJ,⁷⁵ which in turn triggered a more extensive review of the scientific basis of fingerprint identification by the FBI.⁷⁶

Once *Daubert* attacks on the admissibility of handwriting and fingerprint evidence had been made, it was inevitable that firearms identifications would also be challenged. The initial attacks failed.⁷⁷ However, in *United States v. Green*,⁷⁸ the court recognized the shortcomings in this field. The expert testified that a match could be made “to the exclusion of every other firearm in the world”; according to the court, “[t]hat conclusion . . . is extraordinary, particularly given [the expert’s] data and methods.”⁷⁹ Despite “serious reservations,” the judge felt “compelled” to

the better one.”); Recent Case, *United States v. Havvard*, 260 F.3d 597 (7th Cir. 2001), 115 HARV. L. REV. 2349, 2352 (2002) (“Fingerprint expert testimony does not survive application of the *Daubert* factors”); Sombat, *supra* note 70, at 2825 (“[T]he result Judge Pollak reached when he excluded expert testimony concerning fingerprints [in *Llera Plaza I*] was fair.”).

72. See Sarah Kershaw, *Spain and U.S. at Odds on Mistaken Terror Arrest*, N.Y. TIMES, June 5, 2004, at A1 (clearing Brandon Mayfield as Spanish authorities matched the fingerprints to an Algerian national); Flynn McRoberts & Maurice Possley, *Report Blasts FBI Lab: Peer Pressure Led to False ID of Madrid Fingerprint*, CHI. TRIB., Nov. 14, 2004, at 1.

73. Professor Cole followed with an article identifying twenty-three cases of documented fingerprint misidentifications. See Simon A. Cole, *More Than Zero: Accounting for Error in Latent Fingerprint Identification*, 95 J. CRIM. L. & CRIMINOLOGY 985, 1001–16 (2005). The misidentification cases include some that involved (1) verification by one or more other examiners, (2) examiners certified by the International Association of Identification, (3) procedures using a sixteen-point standard, and (4) defense experts who corroborated misidentifications made by prosecution experts. *Id.* at 1003, 1008, 1010, 1014–15.

74. See Robert B. Stacey, *A Report on the Erroneous Fingerprint Individualization in the Madrid Train Bombing Case*, 54 J. FORENSIC IDENTIFICATION 706, 706 (2004).

75. See OFFICE OF THE INSPECTOR GEN., U.S. DEP’T OF JUSTICE, A REVIEW OF THE FBI’S HANDLING OF THE BRANDON MAYFIELD CASE, UNCLASSIFIED EXECUTIVE SUMMARY 9 (2006).

76. See Bruce Budowle et al., *Review of the Scientific Basis for Friction Ridge Comparisons as a Means of Identification: Committee Findings and Recommendations*, FORENSIC SCI. COMM. (Jan. 2006), http://www2.fbi.gov/hq/lab/fsc/backissu/jan2006/research/2006_01_research02.htm.

77. See *United States v. Hicks*, 389 F.3d 514, 526 (5th Cir. 2004) (“[T]he matching of spent shell casings to the weapon that fired them has been a recognized method of ballistics testing in this circuit for decades.”); *United States v. Foster*, 300 F. Supp. 2d 375, 376 n.1 (D. Md. 2004) (“Ballistics evidence has been accepted in criminal cases for many years. . . . In the years since *Daubert*, numerous cases have confirmed the reliability of ballistics identification.”); *United States v. Santiago*, 199 F. Supp. 2d 101, 111 (S.D.N.Y. 2002) (“The Court has not found a single case in this Circuit that would suggest that the entire field of ballistics identification is unreliable.”); *State v. Anderson*, 624 S.E.2d 393, 398 (N.C. Ct. App. 2006) (finding no abuse of discretion in admitting bullet identification evidence); *Commonwealth v. Whitacre*, 878 A.2d 96, 101 (Pa. Super. Ct. 2005) (“[W]e find no abuse of discretion in the trial court’s decision to permit admission of the evidence regarding comparison of the two shell casings with the shotgun owned by Appellant.”).

78. 405 F. Supp. 2d 104, 109–16 (D. Mass. 2005).

79. *Id.* at 107. Although the expert had seven years of experience in the field, he was not certified, and his lab was not accredited. Moreover, he had never been formally tested by a neutral proficiency examination. Finally, he could not cite any reliable error rates. *Id.* The expert

allow the testimony based on precedent.⁸⁰ Significantly, however, the court limited the testimony as it had previously done in handwriting cases.⁸¹ The expert could only describe and explain the ways in which the cartridge cases were similar, but not that they came from a specific weapon “to the exclusion of every other firearm in the world”; in the court’s view, “[t]hat conclusion . . . stretches well beyond [the expert’s] data and methodology.”⁸² Finally, the court issued a caution: “The more courts admit this type of toolmark evidence without requiring documentation, proficiency testing, or evidence of reliability, the more sloppy practices will endure; we should require more.”⁸³ In sum, the fallout from the *Daubert* challenges, like DNA profiling, had a significant impact on forensic science.

C. Response of Scientific Community

By this time, sectors of the scientific community were becoming interested—and alarmed—about how science was being used in criminal cases. In 2002, a stunning editorial appeared in *Science*, one of the country’s top scientific journals. The title alone is remarkable, “Forensic Science: Oxymoron?”⁸⁴ Written by the editor-in-chief, the editorial discussed the cancellation of a NAS project designed to examine various forensic science techniques, including fingerprinting, because the Departments of Justice and Defense insisted on a right of review that the Academy, as a scientific institution, found objectionable.⁸⁵ The NAS relies on the government and private foundations for funding, which creates a “Catch-22” dynamic: the organization with the expertise to commission an independent study is dependent for financial support upon the federal agencies that want to control the research.

conceded, over and over again, that he relied mainly on his subjective judgment. There were no reference materials of any specificity, no national or even local database on which he relied. And although he relied on his past experience with these weapons, he had no notes or pictures memorializing his past observations.

Id.

80. *Id.* at 108–09 (“I reluctantly come to the above conclusion because of my confidence that any other decision will be rejected by appellate courts, in light of precedents across the country . . .”).

81. *E.g.*, *United States v. Hines*, 55 F. Supp. 2d 62, 70–71 (D. Mass. 1999) (admitting expert testimony concerning the general similarities and differences between a defendant’s handwriting exemplar and a stick up note, but not the specific conclusion that the defendant was the author).

82. *Green*, 405 F. Supp. 2d at 109.

83. *Id.*

84. Donald Kennedy, Editorial, *Forensic Science: Oxymoron?*, 302 *SCIENCE* 1625, 1625 (2003). *Science* is published by the American Association for the Advancement of Science.

85. Other commentaries on problems in forensic science soon followed in *Science*. In 2002, Professor Faigman criticized fingerprint evidence in the wake of the *Llera Plaza* decisions. Faigman, *supra* note 38, at 339–40. Professors Cole and Loftus published a letter following the exoneration of Steven Cowan, the first conviction overturned based on DNA profiling in which fingerprint evidence had been crucial in securing the wrongful conviction. Elizabeth F. Loftus & Simon A. Cole, Letter to the Editor, *Contaminated Evidence*, 304 *SCIENCE* 959, 959 (2004) (“[F]orensic scientists remain stubbornly unwilling to confront and control the problem of bias, insisting that it can be overcome through sheer force of will and good intentions.”). Professors Saks and Koehler’s article on the paradigm shift appeared next. Saks & Koehler, *supra* note 36.

Next, a series of articles appeared in *Issues in Science and Technology*, the official publication of the NAS. One article included the following observation:

The increased use of DNA analysis, which has undergone extensive validation, has thrown into relief the less firmly credentialed status of other forensic science identification techniques (fingerprints, fiber analysis, hair analysis, ballistics, bite marks, and tool marks). These have not undergone the type of extensive testing and verification that is the hallmark of science elsewhere.⁸⁶

Another article criticized how research has been controlled by the prosecution, arguing that “we have a growing body of unreliable research funded by law enforcement agencies with a strong interest in promoting the validity of these techniques.”⁸⁷ Other authors discussed deficiencies in fingerprint analysis⁸⁸ and crime laboratory regulation.⁸⁹

In 2005, Congress intervened, bypassing the DOJ and appropriating \$1,500,000 to the NAS to study forensic science. As previously discussed, the NAS Report’s central recommendation is the establishment of a new independent agency, NIFS.⁹⁰ Although this recommendation is emphatic, it is not well supported. The next Parts provide the evidence for this recommendation, which is critical for meaningful reform.

III. DNA PROFILING

Forensic DNA analysis was first introduced in this country in the late 1980s through the efforts of private companies, principally Lifecodes and Cellmark.⁹¹ The introduction of DNA evidence went smoothly in the initial cases, but then a successful challenge to admissibility was mounted in *People v. Castro*.⁹² After a fourteen-week evidentiary hear-

86. Donald Kennedy & Richard A. Merrill, *Assessing Forensic Science*, ISSUES SCI. & TECH., Fall 2003, at 33, 34.

87. D. Michael Risinger & Michael J. Saks, *A House with No Foundation*, ISSUES SCI. & TECH., Fall 2003, at 35, 35.

88. Mnookin, *supra* note 71, at 48–49.

89. Paul C. Giannelli, *Crime Labs Need Improvement*, ISSUES SCI. & TECH., Fall 2003, at 55, 55–56.

90. *See supra* text accompanying note 18.

91. In 1985, Dr. Alec Jeffreys of the University of Leicester, England, recognized the utility of DNA profiling in criminal cases. Its first use in American courts came the following year. *See* OFFICE OF TECH. ASSESSMENT, U.S. CONG., *GENETIC WITNESS: FORENSIC USES OF DNA TESTS* 8 (1990). By January 1990, forensic DNA analysis had been admitted into evidence “in at least 185 cases by 38 States and the U.S. military.” *Id.* at 14. The initial technique, Restriction Fragment Length Polymorphism (RFLP) analysis by gel electrophoresis, was soon supplanted by Polymerase Chain Reaction (PCR)-based methods involving the DQ-alpha locus, “polymarkers,” and the D1S80 locus. These, in turn, were replaced by Short Tandem Repeats, the current procedure. In addition to nuclear DNA analysis, courts have admitted evidence based on mitochondrial DNA (mtDNA) sequencing, as well as DNA analyses of animals, plants, and the HIV virus. *See generally* 2 GIANNELLI & IMWINKELRIED, *supra* note 5, ch. 18 (discussing the scientific and legal basis for DNA profiling).

92. 545 N.Y.S.2d 985 (N.Y. Sup. Ct. 1989). *See generally* Jennifer L. Mnookin, *People v. Castro: Challenging the Forensic Use of DNA Evidence*, in *EVIDENCE STORIES* 207, 208 (Richard Lempert ed., 2006) (discussing the historical development of DNA evidence use, *Castro*, and the “radical, though perhaps in the end, temporary, shift in the evaluation of DNA evidence” the case caused).

ing with a 5000-page transcript, the court wrote: “In a piercing attack upon each molecule of evidence presented, the defense was successful in demonstrating to this court that the testing laboratory failed in its responsibility to perform the accepted scientific techniques and experiments in several major respects.”⁹³ In an unusual occurrence, the prosecution and defense experts met without the attorneys and issued a joint statement, including the following:

[T]he DNA data in this case are not scientifically reliable enough to support the assertion that the samples . . . do or do not match. If these data were submitted to a peer-reviewed journal in support of a conclusion, they would not be accepted. Further experimentation would be required.⁹⁴

Another problem, which would only be revealed years later, lurked beneath the surface in *Castro*. Nearly two decades after his participation as a prosecution witness in *Castro*, Richard Roberts, a Noble Laureate, stated in an interview that “it never occurred to him to ask if [the prosecutors] were withholding any data . . . [he] assumed they were showing [him] all they had.”⁹⁵ But they were not.

It did not take the FBI Laboratory, the premier forensic facility in this country, long to appreciate the significance of DNA profiling, and the Bureau soon began work to bring its own DNA unit online. Indeed, after *Castro*, the FBI Laboratory would achieve hegemony over DNA profiling. The laboratory, however, would withhold data from the general scientific community, selectively share information with scientists it approved, and underwrite their research. Moreover, prosecutors would attack opposing experts *outside* the courtroom.

A. United States v. Yee

Castro was only the opening volley in what came to be known as the DNA admissibility wars,⁹⁶ sparking a debate that found its way into the popular press.

93. *Castro*, 545 N.Y.S.2d at 996.

94. Lander, *supra* note 42, at 504. The FBI’s top DNA scientist, Dr. Bruce Budowle, would later acknowledge the shortfalls of DNA evidence when first introduced:

The initial outcry over DNA typing standards concerned laboratory problems: poorly defined rules for declaring a match; experiments without controls; contaminated probes and samples; and sloppy interpretation of autoradiograms. Although there is no evidence that these technical failings resulted in any wrongful convictions, the lack of standards seemed to be a recipe for trouble.

Eric S. Lander & Bruce Budowle, Commentary, *DNA Fingerprinting Dispute Laid to Rest*, 371 NATURE 735, 735 (1994); *see also* JAMES D. WATSON & ANDREW BERRY, DNA: THE SECRET OF LIFE 269 (2004) (“Initially, when DNA fingerprinting was done in forensic laboratories without special expertise in handling and analyzing DNA, critical mistakes were not uncommon.”). Watson was one of the discoverers of the double helix structure of DNA. *See* WATSON & BERRY, *supra*, at xi–xiv.

95. JAY D. ARONSON, GENETIC WITNESS: SCIENCE, LAW, AND CONTROVERSY IN THE MAKING OF DNA PROFILING 71 (2007). After testifying, Roberts signed the “joint statement” of scientists. *See supra* text accompanying note 94.

96. *See* Thompson, *supra* note 39.

In response to several critical articles on forensic DNA analysis, John Hicks, Director of the FBI Crime Laboratory at the time, wrote a letter to the *New York Times*, defending the Bureau's DNA program:

The procedures employed in these tests have been carefully defined, based on extensive studies. Our procedures and test results have passed muster when subjected to close scrutiny in the scientific community and the courts. The F.B.I. has encouraged wide review of the forensic use of DNA technology through sponsorship of technical seminars and international symposiums and support to studies conducted by the Office of Technology Assessment and the National Academy of Sciences.⁹⁷

This letter was published on February 21, 1990. Yet the day before, in an Ohio courtroom, federal prosecutors—at the FBI Laboratory's behest—opposed turning over data concerning the FBI's matching criteria, environmental insult studies, population data, and proficiency testing. The case, *United States v. Yee*,⁹⁸ involved the first major challenge to the Bureau's DNA protocols. According to the presiding magistrate, the need for discovery was underscored by the lack of “extensive independent scientific assessment and replication of the reliability of the procedures that have been developed by the F.B.I.”⁹⁹ In their efforts to withhold this information, the prosecutors offered a technical (and unpersuasive) argument—that these materials were not scientific “reports” within the meaning of the federal discovery rule and therefore were not subject to disclosure.¹⁰⁰ Significantly, they did not argue that this information was irrelevant or that it would not help the defense prepare for trial. In the end, the magistrate rejected the prosecution's argument.¹⁰¹

When *Yee* was finally decided, the prosecution won; expert testimony based on the FBI's protocols was deemed admissible. Nevertheless, a number of disquieting comments appeared in the opinion. At one point, for example, the magistrate wrote: “[T]he F.B.I. program of [DNA] proficiency testing has serious deficiencies, even without consideration of

97. John W. Hicks, Letter to the Editor, *DNA Test Proves Itself in Solving Crimes*, N.Y. TIMES, Feb. 21, 1990, at A24.

98. 129 F.R.D. 629, 630 (N.D. Ohio 1990).

99. *Id.* at 631.

100. *Id.* at 635–36; see FED. R. CRIM. P. 16(a)(1)(D) (current version at FED. R. CRIM. P. 16(a)(1)(G)).

101. The federal magistrate granted the defense discovery motion based on a different provision of the discovery rule, one that required disclosure of documents and tangible objects that are material to the preparation of the defense. He ruled that “predicate materials” were discoverable under this provision. *Yee*, 129 F.R.D. at 635–36.

Yee was not the only case in which important information was withheld in DNA litigation. Timothy Spencer was the first person executed based on DNA evidence. *Murderer Put to Death in Virginia: First U.S. Execution Based on DNA Tests*, N.Y. TIMES, Apr. 28, 1994, at A19. When the defense sought discovery of the prosecution expert's “work notes,” which formed the basis of his report, the motion was denied, and the Virginia Supreme Court upheld this ruling. *Spencer v. Commonwealth*, 384 S.E.2d 785, 791 (Va. 1989). See generally Paul C. Giannelli, *Criminal Discovery, Scientific Evidence, and DNA*, 44 VAND. L. REV. 791, 800–03 (1991) (discussing unjustifiable limitations on discovery).

the troubling hint in the record of an impulse at one point to *destroy* some of the small amount of test data that had been accumulated earlier.”¹⁰² There was more than a “hint” in the record: “Internal memoranda obtained through court-ordered discovery from the FBI show that the agency contemplated destroying its own scientific data concerning the performance of its DNA test in proficiency trials rather than turn the data over to defense lawyers.”¹⁰³ In a later passage, the magistrate commented: “I do not either disregard or discount the accuracy of many of the criticisms about the remarkably poor quality of the F.B.I.’s work and infidelity to important scientific principles.”¹⁰⁴

B. *The Science Affair*

Dr. Richard C. Lewontin of Harvard University and Dr. Daniel Hartl, then of Washington University, “two of the leading lights of population genetics,”¹⁰⁵ testified for the defense in *Yee*. The prosecution had its own prominent experts, including Dr. Thomas Caskey of Baylor College of Medicine and Dr. Kenneth K. Kidd of Yale University. After the *Yee* admissibility hearing, Lewontin and Hartl submitted a paper to *Science*, which was accepted in accordance with *Science*’s peer-review process. Although Lewontin and Hartl did not question the underlying science, they wrote that the estimates of the probability of a matching DNA profile “as currently calculated, are unjustified and generally unreliable.”¹⁰⁶

Surprisingly, the editors of *Science* changed the normal practice of publishing rebuttals in later issues and instead actively sought out a rebuttal article for the same issue.¹⁰⁷ The events proceeded as follows:

In mid-October Caskey and Kidd [the prosecution experts in *Yee*], who had both gotten hold of the paper, cornered one of *Science*’s editors at a genetics meeting and urged her not to publish it without a rebuttal. *Science* editor Daniel Koshland agreed, commissioning a rebuttal by Kidd and Ranajit Chakraborty of the University of Texas, which was published in the same issue. Koshland also called Lewontin a few days after the genetics meeting, asking

102. United States v. Yee, 134 F.R.D. 161, 208 (N.D. Ohio 1991), *aff’d sub nom.* United States v. Bonds, 12 F.3d 540 (6th Cir. 1993) (emphasis added).

103. Thompson, *supra* note 39, at 98.

104. *Yee*, 134 F.R.D. at 210.

105. Leslie Roberts, *Fight Erupts over DNA Fingerprinting*, 254 SCIENCE 1721, 1721 (1991).

106. See Richard C. Lewontin & Daniel L. Hartl, *Population Genetics in Forensic DNA Typing*, 254 SCIENCE 1745, 1750 (1991). They also wrote: “Appropriately carried out and correctly interpreted, DNA typing is possibly the most powerful innovation in forensics since the development of fingerprinting in the last part of the 19th century.” *Id.* at 1746.

107. See *Cases and Commentaries*, PROF. ETHICS REP. (Am. Ass’n for the Advancement of Sci. Comm. on Scientific Freedom & Responsibility & Prof’l Soc’y Ethics Grp., D.C.), Spring 1992, at 1, 2 [hereinafter AAAS ETHICS REPORT] (“[T]he normal procedure followed by *Science* is to publish rebuttals in a subsequent issue and to give the authors of the original article an opportunity to respond.”).

for revisions in the [previously peer-reviewed and accepted] paper, which was already in galleys.¹⁰⁸

Not only was the rebuttal article published in the same issue,¹⁰⁹ it appeared *before* the Lewontin and Hartl piece. Lewontin and Hartl accused Koshland of “caving into political pressure by commissioning the Chakraborty-Kidd rebuttal.”¹¹⁰ Although some scientists commended Koshland for his “objective approach,”¹¹¹ others were shocked: “I am appalled It seems to me inconceivable that scientists would attempt to suppress publication of a paper because they disagreed with its conclusions, a paper which apparently had gone through what one assumes was a normal and stringent review process”¹¹²

In addition, James Wooley, one of the federal prosecutors in *Yee*, “lobbied” Hartl to withdraw the *Science* paper on the ground that the article was “ill-conceived.”¹¹³ Although Wooley described the conversation as an “amiable chat,” Hartl, on the other hand, said it was a “chilling experience in which Wooley attempted to intimidate him.”¹¹⁴

108. Leslie Roberts, *Science in Court: A Culture Clash*, 257 *SCIENCE* 732, 735 (1992). Roberts was a staff writer for *Science*.

109. See Ranajit Chakraborty & Kenneth K. Kidd, *The Utility of DNA Typing in Forensic Work*, 254 *SCIENCE* 1735 (1991).

110. Roberts, *supra* note 105, at 1721. Lewontin characterized the use of the rebuttal article as “[p]ure politics . . . I think it is quite extraordinary that an editor would go out and hire two guys to write a rebuttal’ after the article had been peer reviewed and accepted.” Leslie Roberts, *Was Science Fair to Its Authors?*, 254 *SCIENCE* 1722, 1722 (1991). Kidd explained: “I felt publishing the article would create a very serious problem in the legal system, and that that was their intent.” *Id.* Koshland defended this position: “I did it to give a more balanced view of the subject. I was trying to be fair.” *Id.*

111. Robert A. Bever et al., Letter to the Editor, 255 *SCIENCE* 1050, 1050 (1992).

112. Lynwood R. Yarbrough, Letter to the Editor, 255 *SCIENCE* 1052, 1052 (1992); see also Don W. Cleveland, Letter to the Editor, 255 *SCIENCE* 1052, 1052 (1992) (“[S]urely it is not often that an Editor insists on revisions to the galleys of an article accepted after peer review. Even more remarkable (and all credit no doubt due to the Editor) is to commission a rebuttal to the article and to publish it contemporaneously. Save for an uncritical account filtered through a staff reporter (Leslie Roberts), oddly missing has been direct comment, so often heard on other issues, from the Editor who stands at the center (or more accurately to one side) of the controversy. Having first stirred the pot, where was he when it came time to eat the meal, be it cake or crow?”).

Two years later the controversy was still simmering. Compare Daniel E. Koshland Jr., Editorial, *The DNA Fingerprint Story (Continued)*, 265 *SCIENCE* 1015, 1015 (1994) (“This acceptance of the validity of DNA evidence is . . . a rebuke to the judicial process that has been so slow to accept DNA evidence by failing to see that a couple of outspoken individuals were less representative of the scientific community than the vast majority of careful scholars.”), with Daniel L. Hartl & Richard C. Lewontin, Letter to the Editor, 266 *SCIENCE* 201, 201 (1994) (“The present editor of *Science* has more than once attempted to nullify our analysis of scientific issues in the forensic use of DNA polymorphism. . . . Now he has used his privileged access to the editorial column of *Science* to publish an attack of his own . . .”).

113. Roberts, *supra* note 108, at 735 (“In a move he would come to regret, Wooley called Hartl in early October 1991 to ‘lobby him’ not to publish the article, which he considered ill-conceived.”); see also Gina Kolata, *Critic of “Genetic Fingerprint” Tests Tells of Pressure to Withdraw Paper*, N.Y. *TIMES*, Dec. 20, 1991, at A20.

114. Roberts, *supra* note 108, at 735; see also Peter J. Neufeld, *Have You No Sense of Decency?*, 84 *J. CRIM. L. & CRIMINOLOGY* 189, 193 (1993) (“Dr. Hartl ‘had no doubt,’ both ‘from the tone and intensity of his remarks, that Mr. Wooley, on behalf of the FBI and the Department of Justice, was trying to get me to withdraw the article.” (quoting Affidavit of Daniel Hartl at 1–4, *United States v. Yee*, No. 91-3160 (N.D. Ohio Mar. 16, 1992))).

C. The Journal of Human Genetics Affair

Yee altered the landscape of the admissibility battles. The initial skirmishes over laboratory protocols had now metamorphosed into fights over statistical interpretation and population genetics. Accordingly, defense experts needed access to the underlying population data.¹¹⁵ As it had done in *Yee*, however, the FBI balked. As one court noted: “Alt [the defendant] argues the FBI DNA test results are inadmissible because the FBI does not allow members of the scientific community general access to its data bases. . . . We are troubled by Alt’s allegations of denial of access to the FBI data bases.”¹¹⁶ Eventually, one court ordered disclosure. The defense expert, Seymour Geisser, a professor of statistics at the University of Minnesota, explained that

the form in which databases were surrendered by the FBI was unusable for a proper analysis by the defense. However, the material was supplied, in the form requested, to one of the prosecution experts. Hearing my complaint, this expert generously sent me an appropriate diskette, to the chagrin of the FBI.¹¹⁷

Geisser’s travails as a defense witness were only beginning. In November 1991, he submitted a paper on the forensic use of DNA statistics to the *American Journal of Human Genetics (Journal)*, which, in turn, sent the article out for peer review as Geisser was preparing to testify. On January 15, 1992, a prosecutor demanded discovery (by fax) of any article Geisser had written about DNA, *along with any peer-review comments*.¹¹⁸ Fifteen minutes later Geisser received the peer-review comments by fax, two of which raised serious questions about his paper. Geisser believed the reviews were leaked to the prosecutor before he had even seen them.¹¹⁹

115. See ARONSON, *supra* note 95, at 44 (“Open access to the materials used to conduct DNA testing (especially the probes), as well as the databases used to determine the frequency of a specific allele, would become a major aspect of the controversy over DNA evidence in mid-1989.”).

116. *State v. Alt*, 504 N.W.2d 38, 48–49 (Minn. Ct. App. 1993) (admitting DNA evidence). Courts had also criticized private DNA labs on this basis. See *State v. Schwartz*, 447 N.W.2d 422, 427–28 (Minn. 1989) (“The validity of testing procedures and principles is assessed in the scientific community by publishing the data in peer review journals. . . . Efforts to assess the reliability of the commercial laboratories’ methodology consequently have been hindered because this information has not yet been made fully available. For example, Cellmark has not yet published data regarding its methodology and its probes are only selectively available.”). In contrast to the FBI, these enterprises at least have a colorable claim of trade secrets. See ARONSON, *supra* note 95, at 77–87 (discussing *Schwartz*).

117. Seymour Geisser, *Statistics, Litigation, and Conduct Unbecoming*, in *STATISTICAL SCIENCE IN THE COURTROOM* 71, 79 (Joseph L. Gastwirth ed., 2000). According to a NAS report, “[a]n author’s obligation is not only to release data and materials to enable others to verify or replicate published findings . . . but also to provide them in a form on which other scientists can build with further research.” NAT’L RESEARCH COUNCIL, NAT’L ACAD. OF SCIS., *SHARING PUBLICATION-RELATED DATA AND MATERIALS: RESPONSIBILITIES OF AUTHORSHIP IN THE LIFE SCIENCES* 4 (2003) [hereinafter *NAS SHARING DATA REPORT*].

118. Geisser, *supra* note 117, at 80.

119. The editor (Epstein) later wrote that this incident was “sheer coincidence.” AAAS ETHICS REPORT, *supra* note 107, at 4. Chakraborty responded:

I have never discussed this review nor the paper with anyone. I was critical of the manuscript, because I believed that it was unprofessionally written, it contained several fatal errors, and it only

One of the anonymous peer reviewers, who strongly recommended against publication, was Dr. Ranajit Chakraborty. Recall that he had coauthored the rebuttal article in *Science* and had been aligned with the prosecution in court cases.¹²⁰ Geisser questioned his participation in the review process:

Both [Chakraborty and the second referee, Dr. Bruce Weir] have frequently submitted reports and testified for the prosecution when FBI DNA profiles were at issue. I have testified for the defense in some of these cases. They have collaborated with FBI forensic workers, gained access to their data, and have published it. Certainly they should have recused themselves from serving as referees, or at the very least informed the editor of their situation.¹²¹

Chakraborty had also received a grant from the NIH, the agency in the DOJ that funds forensic science research.¹²² His proposal stated that he expected “to generate publications and make presentations at national meetings that will lend credibility to the FBI’s statistical methods.”¹²³ This suggests that the results were foreordained. James Kearney, the head of Forensic Science Research at the FBI Laboratory, sat on the panel that awarded the grant.¹²⁴

Next, the *Journal* asked Geisser to obtain permission from the FBI to use its original data rather than data submitted by the Bureau at trial. Geisser complied, requesting permission from Dr. Bruce Budowle, the top FBI DNA scientist. The FBI informed Geisser that (1) the Bureau had made commitments earlier to other scientists (Chakraborty, Devlin, Risch, and Weir) and his study must not conflict with their projects, (2) the FBI data could be used only in a joint collaboration with Budowle, (3) the use of the data would be restricted to this one paper, and (4) *all authors must agree* to the entire contents of a final manuscript prior to submission to a journal.¹²⁵ Geisser concluded that

reported parts of unpublished data from other laboratories without appropriate credit or consent of the data gatherers.

Id. The paper was subsequently published. See Seymour Geisser & Wesley Johnson, *Testing Hardy-Weinberg Equilibrium on Allelic Data from VNTR Loci*, 51 AM. J. HUM. GENETICS 1084 (1992).

120. See *supra* text accompanying note 108.

121. AAAS ETHICS REPORT, *supra* note 107, at 5. Epstein, editor of *American Journal of Human Genetics*, wrote that his journal had “served as an open forum on the forensic uses of DNA technology. We have published highly ‘partisan’ but nevertheless carefully reviewed papers on all sides of the issue.” *Id.*

122. Chakraborty explained: “My co-investigatorship in a NIH grant had no connection with my reviewing this manuscript, and my review was to the point of evaluating a ‘scientific manuscript on its scientific merit.’” *Id.* at 4.

123. Geisser, *supra* note 117, at 81.

124. *Id.* at 82.

125. Christopher Anderson, *FBI Attaches Strings to Its DNA Database*, 357 NATURE 618, 618 (1992) (quoting part of letter).

Kearney says that the FBI is “not quite sure of [Geisser’s] intent” in seeking to analyze the data, pointing out that Geisser has testified for the defence Kearney acknowledged that the FBI has provided the data to other researchers . . . at least two of whom have testified for the prosecution

Id.

an independent study under such provisions would be totally compromised, if not impossible. . . . By the way, Chakraborty, Devlin, Risch and Weir have all published articles based on the FBI databases without Budowle as a co-author. . . .

Recently, I analyzed Cellmark databases for a court case in Ann Arbor, Michigan. At the insistence of Cellmark, the prosecutor requested that the judge rule that I not be allowed to submit my analysis of their data for publication. So much for open science!¹²⁶

Controlling scientific research in this manner is troublesome. In other fields, researchers have noted a “funding effect.” For example, “[t]he best predictor of the conclusions in published reviews assessing the health impacts of passive smoking . . . is whether they are written by authors affiliated with the tobacco industry.”¹²⁷ In short, researchers funded by tobacco companies found no passive smoking effect. The problem is not limited to tobacco research. An exhaustive review of 1140 biomedical studies found that “industry-sponsored studies were significantly more likely to reach conclusions that were favorable to the sponsor than were nonindustry studies.”¹²⁸ There is little reason to believe that forensic science research would not be subject to a “funding effect.”

D. *Spinning the National Academy of Sciences DNA Report*

The DNA controversy next moved to Washington, D.C., with the FBI requesting the NAS to appoint a committee to investigate the forensic use of DNA evidence.¹²⁹ In violation of the Academy’s rules, someone leaked a confidential draft of the Committee’s report to John Hicks, the FBI Laboratory Director.¹³⁰ Apparently undisturbed by this breach of confidentiality, Hicks wrote to the NAS criticizing the draft.¹³¹ Once again, law enforcement advocates had penetrated the halls of science.

The specter of conflict of interest also surfaced at this point.¹³² Dr. Caskey, the prosecution witness in *Yee*, was pressured to resign from the

126. AAAS ETHICS REPORT, *supra* note 107, at 6.

127. THOMAS O. MCGARITY & WENDY E. WAGNER, BENDING SCIENCE: HOW SPECIAL INTERESTS CORRUPT PUBLIC HEALTH RESEARCH 96 (2008) (listing examples of the “funding effect”).

128. Justin E. Bekelman et al., *Scope and Impact of Financial Conflicts of Interest in Biomedical Research: A Systematic Review*, 289 J. AM. MED. ASS’N. 454, 463 (2003).

129. NAS DNA REPORT I, *supra* note 40, at 1–2. A second committee was formed after some aspects of the first report were severely criticized. NAS DNA REPORT II, *supra* note 40, at v–vi.

130. See AAAS ETHICS REPORT, *supra* note 107, at 7 (statement of Barry Scheck) (“Hicks subsequently wrote an unsolicited reply that NAS staff say they did not distribute to the Committee.”); Celia Hooper, *Rancor Precedes National Academy of Science’s DNA Fingerprinting Report*, J. NIH RES., Mar. 1992, at 76, 79 (“Hicks says that . . . two members of the NAS committee gave him copies of a preliminary draft of the report.”); see also Shannon Brownlee, *Courtroom Genetics: A Flap over DNA Evidence Raises Questions About the Relationship of Science to the Law*, U.S. NEWS & WORLD REP., Jan. 27, 1992, at 60, 61 (“Hicks told *U.S. News* that two panel members, who were unhappy with the panel’s conclusions, sent him a draft . . .”).

131. The NAS officials refused to pass on the FBI’s objections to the committee. Hooper, *supra* note 130, at 80.

132. The issue had arisen at the time of the *Science* affair. Yarbrough’s letter to the editor noted:

NAS Committee because of his financial interest in a new type of DNA testing, Short Tandem Repeats, which is now the current protocol.¹³³

E. Harassing Scientists

In civil litigation, harassment of scientists is one way to influence their behavior. One tactic involves the misuse of the subpoena power:

Burdening a scientist with unreasonable document requests does nothing to advance peer scrutiny of the research. . . . [S]uch requests effectively undercut scientific freedom by overwhelming scientists with sanctions-backed demands for documentation and, in some cases, by intimidating scientists with the threat of further legal proceedings after they produce the documents.¹³⁴

*State v. DeMarco*¹³⁵ illustrates a variation of this tactic. In that case, the prosecutor issued a subpoena for 234 reports prepared in unrelated cases by the defense expert, Dr. Edward Blake. Blake, a prominent DNA expert who had consulted with both prosecutors and defense attorneys, objected.¹³⁶ The subpoena raised significant issues concerning the attorney-client privilege and the Sixth Amendment right to effective assistance of counsel. A New Jersey appellate court ruled that the prosecution may not compel discovery of DNA reports prepared by the defendant's expert witness for other clients in unrelated cases and issued a protective order: "Dr. Blake's reports contain private and critical information which should be shielded from undue public exposure. Moreover, litigators, public and private, should have access to the assistance of retained experts with a minimum of risk that their reports . . . will surface in unrelated litigation."¹³⁷

Harassment is one thing, intimidation is quite another. As the DNA wars raged on, prosecutors (and defense attorneys) formed tight knit groups to engage the legal battles. Some prosecutors closely

The vehemence and lack of scientific objectivity that appear to surround this issue indicate that there may be important concerns other than scientific ones. I urge that *Science* obtain from those most closely involved in this debate information about possible economic interests in DNA typing and provide this information to the reader, as other journals have sometimes done.

Yarbrough, *supra* note 112, at 1052; see also Rorie Sherman, *DNA Is on Trial Yet Again*, NAT'L L.J., Mar. 16, 1992, at 1 (discussing conflicts of interest).

133. See Christopher Anderson, *Conflict Concerns Disrupt Panels, Cloud Testimony*, 355 NATURE 753, 753–54 (1992) (reporting Caskey's resignation from several panels including the NAS Committee); Christopher Anderson, *DNA Fingerprinting Discord*, 354 NATURE 500, 500 (1991) ("Caskey is a prominent supporter of DNA fingerprinting who licenses his techniques to Cellmark Diagnostics, one of the largest DNA fingerprinting companies."); see also ARONSON, *supra* note 95, at 159 (discussing Caskey's resignation from the NAS Committee).

134. MCGARITY & WAGNER, *supra* note 127, at 173.

135. 646 A.2d 431 (N.J. Super. Ct. App. Div. 1994) (per curiam).

136. A former prosecutor would later write that Blake was "a noted forensic serologist, [who] had become a pioneer in the use of PCR testing in criminal cases" and that "prosecutors and defense attorneys alike enlisted Blake for testing and advice." GEORGE "WOODY" CLARKE, JUSTICE AND SCIENCE: TRIALS AND TRIUMPHS OF DNA EVIDENCE 41–42 (2007).

137. *DeMarco*, 646 A.2d at 436–37; see also Kolata, *supra* note 113, at A20 ("When Dr. Ford testified . . . , the prosecutors obtained a court order to examine his laboratory and all papers in it.").

associated with the FBI lab, however, went further.¹³⁸ After Professor Laurence Mueller, of the University of California at Irvine, began appearing as a defense expert, a prosecutor, Rockne Harmon, began stalking him—sending letters to his department chair and the university chancellor.¹³⁹ According to an article in *Science*: “Harmon has dogged Mueller’s every move, scrutinizing his testimony in each case and writing him letters when he thinks his science is wrong or his ethics questionable. Indeed, Mueller seems to have almost become an obsession for Harmon.”¹⁴⁰ Mueller viewed this tactic as an attempt to keep him from testifying. Similarly, another defense expert, Professor Simon Ford, a British citizen, felt intimidated by a prosecutor’s threat of loss of his immigration status.¹⁴¹

Perhaps the most disturbing episode was the perjury indictment of molecular biologist Randall Libby, a defense expert, based on an affidavit he submitted in a murder case. The prosecutor faxed the indictment around the country, thereby effectively precluding Libby’s participation as a defense expert in other cases. The charges seemed dubious,¹⁴² and Libby, along with a defense attorney, was eventually acquitted in a bench trial. Libby then demanded that the prosecutor notify those he had faxed of the acquittal. When he refused, Libby brought a civil rights action against the state. The case “was finally settled out of court, resulting in the Oregon Department of Justice sending letters to all of the prosecutor’s correspondents that Libby had been acquitted.”¹⁴³

Prosecutors justified their extrajudicial conduct on two grounds. First, they knew that the defense experts were wrong *as a matter of*

138. See Leslie Roberts, *Prosecutor v. Scientist: A Cat-and-Mouse Relationship*, 257 *SCIENCE* 733, 733 (1992) (noting “an unofficial network of prosecutors and the FBI”).

139. Kolata, *supra* note 113, at A20.

140. Roberts, *supra* note 138, at 733; see also Neufeld, *supra* note 114, at 192–93 (“Harmon wrote to the editors of *Science* in an attempt to thwart the publication of Mueller’s paper. In his letter to *Science*, written on official government letterhead, Harmon . . . derided Dr. Mueller’s technical criticisms as ‘knuckle-headed,’ suggested that the doctor was unethical, and cautioned the editors that publication ‘could conceivably result in a vicious, violent criminal being freed to continue to prey on society.’”). Harmon’s letter worked.

141. See Kolata, *supra* note 113, at A20 (“[Dr. Ford] said an F.B.I. lawyer asked him about the status of his visa status during cross-examination . . . last year.”).

142. Geisser, *supra* note 117, at 84. Libby was a defense expert in the 1994 trial of Bradley Cunningham for the murder of his wife. Cunningham was representing himself. John Hunt, Cunningham’s standby attorney (advisor), was also indicted along with Libby. The charge of false swearing arose from Libby’s affidavit in the support of a mistrial motion, in which Libby asserted that he had not been allowed to talk to the defendant in jail in order to prepare to testify. Jail officials said that arrangements would have been made if Libby and Hunt had so requested. Yet John Junkin, the county counsel, testified at the trial “that he and the jail commander had issued a policy prohibiting Cunningham from meeting privately with anyone except his advisers and investigator. Junkin said a court order would have been necessary for Cunningham to meet with an expert witness, such as Libby.” Elvia Diaz, *Expert Witness, Attorney Acquitted*, *OREGONIAN*, Aug. 13, 1996, at B02. Incredibly, Libby was also charged with tampering with physical evidence—signing the affidavit. See also Don Hamilton, *Forensic Expert Sues County’s District Attorney*, *OREGONIAN*, May 9, 1997, at C02.

143. Geisser, *supra* note 117, at 84.

science.¹⁴⁴ Yet the views of prosecutors (and defense attorneys) on scientific matters have often been notoriously wrong. For example, the paraffin test for the detection of gunshot residue was introduced in this country in the 1930s and admitted at trial for over thirty years before it was debunked.¹⁴⁵ Similarly, “voiceprint” evidence was admitted in numerous trials in the 1970s until a NAS report undercut its reliability.¹⁴⁶ Attorneys typically lack the educational background to evaluate scientific issues,¹⁴⁷ and the adversarial process frequently distorts any objectivity that they might otherwise have.¹⁴⁸ Second, prosecutors were apparently offended that some defense experts were compensated.¹⁴⁹ This criticism ignores the fees collected by prosecution witnesses¹⁵⁰ and their government-subsidized research grants.¹⁵¹

More importantly, attacking defense experts *outside* the courtroom further exacerbates the profound imbalance of resources in criminal cases.¹⁵² Prosecutors typically have access to the over three hundred crime

144. One prosecutor referred to a defense expert as espousing “knuckle-headed ideas.” Roberts, *supra* note 138, at 733 (quoting Rockne Harmon). Another referred to a different expert’s views as “ill-conceived.” Roberts, *supra* note 108, at 735 (discussing James Wooley’s views).

145. See Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 COLUM. L. REV. 1197, 1224–25 (1980) (discussing the history of the paraffin test).

146. NAT’L RESEARCH COUNCIL, NAT’L ACAD. OF SCIS., ON THE THEORY AND PRACTICE OF VOICE IDENTIFICATION 1–2, 45 (1979) [hereinafter NAS VOICE ID REPORT]; see also 1 GIANNELLI & IMWINKELRIED, *supra* note 5, ch. 10 (discussing the voiceprint developments).

147. See *Symposium on Science and the Rules of Evidence*, 99 F.R.D. 187, 233 (1983) (statement of Margaret Berger) (noting “the lack of scientific literacy” of lawyers).

148. Adversarial pressure on experts is so common that the ABA felt compelled to issue a standard in an attempt to address the problem. ABA Criminal Justice Standard 3-3.3(a) provides: “A prosecutor who engages an expert for an opinion should respect the independence of the expert and should not seek to dictate the formation of the expert’s opinion on the subject.” STANDARDS FOR CRIMINAL JUSTICE PROSECUTION FUNCTION & DEF. FUNCTION § 3-3.3(a) (3d ed. 1993). The accompanying commentary states:

Statements made by physicians, psychiatrists, and other experts about their experiences as witnesses in criminal cases indicate the need for circumspection on the part of prosecutors who engage experts. Nothing should be done by a prosecutor to cast suspicion on the process of justice by suggesting that the expert color an opinion to favor the interests of the prosecutor.

Id. § 3-3.3 cmt. at 59. A comparable Standard applies to defense counsel. *Id.* § 4-4.4(a).

149. E.g., Leslie Roberts, *Hired Guns or True Believers?*, 257 SCIENCE 735, 735 (1992) [hereinafter Roberts, *Hired Guns*] (reporting that another expert received more than \$60,000 for testifying once a month for several years); Roberts, *supra* note 108, at 734 (noting that one prosecutor complained that an expert was paid \$28,000 for four-month preparation and trial testimony).

150. Roberts, *Hired Guns*, *supra* note 149, at 735 (“[One prosecution witness] appeared 14 times in the past year and a half, bringing in \$3,000 to \$4,000 a case. . . . In fact, witnesses on both sides charge roughly the same amount—\$150 or \$200 an hour, and perhaps \$1,000 a day if they are out of town, plus expenses.”).

151. See ARONSON, *supra* note 95, at 111 (“In addition to receiving substantial fees for testifying on behalf of the prosecution, members of this group also received significant grants from the National Institute of Justice . . .”).

152. As Judge Weinstein has noted, “[c]ourts, as gatekeepers, must be aware of how difficult it can be for some parties—particularly indigent criminal defendants—to obtain an expert to testify. The fact that one side may lack adequate resources with which to fully develop its case is a constant problem.” Jack B. Weinstein, *Science, and the Challenges of Expert Testimony in the Courtroom*, 77 OR. L. REV. 1005, 1008 (1998).

laboratories in this country.¹⁵³ In addition to the FBI facility, the Drug Enforcement Administration; Internal Revenue Service; Postal Inspection Service; Secret Service; Bureau of Alcohol, Tobacco and Firearms; Customs Service; and the military operate crime laboratories.¹⁵⁴ These laboratories often provide their services for free to state law enforcement agencies.¹⁵⁵

In contrast, the defense often encounters problems securing expert assistance. Most defendants are indigent and cannot afford experts.¹⁵⁶ Although the Supreme Court recognized a due process right to an expert in *Ake v. Oklahoma*,¹⁵⁷ studies indicate that the right has not been fully implemented and the asymmetry in resources is pronounced.¹⁵⁸ A study of indigent defense systems by the National Center for State Courts noted that the “greatest disparities occur in the areas of investigators and

153. A survey of approximately three hundred crime laboratories revealed that “[f]ifty-seven percent . . . would *only* examine evidence submitted by law enforcement officials.” Joseph L. Peterson et al., *The Capabilities, Uses, and Effects of the Nation’s Criminalistics Laboratories*, 30 J. FORENSIC SCI. 10, 13 (1985); see also PRESIDENT’S COMM’N ON LAW ENFORCEMENT & ADMIN. OF JUSTICE, *THE CHALLENGE OF CRIME IN A FREE SOCIETY* 255 (1967) (“[Crime laboratories are] the oldest and strongest link between science and technology and criminal justice.”).

The FBI Laboratory, the largest publicly funded forensic laboratory in the country, had 585 full-time employees as of January 2004. The new FBI Lab at Quantico, Virginia, cost over \$150 million. Joseph L. Peterson & Matthew J. Hickman, *Census of Publicly Funded Forensic Crime Laboratories, 2002*, in BUREAU OF JUSTICE STATISTICS BULLETIN 11 (U.S. Dep’t of Justice, NCJ 207205, Feb. 2005). See generally DAVID FISHER, *HARD EVIDENCE: HOW DETECTIVES INSIDE THE FBI’S SCI-CRIME LAB HAVE HELPED SOLVE AMERICA’S TOUGHEST CASES* (1995) (discussing the FBI Lab’s successes); *The History Channel, Modern Marvels: FBI’s Crime Lab* (2004) (documentary).

154. “It is quite common to find FBI or other federal experts testifying in state criminal proceedings about a diverse array of forensic procedures, including the analysis of drugs, blood, hair, fibers, firearms, fingerprints, gunshot residues, shoeprints, voice comparisons, and the like.” Giannelli, *supra* note 23, at 1329–30 (footnotes omitted).

155. For example, the services of the FBI Laboratory are available without charge to all police departments. See 28 C.F.R. § 0.85(g) (2009) (“[The FBI Laboratory is] to provide, without cost, technical and scientific assistance . . . for all duly constituted law enforcement agencies, . . . which may desire to avail themselves of the service.”).

156. See *Kowalski v. Tesmer*, 543 U.S. 125, 140 (2004) (Ginsburg, J., dissenting) (“According to the Department of Justice, approximately eight out of ten state felony defendants use court-appointed lawyers.”); YALE KAMISAR ET AL., *MODERN CRIMINAL PROCEDURE* 22–23 (10th ed. 2002) (“A sampling of felony defendants in the 75 largest counties indicated that approximately 80% receive court appointed attorneys.”).

157. 470 U.S. 68, 83–84 (1985).

158. In 1990, the *National Law Journal* published the results of a six-month investigation of the defenses of capital murders in the South. One of the “key findings” concerned defense experts: “Judges routinely deny lawyers’ requests for expert/investigative fees.” Marcia Coyle et al., *Fatal Defense: Trial and Error in the Nation’s Death Belt*, NAT’L L.J., June 11, 1990, at 30, 30. As part of this investigation, sixty death row trial lawyers were interviewed—“54.2% felt [the] court provided inadequate investigation and expert funds.” *Id.* at 40. One attorney, who was appointed to represent a death row inmate in Georgia, had his request for the appointment of an expert denied. He commented: “There’s an economic presumption of guilt The district attorney has all the resources of the state crime lab, and we have to go hat in hand to the judge and the DA on every request.” *Id.* at 38.

In addition, a 1993 report commissioned by the Texas Bar Association concluded that “[t]here is a serious underfunding of essential expert services and other expenses in capital trials and appeals.” The Spangenberg Group, *A Study of Representation in Capital Cases in Texas*, 56 TEX. B.J. 333, 408 (1993).

expert witnesses, with the prosecutors possessing more resources.”¹⁵⁹ A recent book concluded that “prosecution experts were much more common than experts called by the defense.”¹⁶⁰ The NAS 1992 DNA Report also recognized the need for defense experts.¹⁶¹ Yet no defendant, no matter how rich, can conduct extensive empirical studies. A defense expert in a particular case can critique the bases of a prosecution expert’s opinion but can rarely replicate the research upon which that opinion rests.

Of course, if the FBI had made its data publicly available, research scientists could have analyzed it, published their conclusions in peer-review journals, and the debate would have been fought out in public, probably saving the taxpayers money in the long run. “According to long-standing and wise scientific tradition, the data underlying an important scientific conclusion must be freely available, so that others can evaluate the results and publish their own findings, whether in support or in disagreement.”¹⁶² Moreover, “[i]f scientific evidence is not yet ready for both scientific scrutiny and public re-evaluation by others, it is not yet ready for court.”¹⁶³

F. *The Aftermath*

In the end, the defense’s challenges to DNA evidence had a salutary effect. As one scholar noted, the British Forensic Science Service “adopted a method of calculating DNA match probabilities that had been proposed by statisticians associated with the defence side of the

159. ROGER A. HANSON ET AL., NAT’L CTR. FOR STATE COURTS, INDIGENT DEFENDERS: GET THE JOB DONE AND DONE WELL 100 (1992).

160. NEIL VIDMAR & VALERIE P. HANS, AMERICAN JURIES: THE VERDICT 173 (2007). In their landmark 1966 jury study, Kalven and Zeisel commented: “Again, the imbalance between prosecution and defense appears. In 22 per cent of the cases the prosecution has the only expert witness, whereas in only 3 per cent of the cases does the defense have such an advantage.” HARRY KALVEN, JR. & HANS ZEISEL, THE AMERICAN JURY 139 (1966).

161. “Defense counsel must have access to adequate expert assistance, even when the admissibility of the results of analytical techniques is not in question, because there is still a need to review the quality of the laboratory work and the interpretation of the results.” NAS DNA REPORT I, *supra* note 40, at 147. “Because of the potential power of DNA evidence, authorities must make funds available to pay for expert witnesses” *Id.* at 149. A British study came to the same conclusion: “Legal Aid should be granted automatically for one expert assessment of the prosecution work. DNA evidence should only be admissible where an appropriate expert is available to the defence.” BEVERLEY STEVENTON, ROYAL COMM’N ON CRIMINAL JUSTICE, THE ABILITY TO CHALLENGE DNA EVIDENCE, RESEARCH STUDY No. 9, at 44 (1993). According to the *President’s DNA Initiative*, “Even if DNA evidence is admitted, there still may be disagreement about its interpretation—what do the DNA results *mean* in a particular case?” NAT’L INST. OF JUSTICE, PRESIDENT’S DNA INITIATIVE: PRINCIPLES OF FORENSIC DNA FOR OFFICERS OF THE COURT (U.S. Department of Justice CD-ROM, NCJ 212399).

162. NAS DNA Report I, *supra* note 40, at 93. The Report further commented: “Because the application of DNA typing in forensic science is to be used in the service of justice, it is especially important for society to establish mechanisms for accountability and to ensure appropriate public scrutiny.” *Id.* at 162.

163. *Id.* at 94.

DNA dispute.”¹⁶⁴ Even the DNA experts who worked closely with the FBI subsequently conceded that “most would now agree that this extended debate has been good for the science.”¹⁶⁵ Unfortunately, defendants were being tried and convicted while this process unfolded.

In sum, the government shaped science by controlling the research agenda, hiding unwelcome test results, attacking legitimate studies that were unfavorable, harassing scientists who disagreed, and “spinning” science in the press. As discussed in the next Parts of this Article, some of these tactics were repeated in later controversies.

IV. FINGERPRINTING

As discussed previously, after the Supreme Court decided *Daubert*, a number of forensic sciences came under attack. These techniques had gained admissibility long before *Daubert* was decided and were not supported by the type of scientific research that undergirded DNA profiling. Fingerprinting, the gold standard in forensic science before DNA analysis, provoked the greatest controversy.

A. Controlling Research

When fingerprint evidence was challenged,¹⁶⁶ FBI experts launched a full-bore defense of the technique, insisting in court testimony that the “error rate for the method is zero.”¹⁶⁷ In response to the first post-*Daubert* evidentiary attack in *United States v. Mitchell*,¹⁶⁸ the FBI attempted to support its position by conducting two studies. In one, the FBI distributed Mitchell’s ten-point fingerprint card and two latent prints from the crime scene to numerous fingerprint examiners and asked them to make a comparison. “Of the thirty-four agencies that responded, nine (27%) reported that they had not identified either one or both of the latent prints with any of the fingers on Mitchell’s ten print card.”¹⁶⁹ Faced with these troublesome results, the FBI recontacted these agencies, providing more information, including enlarged photographs, pointing out

164. MIKE REDMAYNE, EXPERT EVIDENCE AND CRIMINAL JUSTICE 204 (2001); see also ARONSON, *supra* note 95, at 3–4 (“As a result of defense challenges, scientists were forced to go back to their laboratories and professional societies to develop more robust methods and protocols, better quality control mechanisms, and more effective, inclusive peer review systems.”).

165. IAN W. EVETT & BRUCE S. WEIR, INTERPRETING DNA EVIDENCE: STATISTICAL GENETICS FOR FORENSIC SCIENTISTS xiv (1998); see also Richard Lempert, *Comment: Theory and Practice in DNA Fingerprinting*, 9 STAT. SCI. 255, 258 (1994) (“[I]n this instance the importation of legal adversariness into the scientific world has spurred both valuable research and practical improvements in the way DNA evidence is analyzed and presented.”); Mnookin, *supra* note 41, at 70 (“[W]hile it is easy to disparage ‘battles of the experts’ as expensive, misleading, and confusing to the factfinder, these battles may also reveal genuine weaknesses in proffered expert knowledge.”).

166. See *supra* notes 59–71 and accompanying text.

167. *United States v. Havvard*, 117 F. Supp. 2d 848, 854 (S.D. Ind. 2000), *aff’d*, 260 F.3d 597 (7th Cir. 2001).

168. 365 F.3d 215, 219 (3d Cir. 2004).

169. Epstein, *supra* note 70, at 629. Epstein was the defense counsel in *Mitchell*.

their mistake, and asking for a do-over. The FBI letter to these agencies, disclosed in discovery, reads in part: “Please test your prior conclusions against these enlarged photographs with the *marked* characteristics.”¹⁷⁰ In short, the “test” was rigged.

Lockheed Martin conducted the second test sponsored by the FBI, known as the 50K study, which involved 50,000 fingerprint images taken from the FBI’s Automated Fingerprint System, a computer database. Although the study proved persuasive in court,¹⁷¹ commentators criticized it.¹⁷² For example, one scholar asserted that the “study addresses the irrelevant question of whether one image of a fingerprint is immensely more similar to itself than to other images—including those of the same finger.”¹⁷³ In contrast, the relevant issue is whether crime scene prints, which are typically distorted, smudged, and one-fifth of the size of record prints, are unique. The Lockheed Martin study, which was never published, did not address this issue.¹⁷⁴

In addition, the rigor of proficiency testing was drawn into question in one case when a fingerprint examiner from New Scotland Yard testified that the FBI proficiency tests were deficient: “It’s not testing their ability. It doesn’t test their expertise. . . . And if I gave my experts these tests, they’d fall about laughing.”¹⁷⁵ A district court agreed, noting that “the FBI examiners got very high proficiency grades, but the tests they took did not. . . . [O]n the present record I conclude that the proficiency tests are less demanding than they should be.”¹⁷⁶ A later FBI report implicitly acknowledged this shortcoming.¹⁷⁷

170. *Id.* at 629 n.132 (emphasis added) (quoting FBI letter). According to Epstein, [t]he FBI was so unhappy with the results of this experiment that it sent the nine agencies in question a new response form This time, however, the FBI took nothing for granted. The FBI provided the agencies with the marked-up enlargements of the fingerprints displaying what the FBI apparently believed to be the common characteristics.

Id.

171. *E.g.*, United States v. Hernandez, 299 F.3d 984, 991 (8th Cir. 2002); United States v. Prime, 220 F. Supp. 2d 1203, 1210 (W.D. Wash. 2002).

172. *E.g.*, David H. Kaye, *Questioning a Courtroom Proof of the Uniqueness of Fingerprints*, 71 INT’L STAT. REV. 521, 526–28 (2003); Sharath Pankanti et al., *On the Individuality of Fingerprints*, 24 IEEE TRANSACTIONS ON PATTERN ANALYSIS & MACHINE INTELLIGENCE 1010, 1024 (2002).

173. Kaye, *supra* note 172, at 527–28. In another passage, he wrote: “the study merely demonstrates the trivial fact that the *same* two-dimensional representation of the surface of a finger is far more similar to itself than to such a representation of the surface of a finger from any other person in the data set.” *Id.* at 527.

174. Professor Kaye also made the following observations: “The sampling procedure was not described beyond the observation that ‘database retrieval software’ selected ‘the first 50,000 left loop records.’” *Id.* at 524. “The report gives no explanation of the algorithms or how they differ.” *Id.* at 524–25. “The report does not describe these distributions. No values for the means and standard deviations are provided.” *Id.* at 525. “[T]he probabilities . . . are too small, making the demonstration of uniqueness seem stronger than it is.” *Id.* at 526.

175. *Llera Plaza II*, 188 F. Supp. 2d 549, 558 (E.D. Pa. 2002).

176. *Id.* at 565.

177. See Stacey, *supra* note 74, at 716 (“Verifiers should be given challenging exclusions during blind proficiency tests to ensure that they are independently applying ACE-V methodology correctly”); see also United States v. Crisp, 324 F.3d 261, 274 (4th Cir. 2003) (Michael, J., dissenting) (“Proficiency testing is typically based on a study of prints that are far superior to those usually retrieved from a crime scene.”); Jennifer L. Mnookin, Op-Ed., *A Blow to the Credibility of Fingerprint*

B. *Suppressing Independent Studies*

During the early stages of the *Mitchell* litigation, the National Institute of Justice was preparing to release a solicitation for fingerprint research. The “Introduction” to the solicitation stated that *Daubert* “require[d] scientists to address the reliability and validity of the methods used in their analysis. Therefore, the purpose of [the] solicitation is to . . . provide greater scientific foundation for forensic friction ridge (fingerprint) identification.”¹⁷⁸ A DOJ solicitation for greater scientific support for fingerprints carried the risk of undermining FBI claims that the technique was on solid footing. After the *Mitchell* trial, the defense attorney learned that the solicitation had been postponed, arguably so it could not be used to support the defense challenge in that case.¹⁷⁹ When the case reached the U.S. Court of Appeals for the Third Circuit, Judge Becker commented on the testimony of Dr. Richard Rau, the NIJ official who coordinated the drafting of the solicitation for the DOJ:

We are deeply discomforted by Mitchell’s contention—supported by Dr. Rau’s account of events, though contradicted by other witnesses—that a conspiracy within the Department of Justice intentionally delayed the release of the solicitation until after Mitchell’s jury reached a verdict. Dr. Rau’s story, if true, would be a damning indictment of the ethics of those involved.¹⁸⁰

The story did not end there. As a result of the court challenges, a project designed to examine various forensic science techniques, including fingerprinting, was under discussion at the NAS. The project was cancelled, however, because the Departments of Justice and Defense insisted on a right of review that the Academy found unacceptable; such a right of review would violate scientific norms. In response, the editor-in-chief of *Science* wrote the “Forensic Science: Oxymoron?” editorial mentioned earlier.¹⁸¹ He also pointed out that the NIJ “regularly resisted including comprehensive evaluations of the science underlying forensic techniques” in planning sessions for conferences sponsored with the

Evidence, BOSTON GLOBE, Feb. 2, 2004, at A15 (“There are no systematic proficiency tests to evaluate examiners’ skill. Those tests that exist are not routinely used and are substandard.”).

178. NAT’L INST. OF JUSTICE, U.S. DEP’T OF JUSTICE, SOLICITATION: FORENSIC FRICTION RIDGE (FINGERPRINT) EXAMINATION VALIDATION STUDIES 3 (2000).

179. See Epstein, *supra* note 70, at 628 n.122 (“Internal documents of the NIJ presently on file with the author . . . reveal that the Institute was ready to publish the Solicitation in September of 1999, but that at the FBI’s request, publication was delayed until after Mitchell’s trial.”).

180. *United States v. Mitchell*, 365 F.3d 215, 255 (3d Cir. 2004); see also *id.* at 232.

[Mitchell’s] most damaging evidence came from Dr. Richard Rau of the NIJ, who coordinated the drafting of the solicitation. Rau testified to conversations at a September 1999 meeting among himself, Donald Kerr (the Assistant Director of the FBI in charge of the FBI crime laboratory), David Boyd (the Deputy Director of the NIJ), and others. Rau claimed that at that meeting Kerr and Boyd agreed to withhold release of the solicitation until the end of Mitchell’s trial. In response to Dr. Rau’s testimony, the government called Kerr, Boyd, and the other individuals at the meeting to testify that Dr. Rau’s account of the delay in releasing the solicitation was incorrect and that the delay was caused by budgetary issues.

Id.

181. See *supra* text accompanying notes 84–85.

NAS, the American Association for the Advancement of Science, the American Bar Association, and the Federal Judicial Center.¹⁸²

The FBI did not undertake a serious review of fingerprints until it was compelled to address the issue due to the negative publicity surrounding the Bureau's misidentification of Brandon Mayfield as a terrorist.¹⁸³ One of the most telling comments about the misidentification, according to the FBI's own report, was that the laboratory culture was poorly suited to detect mistakes: "To disagree was not an expected response."¹⁸⁴

Here, again, the DOJ, through the FBI and NIJ, went to great lengths to manage the research agenda on fingerprint comparisons, as it had in DNA analysis. These tactics would once again be used when the science underlying bullet lead analysis was challenged in court.

V. COMPARATIVE BULLET LEAD ANALYSIS

For over thirty years, FBI experts testified about comparative bullet lead analysis (CBLA), a technique that was first used in the investigation into President Kennedy's assassination.¹⁸⁵ CBLA compares trace chemicals found in bullets at crime scenes with ammunition found in the possession of a suspect. This technique was used when traditional firearms identification could not be employed because, for example, the bullet was too mutilated or the weapon was not recovered. FBI experts used various analytical techniques (first, neutron activation analysis (NAA), and then inductively coupled plasma-atomic emission spectrometry (ICP-AES)) "to determine the concentrations of seven selected elements—arsenic (As), antimony (Sb), tin (Sn), copper (Cu), bismuth (Bi), silver (Ag), and cadmium (Cd)—in the bullet lead alloy of both the crime-scene and the suspect's bullets."¹⁸⁶ Statistical tests were then applied to compare the elements in each bullet and determine whether the fragments and suspect's bullets were "analytically indistinguishable for each of the elemental concentration means."¹⁸⁷ Exactly what the phrase "analytically indistinguishable" meant was the central issue—in other words, did such a finding mean that the bullet fragments came from a small or large universe? The probative value of the test results would, of course, differ if only one hundred bullets had the same chemical composition as opposed to several million bullets.

182. Kennedy, *supra* note 84, at 1625.

183. See Budowle et al., *supra* note 76; *supra* text accompanying notes 72–76.

184. Stacey, *supra* note 74, at 713.

185. See generally Erik Randich & Patrick M. Grant, *Proper Assessment of the JFK Assassination Bullet Lead Evidence from Metallurgical and Statistical Perspectives*, 51 J. FORENSIC SCI. 717 (2006) (discussing the original analysis of the bullet fragments).

186. NAT'L RESEARCH COUNCIL, NAT'L ACAD. OF SCIS., FORENSIC ANALYSIS: WEIGHING BULLET LEAD EVIDENCE 1–2, 15 (2004) [hereinafter NAS CBLA REPORT]. The author served on the NAS Committee.

187. *Id.* at 2.

The technique was not seriously challenged until a retired FBI examiner, William Tobin, began questioning the procedure in scientific and legal journals¹⁸⁸ and in court testimony as well.¹⁸⁹ As a result, the FBI asked the NAS to review the technique.¹⁹⁰ The NAS appointed a committee of scientists, statisticians, and attorneys to conduct the review.¹⁹¹

One of the first things the committee discovered was the disparate (often inconsistent) interpretive conclusions provided by FBI experts in the reported cases. In some, experts testified only that two exhibits were “analytically indistinguishable.”¹⁹² In other cases, examiners concluded that samples “*could have* come from the same batch” or source.¹⁹³ In still others, they stated that the samples *came* from the same source.¹⁹⁴ The testimony in numerous cases went much further and referred to a “box” of ammunition (usually fifty loaded cartridges, sometimes twenty). For example, two specimens:

- “Could have come from the same box,”¹⁹⁵
- Could have come from the same box or a box manufactured on the same day,¹⁹⁶

188. See Edward J. Imwinkelried & William A. Tobin, *Comparative Bullet Lead Analysis (CBLA) Evidence: Valid Inference or Ipse Dixit?*, 28 OKLA. CITY U. L. REV. 43, 44–46 (2003); Erik Randich et al., *A Metallurgical Review of the Interpretation of Bullet Lead Compositional Analysis*, 127 FORENSIC SCI. INT’L 174, 174–76 (2002) (Tobin was a co-author); William A. Tobin & Wayne Duerfeldt, *How Probative Is Comparative Bullet Lead Analysis?*, CRIM. JUST., Fall 2002, at 26, 27. In 2003, a federal district court excluded CBLA evidence under the *Daubert* standard, the first case to do so. *United States v. Mikos*, No. 02 CR 137, 2003 WL 22922197, at *6 (N.D. Ill. Dec. 9, 2003).

189. *E.g.*, *Ragland v. Commonwealth*, 191 S.W.3d 569, 577 (Ky. 2006); *Clemons v. State*, 896 A.2d 1059, 1068–70 (Md. 2006); *State v. Behn*, 868 A.2d 329, 339–42 (N.J. Super. Ct. App. Div. 2005) (Tobin’s affidavit submitted).

190. In *Ragland*, 191 S.W.3d at 580, a Kentucky murder case, an FBI examiner, Kathleen Lundy, lied during an admissibility hearing. She “blamed her conduct partly on a sense of crisis in her work, fed by ‘new and repeated challenges to the validity of the science associated with bullet lead comparison analysis.’” Charles Piller & Robin Mejia, *Science Casts Doubt on FBI’s Bullet Evidence*, L.A. TIMES, Feb. 3, 2003, at A1. Lundy subsequently admitted to her superiors that she had lied, and on June 17, 2003, she pleaded guilty to testifying falsely and was sentenced to a suspended ninety-day jail sentence and a \$250 fine. Mark Pitsch, *Ex-FBI Scientist Pleads Guilty*, COURIER-JOURNAL, June 18, 2003, at 1B; see also Associated Press, *Prosecutors Challenged in Ragland Murder Case*, KY. POST, Sept. 6, 2002, at A13 (“Attorneys for both sides were in court for a hearing in which FBI ballistics expert Kathleen Lundy was scheduled to testify about lying during a preliminary hearing in Shane Ragland’s murder case.”); Maurice Possley, *Study Shoots Holes in Bullet Analyses by FBI*, CHI. TRIB., Feb. 11, 2004, at C14.

191. NAS CBLA REPORT, *supra* note 186, at iv, 5–6. The remainder of this Section, *infra* notes 192–200 and accompanying text, are amplified in the National Academy of Sciences’ report, *Forensic Analysis: Weighing Bullet Lead Evidence*, which the author co-authored, and other previous articles published by the author. See *id.* at 91–93; Giannelli, *supra* note 45, at 198–203.

192. *E.g.*, *Wilkerson v. State*, 776 A.2d 685, 689 (Md. Ct. Spec. App. 2001).

193. *E.g.*, *State v. Krummacher*, 523 P.2d 1009, 1012 (Or. 1974).

194. *E.g.*, *United States v. Davis*, 103 F.3d 660, 673–74 (8th Cir. 1996); *People v. Lane*, 628 N.E.2d 682, 689–90 (Ill. App. Ct. 1993).

195. See *Jones v. State*, 425 N.E.2d 128, 131 (Ind. 1981); *State v. Strain*, 885 P.2d 810, 817 (Utah Ct. App. 1994).

196. See *State v. Grube*, 883 P.2d 1069, 1078 (Idaho 1994); *People v. Johnson*, 499 N.E.2d 1355, 1366 (Ill. 1986).

- Were “consistent with their having come from the same box of ammunition,”¹⁹⁷
- Probably came from the same box,¹⁹⁸
- Must have come from the same box or from another box that would have been made by the same company on the same day.¹⁹⁹

The Report noted other inconsistencies as well.²⁰⁰

The NAS Report, published in 2004, undercut much of the FBI testimony. The Report found that 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.”²⁰¹

A. Withholding Data

Much of FBI testimony rested on a database, which the Bureau had built up over the course of many years. Although the NAS Committee frequently asked for this data during its year-long investigation, the FBI did not turn over the data until it was too late to include an analysis of the information in its report.²⁰² The two statisticians who served on the NAS Committee would later write that their subsequent inspection of the data “identified several peculiarities.”²⁰³ First, the database was incomplete. The FBI claimed to have a “complete data file” of some 71,000+ measurements but only 64,869 were turned over.²⁰⁴ Moreover,

197. See *State v. Reynolds*, 297 S.E.2d 532, 534 (N.C. 1982).

198. *Bryan v. State*, 935 P.2d 338, 360 (Okla. Crim. App. 1997).

199. See *Davis*, 103 F.3d at 666 (“An expert testified that such a finding is rare and that the bullets must have come from the same box or from another box that would have been made by the same company on the same day.”); *Commonwealth v. Daye*, 587 N.E.2d 194, 207 (Mass. 1992); *State v. King*, 546 S.E.2d 575, 584 (N.C. 2001) (“Ms. Lundy opined that, based on her lead analysis, the bullets she examined either came from the same box of cartridges or came from different boxes of the same caliber, manufactured at the same time.”).

200. An early case reported that the specimens “had come from the same batch of ammunition: they had been made by the same manufacturer on the same day and at the *same hour*.” *Brown v. State*, 601 P.2d 221, 224 (Alaska 1979) (emphasis added). In another case, the expert “opined that the same company produced the bullets at the same time, using the same lead source. Based upon Department of Justice records, she opined that an overseas company called PMC produced the bullets around 1982.” *People v. Villarta*, No. H021354, 2002 WL 66887, at *6 (Cal. Ct. App. Jan. 17, 2002). One case reports the expert’s conclusion with a statistic. *Earhart v. State*, 823 S.W.2d 607, 614 (Tex. Crim. App. 1991). In recent years, the testimony became more limited. A 2002 FBI publication stated the conclusion as follows: “Therefore, they *likely* originated from the same manufacturer’s source (melt) of lead.” Charles A. Peters, *The Basis for Compositional Bullet Lead Comparisons*, FORENSIC SCI. COMM. (July 2002), <http://www2.fbi.gov/hq/lab/fsc/backissu/july2002/peters.htm> (emphasis added).

201. NAS CBLA REPORT, *supra* note 186, at 7.

202. See Clifford H. Spiegelman & Karen Kafadar, *Data Integrity and the Scientific Method: The Case of Bullet Lead Data as Forensic Evidence*, CHANCE, June 2006, at 17, 22.

203. *Id.*

204. *Id.* (“During the open sessions of the committee meetings, the FBI claimed to have a ‘complete data file’ of some 71,000+ measurements. Following repeated requests from the committee, the FBI submitted at its last meeting a CD-ROM that contained two data files with a combined total of 64,869 bullet (not 71,000+) measurement records. This dataset could not be analyzed in time for the release of the report . . .”).

only measurements made by ICP-AES were included; a different analytical method, NAA, had been used before 1997.²⁰⁵ Both techniques measured the same elements, and therefore the results from either technique would have been suitable for comparison. Further, the numbering system for the bullets was “highly inconsistent and rather unexpected,” suggesting that some bullet measurements had been deleted.²⁰⁶ Additionally, “a rough investigation of the measurement error indicated many measurement errors that exceeded the FBI’s claimed analytical precision of 2–5%.”²⁰⁷ Finally, “only 15% of the 1,079 cases listed in these two files had measurements from [National Institute of Standards and Technology] . . . making it impossible to determine the frequency of matches” in some cases.²⁰⁸ Accordingly, the “missing data and the inconsistent precisions” undermined the Bureau’s public claims.²⁰⁹

As researchers steeped in the traditions of science, these authors were puzzled by the FBI’s failure to disclose data. They wrote: “The scientific method is important for science generally; forensic science is no exception. . . . [T]he evidence in this paper suggests that, at least for CBLA, forensic science failed in the requirement to share the materials, methods, and data used to reach conclusions with the scientific community.”²¹⁰

In short, the NAS Committee, appointed at the behest of and funded by the FBI, was not provided with critical data that would have assisted it in evaluating the technique. This data formed the basis of the Bureau’s testimony in about five hundred prosecutions, including death penalty cases.²¹¹ Perhaps the most disturbing case is *Earhart v. State*,²¹² a capital murder case in which CBLA evidence apparently played a significant role.²¹³ The trial transcript contains the following expert testimony:

205. *Id.*

206. *Id.* “[T]he numbering system of the bullets was highly inconsistent and rather unexpected (e.g., the bullets from a suspect in a particular case might be numbered Q13A, Q13B, Q13C, Q14A, Q14B, Q14C, . . . , leading one to wonder what happened to bullets Q01, Q02, . . . , Q12).” *Id.* Other illustrations of incomplete data were noted: “while most of the bullets indicated three measurements, about 30 bullets had six or more measurements.” *Id.*

[O]nly about 50% of the bullets in this dataset were identified as having come from one of the four major bullet manufacturers in the United States [(Cascade Cartridge, Inc., or CCI; Federal; Remington; and Winchester)]; the “complete data file” of 71,000 bullets may yield a higher proportion of bullets from these four manufacturers.

Id. at 18–19, 22.

207. *Id.* at 22.

208. *Id.*

209. *Id.*

210. *Id.* at 24.

211. See Giannelli, *supra* note 45, at 198–203 (discussing CBLA).

212. 823 S.W.2d 607, 614 (Tex. Crim. App. 1991) (“[The expert] concluded that the likelihood that two .22 caliber bullets came from the same batch, based on *all* the .22 bullets made in one year, is approximately .000025 percent, ‘give or take a zero.’ [The expert] subsequently acknowledged, however, that the numbers which he used to reach the .000025 percent statistic failed to take into account that there are different types of .22 caliber bullets made each year . . .”).

213. See *Earhart v. Johnson*, 132 F.3d 1062, 1067 (5th Cir. 1998) (denying habeas relief) (“Given the significant role the bullet evidence played in the prosecution’s case, we shall therefore assume

“[F]rom my 21 years experience of doing bullet lead analysis and doing research on boxes of ammunition down through the years I can determine if bullets came from the same box of ammunition”²¹⁴ According to the NAS Committee, however, the amount of bullets that can be produced from an “analytically indistinguishable” melt “can range from the equivalent of as few as 12,000 to as many as 35 million 40-grain, .22 caliber longrifle bullets.”²¹⁵ In other words, tens of thousands of boxes could have been involved, which would have greatly undercut the probative value of the evidence. Earhart was executed before the Report was released.²¹⁶

B. *Spinning Science*

The FBI’s response to the NAS Report was also disconcerting. The Bureau quickly put out a press release, obscuring the Report’s findings.²¹⁷ The release highlighted the Committee’s conclusion that the FBI was using appropriate instrumentation and the correct elements for comparison. Yet these aspects of CBLA were never seriously questioned. Rather, the interpretation of the data was disputed. Only one sentence in the press release addressed this important issue: “Recommendations by the [NAS] included suggestions to improve the statistical analysis, quality control procedures, as well as expert testimony.”²¹⁸ The news media read the Report quite differently—for example, “Study Shoots Holes in Bullet Analyses by FBI,”²¹⁹ “Report Finds Flaws,”²²⁰ “Scientific Panel Questions

Earhart could have made a sufficient threshold showing that he was entitled to a defense expert under Texas law.”).

214. Statement of Facts: Trial at 5248–49, *State v. Earhart*, No. 4064 (Tex. D. Apr. 21, 1989) (testimony of John Riley); see also *id.* at 5258 (“Well, bullets that are . . . analytically indistinguishable compositions . . . typically are found within the same box of ammunition and that is the case that we have here. Now, bullets that are the same composition can also be found in other boxes of ammunition, but it’s most likely those boxes would have been manufactured at the same place on or about the same date.”). A different FBI examiner took a different position in another case. See Transcript of Record at 1–2, *Commonwealth v. Wilcox* (Ky. Feb. 28, 2002) (*Daubert* hearing; testimony of Charles A. Peters, FBI examiner) (“We have never testified, to my knowledge, that that bullet came from that box. We’d never say that. All we are testifying is that that bullet, or that victim fragment or something, the bullet, either came from that box or the *many* boxes that were produced at the same time.” (emphasis added)).

215. NAS CBLA REPORT, *supra* note 186, at 6.

216. See Death Penalty Info. Ctr., *Searchable Execution Database*, DEATHPENALTYINFO.ORG, <http://www.deathpenaltyinfo.org/executions> (search “Earhart” under “Search by Name” search box) (last visited Nov. 9, 2010).

217. Press Release, Fed. Bureau of Investigation, National Academy of Sciences Releases FBI-Commissioned Study on Bullet Lead Analysis (Feb. 10, 2004), available at <http://www.fbi.gov/news/pressrel/press-releases/national-academy-of-sciences-releases-fbi-commissioned-study-on-bullet-lead-analysis>.

218. *Id.*

219. Possley, *supra* note 190, at C14.

220. Charles Piller, *Report Finds Flaws in FBI Bullet Analysis: Changes Are Proposed for the Technique Often Cited in Expert Testimony in Criminal Trials*, L.A. TIMES, Feb. 11, 2004, at A12.

FBI Bullet Analysis Method,”²²¹ and “Report Questions the Reliability of an F.B.I. Ballistics Test.”²²²

The FBI also included the following passage in the press release: “The basis of bullet lead compositional analysis is supported by approximately 50 peer-reviewed articles found in scientific publications beginning in the early 1970’s. Published research and validation studies have continued to demonstrate the usefulness of the measurement of trace elements within bullet lead.”²²³ In contrast, the NAS Report pointed out that there were “very few peer-reviewed articles on homogeneity and the rate of false positive matches” and “[o]utside reviews have only recently been published.”²²⁴ In effect, the FBI cherry-picked favorable statements from the Report and downplayed the unfavorable crucial findings.

Over one year later, the FBI discontinued CBLA testing,²²⁵ issuing another slanted press release. Once again, the release minimized the problems, citing the following reason for its decision: “While the FBI Laboratory still firmly supports the scientific foundation of bullet lead analysis, given the costs of maintaining the equipment, the resources necessary to do the examination, and its relative probative value, the FBI Laboratory has decided that it will no longer conduct this exam.”²²⁶ Nevertheless, a month earlier, Dwight Adams, then laboratory director, had written a memorandum to the FBI Director specifying different reasons for abandoning the technique, including the following comments: (1) “[w]e cannot afford to be misleading to a jury” and (2) “[w]e plan to discourage prosecutors from using our previous results in future prosecutions.”²²⁷ Neither concern was reflected in the press release.

In the wake of the NAS Report, several state courts excluded CBLA evidence.²²⁸ Surprisingly, the FBI supplied affidavits in several

221. Randolph E. Schmid, *Panel Questions FBI Bullet Analysis*, NAT’L WHISTLEBLOWERS CTR., <http://www.whistleblowers.org/index.php?option=content&task=view&id=269> (last visited Nov. 9, 2010).

222. Eric Lichtblau, *Report Questions the Reliability of an F.B.I. Ballistics Test*, N.Y. TIMES, Feb. 11, 2004, at A22.

223. Press Release, Fed. Bureau of Investigation, *supra* note 217.

224. NAS CBLA REPORT, *supra* note 186, at 100.

225. Eric Lichtblau, *F.B.I. Abandons Disputed Test for Bullets from Crime Scenes*, N.Y. TIMES, Sept. 2, 2005, at A12.

226. Press Release, Fed. Bureau of Investigation, FBI Laboratory Announces Discontinuation of Bullet Lead Examinations (Sept. 1, 2005), available at http://www2.fbi.gov/pressrel/pressrel05/bullet_lead_analysis.htm (search “Discontinuation of Bullet Lead Examinations” in search box).

227. John Solomon, *FBI Forensic Test Full of Holes*, WASH. POST, Nov. 18, 2007, at A1.

228. See *Ragland v. Commonwealth*, 191 S.W.3d 569, 580 (Ky. 2006) (“If the FBI Laboratory that produced the CBLA evidence now considers such evidence to be of insufficient reliability to justify continuing to produce it, a finding by the trial court that the evidence is both scientifically reliable and relevant would be clearly erroneous”); *Clemons v. State*, 896 A.2d 1059, 1070, 1078 (Md. 2006) (“CBLA is not admissible under the *Frye-Reed* standard because it is not generally accepted within the scientific community as valid and reliable. . . . Based on the criticism of the processes and assumptions underlying CBLA, we determine that the trial court erred in admitting expert testimony based on CBLA because of the lack of general acceptance of the process in the scientific community.”); *State v. Behn*, 868 A.2d 329, 331 (N.J. Super. Ct. App. Div. 2005) (finding the technique was “based on erroneous scientific foundations”). *But see* *United States v. Davis*, 406 F.3d 505, 509 (8th Cir. 2005)

cases supporting prosecutors' efforts to sustain convictions based on the technique. In one affidavit, the FBI cited the NAS Report but failed to mention that the Report had faulted the FBI's statistical methods. The chair of the NAS Committee criticized the affidavit because it did "not discuss the statistical bullet-matching technique, which is key and probably the most significant scientific flaw found by the committee."²²⁹ The affidavit was also misleading because it estimated that the maximum number of .22 caliber bullets in a batch of lead was 1.3 million, when the NAS Committee found that the number could be as high as 35 million.²³⁰

On November 18, 2007, *60 Minutes* aired a segment on CBLA.²³¹ In an interview, Dwight Adams, the now retired FBI lab director, acknowledged that testimony about boxes was "misleading and inappropriate."²³² That broadcast, along with a *Washington Post* investigation, questioned the FBI's response to the NAS Report.²³³ The main problem was that only the FBI had records of all the cases in which its experts had testified, and the FBI had declined to disclose the names of those cases.²³⁴ Instead, the FBI relied on the NAS Report, its own press releases, and pro forma letters sent to prosecution and defense organizations to notify defendants. This method of communication was grossly inadequate because the letters neither highlighted the problem nor its significance.²³⁵ A few days after the *60 Minutes* expose, Senator Patrick Leahy, the Chairman of the Senate Judiciary Committee, sent a letter to the FBI Director, noting that the FBI's letters gave "the false impression that these discredited tests had continuing reliability."²³⁶

("Davis's trial counsel cannot be said to be ineffective for failing to challenge the FBI's methodology on a basis that was not advanced by the scientific community at the time of trial."); *Commonwealth v. Fisher*, 870 A.2d 864, 871 (Pa. 2005) ("The CBLA evidence, at best, established a possible connection between Appellant and the bullets recovered from the victim's body.").

229. Solomon, *supra* note 227 (quoting Ken MacFadden).

230. *Id.*; see also *supra* text accompanying note 215 (quoting NAS CBLA Report).

231. *60 Minutes: Evidence of Injustice* (CBS television broadcast Nov. 18, 2007).

232. *Id.*

233. Solomon, *supra* note 227.

234. *Id.* at A1 ("Hundreds of defendants sitting in prisons nationwide have been convicted with the help of an FBI forensic tool that was discarded more than two years ago. But the FBI lab has yet to take steps to alert the affected defendants or courts, even as the window for appealing convictions is closing . . .").

235. The Innocence Network and the National Association of Criminal Defense Lawyers have formed a task force and are working with the FBI to contact defense attorneys and convicts. See Vesna Jaksic, *Faulty Bullet-Test Cases Finding Way to Court*, NAT'L L.J., Feb. 25, 2008 ("The task force is lining up pro bono commitments from several law firms to handle the cases.").

236. John Solomon, *Leahy Pursues Forensic-Test Answers: Attorney General Is Told to Prepare for Senate Inquiry*, WASH. POST, Nov. 22, 2007, at A2 (quoting Senator Leahy). Leahy also wrote:

The new revelations about bullet-lead analysis are just the latest examples of the Department's inadequate efforts to ensure that sound forensic testing is utilized to the maximum extent to find the guilty rather than merely obtain a conviction. Punishing the innocent is wrong and allows the guilty party to remain free.

Id.

VI. PRELUDE TO THE NAS FORENSIC SCIENCE REPORT

As noted earlier, the NAS appointed its forensic science committee in 2006.²³⁷ The appointment of a committee with so many independent scientists was apparently a threat to the DOJ.²³⁸ On April 10, 2008, at a subcommittee hearing, Senator Richard Shelby, Republican of Alabama, stated that individuals at NIJ had “attempted to derail the [Fiscal Year 2006] report language that [he] requested, directing the National Academy of Sciences to conduct an independent forensics study” and that “[c]urrent and former employees at [NIJ], along with lobbyists and contractors, have attempted to undermine and influence the National Academies study.”²³⁹ The Senator also objected to a NIJ-convened summit designed to undercut the NAS study.²⁴⁰ He elaborated:

[My] staff discovered potential conflicts of interest, unethical behavior, and a serious void of transparency where lobbyists, including former DOJ employees, were contracted to NIJ to conduct policy forming studies and surveys. These same lobbyists . . . are also representing clients whose business success depends on the results of the studies and surveys their lobbyists conducted.²⁴¹

Senator Shelby was not the only one with a dim view of the DOJ. In a presentation to the Committee, an expert from the Secret Service “blasted the F.B.I. for developing questionable techniques ‘on an ad-hoc basis, without proper research.’ He said the Secret Service wanted the National Academy ‘to send a message to the entire forensic science community that this type of method development is not acceptable practice.’”²⁴²

VII. CONCLUSION

In *Daubert*, the Supreme Court emphasized the importance of empirical research.²⁴³ The Court quoted Hempel: “[T]he statements consti-

237. See *supra* note 2.

238. As one article reported:

Donald Kennedy, a Stanford scientist who helped select the report’s authors, said federal law enforcement agencies resented “intervention” of mainstream science—especially the National Academy—in the courts.

He said the National Institute of Justice . . . tried to derail the forensic study by refusing to finance it and demanding to review the findings before publication.

Solomon Moore, *Science Found Wanting in Nation’s Crime Labs*, N.Y. TIMES, Feb. 5, 2009, at A1.

239. *Fiscal 2009 Appropriations: Commerce, Justice and Science Before the Subcomm. on Commerce, Justice, Sci. & Related Agencies of the S. Comm. on Appropriations*, 110th Cong. (2008) (statement of Sen. Richard Shelby, Ranking Member, Subcomm. on Commerce, Justice, Sci. & Related Agencies), available at http://src.senate.gov/public/_files/radio/shelby4_10_08.mp3.

240. *Id.* (“On December the 17th and 18th of this past year, the Deputy Director of [NIJ] even convened a counterproductive forensics summit here in Washington. Many of the attendees deemed the summit a huge waste of more than \$300,000 in taxpayer’s funds.”).

241. *Id.* (“I am not so sure the seriousness of this matter has the full attention of the leadership at the [DOJ]. I hope and encourage you to check into this matter.”).

242. Moore, *supra* note 238.

243. See *supra* text accompanying notes 48–49.

tuting a scientific explanation must be capable of empirical test,”²⁴⁴ and then Popper: “[T]he criterion of the scientific status of a theory is its falsifiability, or refutability, or testability.”²⁴⁵ In their amici brief in *Daubert*, the *New England Journal of Medicine* and other medical journals observed:

“Good science” is a commonly accepted term used to describe the scientific community’s system of quality control which protects the community and those who rely upon it from unsubstantiated scientific analysis. It mandates that each proposition undergo a rigorous trilogy of publication, replication and verification before it is relied upon.²⁴⁶

Such research is precisely what the NAS Report found to be lacking with many forensic techniques. In addressing the lack of funding, the Report commented: “Of the various facets of underresourcing, the committee is most concerned about the knowledge base. Adding more dollars and people to the enterprise might reduce case backlogs, but it will not address fundamental limitations in the capabilities of forensic science disciplines to discern valid information from crime scene evidence.”²⁴⁷ The Report also observed:

A body of research is required to establish the limits and measures of performance and to address the impact of sources of variability and potential bias. Such research is sorely needed, but it seems to be lacking in most of the forensic disciplines that rely on subjective assessments of matching characteristics.²⁴⁸

Scientists with impeccable credentials should conduct the needed research. Moreover, they should be independent of law enforcement. The most thorough and well-reasoned reports in the field have come from impartial scientific investigations, most done by the NAS, including reports on voiceprints,²⁴⁹ DNA,²⁵⁰ polygraph,²⁵¹ and bullet lead analysis.²⁵² The process should also be transparent. Scientists “are generally expected to exchange research data as well as unique research materials that are essential to the replication or extension of reported findings.”²⁵³

244. HEMPEL, *supra* note 49, at 49.

245. POPPER, *supra* note 49, at 37 (emphasis omitted).

246. Brief of the New England Journal of Med. et al. as Amici Curiae Supporting Respondents at 2, *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993) (No. 92-102). Peer review’s “role is to promote the publication of well-conceived articles so that the most important review, the consideration of the reported results by the scientific community, may occur after publication.” *Id.* at 3.

247. NAS FORENSICS REPORT, *supra* note 2, at 15.

248. *Id.* at 8. Similar statements are found elsewhere in the Report. *See id.* at 87.

249. *See* NAS VOICE ID REPORT, *supra* note 146.

250. *See* NAS DNA REPORT I, *supra* note 40; NAS DNA REPORT II, *supra* note 40; *see also* OFFICE OF TECH. ASSESSMENT, *supra* note 91.

251. *See* NAT’L RESEARCH COUNCIL, NAT’L ACAD. OF SCIS., THE POLYGRAPH AND LIE DETECTION (2003).

252. *See* NAS CBLA REPORT, *supra* note 186.

253. NAT’L RESEARCH COUNCIL, NAT’L ACAD. OF SCIS., RESPONSIBLE SCIENCE: ENSURING THE INTEGRITY OF THE RESEARCH PROCESS 48 (1992); *see also* NAS SHARING DATA REPORT, *supra* note

The government has not only failed to conduct the needed research, it has thwarted efforts to do so. Indeed, the conduct described in this Article rivals that of some private corporations such as the tobacco industry²⁵⁴—shaping the research agenda, limiting access to data, attacking experts who disagree with its positions, and “spinning” negative reports. Currently, we have the worst of two possible worlds. Basic research in the forensic sciences is weak, and the only agency currently capable of funding research, the DOJ, is sabotaging efforts to conduct rigorous independent studies.

The NAS Report on forensic science provides a blueprint for rectifying this problem. Adoption of all recommendations would be the most important development in forensic science since the establishment of the crime laboratory in the mid-1920s.²⁵⁵ The centerpiece of the NAS Report is the creation of an independent federal agency to control funding and research in the field. This Article provides evidence supporting this proposal. Congress should act on the NAS recommendation and establish a National Institute of Forensic Sciences.

117, at 4 (advocating a “uniform principle for sharing integral data and materials expeditiously” or UPSIDE).

254. “The tobacco industry is the poster child for bending science, and its often path-breaking strategies will be featured throughout this book.” MCGARITY & WAGNER, *supra* note 127, at 27.

255. See RICHARD SAFERSTEIN, *CRIMINALISTICS: AN INTRODUCTION TO FORENSIC SCIENCE* 6 (5th ed. 1995) (“The oldest forensic laboratory in the United States is that of the Los Angeles Police Department, created in 1923 by August Vollmer, a police chief from Berkeley, California.”); John I. Thornton, *Criminalistics—Past, Present, and Future*, 11 *LEX ET SCIENTIA* 1, 23 (1975) (“In 1923, Vollmer served as Chief of Police of the City of Los Angeles for a period of one year. During that time, a crime laboratory was established at his direction.”).