

**THE DOUBLE HELIX AND  
THE LAW OF EVIDENCE**

David H. Kaye  
Harvard University Press, 2010  
352 pages, \$47.50  
ISBN-10: 0-67-4035887  
ISBN-13: 978-0-67-4035881  
(hardcover)

**Reviewed by  
Paul C. Giannelli\***

David Kaye's *The Double Helix and the Law of Evidence*<sup>1</sup> is a remarkable accomplishment. According to the preface, the book "is part history, part legal analysis, part popular science, and part applied statistics" and tells "a tale of scientific egos, journalistic hype, lawyerly maneuvering, and judicial doctrine and disposition."<sup>2</sup> It is a rich and nuanced story about the intersection of science and law. Although not the first book on the subject,<sup>3</sup> *Double Helix* is a distinctive narrative written by a law professor who has spent his career writing about science, statistics, and law.<sup>4</sup>

The book is also timely. The National Research Council's (NRC) landmark report on forensic science—*Strengthening Forensic Science in the*

---

\*Distinguished University Professor and Albert J. Weatherhead III & Richard W. Weatherhead Professor of Law, Case Western Reserve University.

1. DAVID H. KAYE, *THE DOUBLE HELIX AND THE LAW OF EVIDENCE* (2010) [hereinafter *DOUBLE HELIX*].

2. *Id.* at xi.

3. See JAY D. ARONSON, *GENETIC WITNESS: SCIENCE, LAW, AND CONTROVERSY IN THE MAKING OF DNA PROFILING* (2007); MICHAEL LYNCH ET AL., *TRUTH MACHINE: THE CONTENTIOUS HISTORY OF DNA FINGERPRINTING* (2008). Books written by prosecutors include: GEORGE "WOODY" CLARKE, *JUSTICE AND SCIENCE: TRIALS AND TRIUMPHS OF DNA EVIDENCE* (2007); HARLAN LEVY, *AND THE BLOOD CRIED OUT: A PROSECUTOR'S SPELLBINDING ACCOUNT OF THE POWER OF DNA* (1996).

4. Kaye, the Distinguished Professor of Law and Weiss Family Scholar at Pennsylvania State University, is a respected evidence scholar. He is a contributor to many standard works in the field. See DAVID L. FAIGMAN ET AL., *MODERN SCIENTIFIC EVIDENCE* (2010–11 ed.); DAVID H. KAYE ET AL., *THE NEW WIGMORE: A TREATISE ON EVIDENCE: EXPERT EVIDENCE* (2004); MCCORMICK ON EVIDENCE (6th ed. 2006). For a listing of some relevant articles by Professor Kaye, see *infra* note 35.

*United States: A Path Forward*<sup>5</sup>—elevated deoxyribonucleic acid (DNA) profiling to almost iconic status. After two years of studying fingerprints, handwriting, firearms identification (“ballistics”), and other common forensic techniques, the NRC report concluded that “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.”<sup>6</sup> Indeed, many commentators have cited DNA evidence as the new gold standard in forensic science, replacing fingerprints in this regard.<sup>7</sup> It is not uncommon to find negative comparisons between DNA profiling and other forensic techniques:

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.<sup>8</sup>

The accolades for DNA evidence are largely justified. As Kaye observes: “Then came DNA evidence. The legal world would never be the same.”<sup>9</sup> There is little doubt that forensic DNA profiling has become a powerful instrument for identifying and convicting the guilty.<sup>10</sup> For example, the national DNA database linked Fletcher Worrell to twenty-five rapes, which were committed over a span of thirty years in New York, New Jersey, and Maryland

---

5. COMM. ON IDENTIFYING THE NEEDS OF THE FORENSIC SCI. CMTY. ET AL., NAT’L RESEARCH COUNCIL OF THE NAT’L ACADS., STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD (2009) [hereinafter NRC REPORT].

6. *Id.* at 100.

7. See Margaret A. Berger, *Expert Testimony in Criminal Proceedings: Questions Daubert Does Not Answer*, 33 SETON HALL L. REV. 1125, 1126 (2003) (“DNA profiling . . . is undoubtedly our ‘gold standard’ of expertise.”); Michael Lynch, *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) (“[T]he scientific integrity and reliability of DNA testing have helped DNA replace fingerprinting and made DNA evidence the new ‘gold standard’ of forensic evidence.”).

8. Donald Kennedy & Richard A. Merrill, *Assessing Forensic Science*, 20 ISSUES IN SCI. & TECH. 33, 34 (Fall 2003); see also Jennifer L. Mnookin, *Fingerprint Evidence in an Age of DNA Profiling*, 67 BROOK. L. REV. 13, 43 (2001) (“One consequence of DNA profiling and its admissibility into court is that it has opened the door to challenging fingerprinting.”); 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) (“[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.”); Sandy L. Zabell, *Fingerprint Evidence*, 13 J.L. & POL’Y 143, 143 (2005) (“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.”).

9. DOUBLE HELIX, *supra* note 1, at 35.

10. See COMM. ON DNA FORENSIC SCI.: AN UPDATE, NAT’L RESEARCH COUNCIL OF THE NAT’L ACADS., THE EVALUATION OF FORENSIC DNA EVIDENCE 73 (1996) (“DNA analysis is one of the greatest technical achievements for criminal investigation since the discovery of fingerprints.”) [hereinafter 1996 DNA REPORT].

(where he was known as the “Silver Springs Rapist”).<sup>11</sup> More recently, DNA helped identify the “Grim Sleeper,” a serial killer who had stalked Los Angeles for nearly twenty-five years. Law enforcement accomplished this by means of a relatively new procedure, known as familial DNA searching.<sup>12</sup> The exoneration of the innocent through DNA testing is no less impressive. For example, on January 4, 2011, Cornelius Dupree was released from prison after serving thirty years for a rape that he did not commit.<sup>13</sup> According to the Cardozo Law School Innocence Project, 273 convicts have been exonerated through DNA testing, seventeen of whom served time on death row.<sup>14</sup> In 123 of these cases, DNA subsequently led to the arrest of the actual perpetrator.<sup>15</sup>

Nevertheless, even with DNA’s remarkable success, some caveats are in order. First, in terms of empirical testing, other forensic disciplines did not set the bar very high. As the NRC report observed: “[S]ome forensic science disciplines are supported by little rigorous systematic research to validate the discipline’s basic premises and techniques.”<sup>16</sup> Second, the DNA “admissibility wars” were not easily won. Indeed, the transfer of DNA technology into the courtroom was exceptionally contentious and the battle lines ebbed and flowed as new scientific articles and studies were published. It is in describing this process that *Double Helix* makes a major contribution. As an academic lawyer, Kaye explains the legal doctrines (and what he calls legal dispositions) embedded in the DNA story. Given the complexity of the subject, the book’s clarity is noteworthy.

---

11. Julia Preston, *Victim Never Saw the Rapist, but Some Clues Can’t Be Hidden*, N.Y. TIMES, April 28, 2005, at B1 (DNA profile evidence derived from a 32-year-old rape kit).

12. Editorial, *A Yellow Light to DNA Searches*, N.Y. TIMES, July 12, 2010 (appearing in print on July 13, 2010 at A24). The killer murdered at least ten people, but his profile was not in the DNA database. However, the police got a “close partial match” to Christopher Franklin, who had been imprisoned based on a weapons conviction. A close match meant two things. First, Christopher Franklin was not the Grim Sleeper. Second, a relative of his probably was. The police narrowed the list of possible suspects to Christopher’s father, Lonnie Franklin. They then collected a saliva sample taken from a discarded slice of pizza, which matched the samples alleged to belong to the killer.

13. James C. McKinley Jr., *Texas: DNA Evidence Clears Man After 30 Years*, N.Y. TIMES, Jan. 4, 2011, at A13. Dupree was convicted in 1980 of robbing a couple and then kidnapping and raping the woman. DNA testing of traces of semen exonerated him weeks after he was released on parole after spending around thirty years in prison.

14. *Facts on Post-Conviction DNA Exonerations*, THE INNOCENCE PROJECT, [http://www.innocenceproject.org/Content/Facts\\_on\\_PostConviction\\_DNA\\_Exonerations.php](http://www.innocenceproject.org/Content/Facts_on_PostConviction_DNA_Exonerations.php), (last visited Aug. 15, 2011). The exonerees came from thirty-four states, and the average time of incarceration is thirteen years. Unfortunately, 22% of cases investigated had to be closed because of lost or missing evidence. *Id.*

15. *Id.*

16. NRC REPORT, *supra* note 5, at 22; *see also* Mnookin, *supra* note 8, at 17 (“[F]ingerprints were accepted as an evidentiary tool without a great deal of scrutiny or skepticism” of their underlying assumptions.); 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, 738 (1989) (“Our literature search for empirical evaluation of handwriting identification turned up one primitive and flawed validity study from nearly 50 years ago, one 1973 paper that raises the issue of consistency among examiners but that presents only uncontrolled impressionistic and anecdotal information not qualifying as data in any rigorous sense, and a summary of one study in a 1978 government report. Beyond this, nothing.”).

## I. HISTORY OF DNA EVIDENCE

*Double Helix's* treatment of the judicial history of DNA is comprehensive. After examining Alec Jeffreys' insight recognizing the potential of DNA as a means of identification, Kaye discusses DNA's first use in the Pitchfork case in the United Kingdom, where DNA profiling exonerated the prime suspect and eventually led the police to a double rape-murderer. The various technologies are then described. 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 (STRs)—the current procedure. In addition to nuclear DNA analysis, courts have admitted evidence based on mitochondrial DNA sequencing. The latter subject is introduced in a fascinating chapter that discusses the identification of the remains of the last Russian Tsar and his family.<sup>17</sup> Other technologies such as low-copy-number STR profiles<sup>18</sup> and Y chromosome STRs<sup>19</sup> are also considered. We are even told of an Australian community that attempted to use DNA testing to enforce its pooper-scooper law, a rather ingenious attempt to catch the miscreants among us.<sup>20</sup>

DNA technology presented the criminal justice system with formidable challenges. Prosecutors introduced new DNA technologies at the trial level as cases litigating the older procedures worked their way through the appellate court system. As Kaye observes:

Within a year or two of the discovery of the polymerase chain reaction as a technique for amplifying DNA fragments, a criminal court was confronted with a PCR-based test for identity. Likewise, it took only two years or so for VNTR-RFLP testing to be brought from the laboratory bench to the judicial bench . . . .<sup>21</sup>

No other technique used in criminal prosecutions rivals DNA. Neutron activation analysis was perhaps the most sophisticated technique introduced prior to DNA profiling, but its impact was limited.<sup>22</sup> The judicial history of spectrographic analysis of speech samples, known as "voiceprints," is somewhat similar to DNA profiling's history in that courts reacted to new reports and publications while addressing admissibility issues,<sup>23</sup> producing numerous "waves" of cases. For different reasons, both activation analysis and voiceprints have been relegated to the "dustbin" of history.<sup>24</sup> Interestingly, like

---

17. *DOUBLE HELIX*, *supra* note 1, at 218–25.

18. *Id.* at 209.

19. *Id.*

20. *Id.* at 2.

21. *Id.* at 243. VNTR stands for variable number tandem repeat.

22. *See* 1 PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, *SCIENTIFIC EVIDENCE* 603–18 (4th ed. 2007) (discussing the legal history of activation analysis).

23. *Id.* at 571–602 (discussing the legal history of voiceprints).

24. An NRC report calling for more empirical research on voiceprints led to its diminished use in criminal cases. *See* COMM. ON THE EVALUATION OF SOUND SPECTROGRAMS, NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., *ON THE THEORY AND PRACTICE OF VOICE*

DNA, both arrived with much hyperbole—the former was labeled a “nuclear fingerprint”<sup>25</sup> and the latter contained an unwarranted comparison to fingerprints in its very name.<sup>26</sup>

## II. THE DNA WARS

*Double Helix* also covers the major controversies, such as *People v. Castro*<sup>27</sup>—the 1989 case in which DNA evidence was first successfully challenged.<sup>28</sup> 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 this data were submitted to a peer-reviewed journal in support of a conclusion, they would not be accepted. Further experimentation would be required.”<sup>29</sup> *Castro* also highlighted a different issue. Eric Lander, a prominent molecular biologist, who became enmeshed in the *Castro* case, 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.”<sup>30</sup> Even today, only a few states require their crime laboratories to be accredited. The initial skirmishes over laboratory protocols quickly metamorphosed into fights over statistical

---

IDENTIFICATION 2 (1979) (“[A]t present the assumption [underlying the technique] is not adequately supported by scientific theory and data. Viewpoints about probable errors in identification decisions at present result mainly from various professional judgments and fragmentary experimental results rather than from objective data representative of results in forensic applications.”).

Neutron activation analysis (NAA) has a different history. Its use in hair analysis was discredited, while its use in gunshot residue testing was supplanted by other techniques, ones that did not require a research reactor and the accompanying problem of nuclear waste disposal. GIANNELLI & IMWINKELRIED, *supra* note 22, at 603–18.

25. See *State v. Coolidge*, 260 A.2d 547, 560 (N.H. 1969) (NAA of hair “not presented as being ‘as infallible as that of fingerprints’”), *rev’d on other grounds*, 403 U.S. 443 (1971); Dennis S. Karjala, Comment, *The Evidentiary Uses of Neutron Activation Analysis*, 59 CAL. L. REV. 997, 1021 (1971) (fingerprints “differ in a fundamental way from a comparison of the results of an NAA measurement”); *id.* at 1029 (phrase “nuclear fingerprint” is “quite misleading”).

26. See *United States v. Baller*, 519 F.2d 463, 465 n.1 (4th Cir. 1975) (“The use of the term ‘voiceprint,’ with its overtones of ‘fingerprint,’ gives voice spectrographic identification an aura of absolute certainty and accuracy which is neither justified by the facts nor claimed by experts in the field. While the district court’s instructions in this case counteracted this effect, we believe that it is better to avoid using ‘voiceprint’ in favor of a more neutral term, such as ‘spectrogram,’ whenever possible.”).

27. 545 N.Y.S.2d 985 (Sup. Ct. 1989). 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.” *Id.* at 996. *Castro* involved a fourteen-week evidentiary hearing with a 5000-page transcript. DOUBLE HELIX, *supra* note 1, at 67.

28. See generally Jennifer L. Mnookin, *People v. Castro: Challenging the Forensic Use of DNA Evidence*, in EVIDENCE STORIES 207 (Richard Lempert ed., 2006) (discussing the impact of the *Castro* case on evidence law).

29. Eric S. Lander, *DNA Fingerprinting On Trial*, 339 NATURE 501, 504 (1989).

30. *Id.* at 505.

interpretation and population genetics. The main event was *United States v. Yee*,<sup>31</sup> in which top scientists lined up on both sides of the issue.

The early controversies led to the first NRC report on DNA,<sup>32</sup> which instead of settling issues provoked its own firestorm. The controversy centered on a proposal (the ceiling principle) that was offered to resolve the statistical issues surrounding DNA testimony. When this was attacked, a second report followed.<sup>33</sup> Along the way, Kaye explains the arguments for choosing a racial database and addresses concerns about including lab error rate along with the random match probability whenever DNA testimony is presented to a jury. He also examines the O.J. Simpson debacle.<sup>34</sup>

### III. BALANCED PRESENTATION

There is little question that Kaye has the background to write on the DNA evidence. He has published numerous important articles on the subject<sup>35</sup> and has sometimes participated in the history that he recounts. He served as a member of the NRC committee that issued the second DNA report,<sup>36</sup> and he subsequently prepared reports for the National Commission on the Future of DNA Evidence,<sup>37</sup> which was appointed by former Attorney General Janet Reno. In writing *Double Helix*, Kaye's challenge was to be as balanced as possible in documenting the contentious history of DNA evidence. He does a good job on this score, although "balance" is often in the eye of the beholder. Kaye's narrative falls between several other texts on the subject. For example, after outlining the "deeply problematic technology" involved when DNA evidence was first introduced, Professor Aronson wrote:

It took a dedicated group of defense lawyers using the mechanisms provided by the American legal system—expert witnesses, discovery, and cross-examination—to bring these deficiencies to light. As a result of defense challenges, scientists were forced to go back to their laboratories and profes-

---

31. 134 F.R.D. 161 (N.D. Ohio 1991), *aff'd sub nom.* *United States v. Bonds*, 12 F.3d 540 (6th Cir. 1993).

32. COMM. ON DNA TECHNOLOGY IN FORENSIC SCI., NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., *DNA TECHNOLOGY IN FORENSIC SCIENCE* (1992) [hereinafter 1992 DNA REPORT].

33. See 1996 DNA REPORT, *supra* note 10.

34. See *DOUBLE HELIX*, *supra* note 1, at 142.

35. See, e.g., David Kaye & George Sensabaugh, *Reference Guide on DNA Identification Evidence*, in REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 129 (3d ed. 2011); Edward J. Imwinkelried & D.H. Kaye, *DNA Typing: Emerging or Neglected Issues*, 76 WASH. L. REV. 413 (2001); David H. Kaye, *Trawling DNA Databases for Partial Matches: What is the FBI Afraid of?*, 19 CORNELL J.L. & PUB. POLY 145 (2009); D.H. Kaye, *The Constitutionality of DNA Sampling on Arrest*, 10 CORNELL J. L. & PUB. POL'Y 455 (2001); D.H. Kaye & Michael E. Smith, *DNA Identification Databases: Legality, Legitimacy, and the Case for Population-Wide Coverage*, 2003 WIS. L. REV. 413; George Sensabaugh & D.H. Kaye, *Non-Human DNA Evidence*, 39 JURIMETRICS J. 1, 2–3 (1998) (Non-human DNA has proved useful in litigation "ranging from homicide prosecutions to patent infringement litigation, with organisms as diverse as household pets, livestock, wild animals, insects, plants, bacteria, and viruses.").

36. 1996 DNA REPORT, *supra* note 10.

37. See *DOUBLE HELIX*, *supra* note 1, at 186.

sional societies to develop more robust methods and protocols, better quality control mechanisms, and more effective, inclusive peer review systems.<sup>38</sup>

Although there is ample support for recognizing the significant contributions of defense attorneys, few prosecutors would accept this characterization of the DNA wars. Not surprisingly, they claim a far more critical role for their profession<sup>39</sup>—and justly so.

Striking the “right balance” does not mean Kaye is shy about offering his own opinions. In this regard, his critique is often searing. In dealing with the phrase “reasonable scientific certainty,” he writes:

The reasonable-degree-of-scientific-certainty language almost certainly was drafted by the lawyers. Scientists have no use for this phrase (outside the courtroom). Indeed, “a reasonable degree of scientific certainty” is not a defined concept in scientific disciplines or even in law. . . . It is legal mumbo jumbo . . . . [E]xperts want to (or are induced to) incant not only “medical certainty” but also “clinical certainty,” “psychological certainty,” “psychiatric certainty,” “engineering certainty,” “architectural certainty,” “ballistic certainty,” “professional certainty,” and even “forensic certainty” and “legal certainty.”<sup>40</sup>

In commenting on proficiency testing, Kaye recognizes that “[i]n some areas of forensic science, the rigor of the proficiency testing programs is dubious.”<sup>41</sup> He also chides the Federal Bureau of Investigation (FBI) for producing a random-match probability in a fingerprint case that was “absurdly estimated”<sup>42</sup> and says that “historically, statistical analysis of forensic evidence has not been the FBI’s strong suit.”<sup>43</sup> Courts are taken to task for overreacting to the risk that statistics will lead juries astray: In experiments, “jurors typically underestimate the impact of the evidence as compared with the effect prescribed by probability theory, and they are not overwhelmed by the statistics for the trace evidence.”<sup>44</sup> In still another passage, he notes that courts sometimes issue “disturbingly shallow opinions”<sup>45</sup> and describes a judge’s order limiting the number of hair samples that could be taken from O.J. Simpson as “surreal.”<sup>46</sup>

#### IV. SCIENCE VS. POLICY

In describing the myriad of controversies, Kaye elucidates the policy debates. Indeed, his repeated attempts to separate science and policy issues is one of the book’s virtues.<sup>47</sup> He criticizes the first NRC report for concluding

---

38. ARONSON, *supra* note 3, at 3–4. I should add that Aronson wrote a fine book.

39. See CLARKE, *supra* note 3; LEVY, *supra* note 3.

40. DOUBLE HELIX, *supra* note 1, at 82 (citations omitted).

41. *Id.* at 165.

42. *Id.* at 52.

43. *Id.* at 236.

44. *Id.* at 31.

45. *Id.* at 184.

46. *Id.* at 230.

47. See, e.g., *id.* at 111 (“But how to present to a jury valid scientific evidence of a match is a legal rather than a scientific issue falling far outside the domain of the general-acceptance test and the fields of statistics and population genetics.”).

that statistics should always be required when presenting DNA evidence in court. According to that report: “To say that two patterns match, without providing any scientifically valid estimate (or, at least, an upper bound) of the frequency with which such matches might occur by chance, is meaningless.”<sup>48</sup> This is quite an overstatement. There are, of course, dangers associated with the term “match,”<sup>49</sup> but as Kaye observes, “[t]he issue is not one of scientific practice but of legal policy. As a legal matter, a completely unexplained statement of a ‘match’ should be inadmissible because it is too cryptic to be weighed fairly by the jury.”<sup>50</sup>

In another passage, Kaye addresses “deracialized” statistics. He notes that there are “scientifically defensible ways” to avoid racial population frequencies but then adds: “The rules of evidence should allow these ‘decracialized’ statistics to be used, but neither evidence doctrine nor scientific knowledge dictates that this be done.”<sup>51</sup>

## V. DEFENSE EXPERTS

Much of the last chapter in *Double Helix* (“Learning from DNA”) focuses on expert witnesses. Kaye notes the adversary system’s distorting effect due to party selection of experts and criticizes several defense experts for continuing to testify when some scientific issues had been resolved against their positions.<sup>52</sup> I think the role of the FBI Laboratory, the dominant actor in the DNA wars, is somewhat neglected in this chapter. I have argued elsewhere that the DNA disputes may have been settled sooner if the FBI Laboratory had disclosed far more data.<sup>53</sup> *Double Helix* provides further support for this thesis. Early in the book, Kaye mentions that a noted expert “pored over databases supplied by the FBI and Lifecodes [a commercial forensic DNA-testing outfit].”<sup>54</sup> This research effort refuted population-structure claims. But the FBI selected which experts would have access to its data, refusing “to make its database public.”<sup>55</sup> Moreover, some of its research was “unpublished” at the time it was used in court.<sup>56</sup> I would argue that the FBI’s conduct dwarfs that of the defense experts.

---

48. 1992 DNA REPORT, *supra* note 32, at 74.

49. The NRC report on forensic science voiced concern about the use of terms such as “match,” “consistent with,” “identical,” “similar in all respects tested,” and “cannot be excluded as the source of.” These terms can have “a profound effect on how the trier of fact in a criminal or civil matter perceives and evaluates scientific evidence.” NRC REPORT, *supra* note 5, at 21.

50. DOUBLE HELIX, *supra* note 1, at 110. *See also* State v. Tester, 968 A.2d 895, 902 (Vt. 2009) (ruling that evidence of DNA matches with no probability statistics is not helpful and is misleading).

51. DOUBLE HELIX, *supra* note 1, at 197.

52. *Id.* at 245–46.

53. Paul C. Giannelli, Daubert and Forensic Science: The Pitfalls of Law Enforcement Control of Scientific Research, 2011 U. ILL. L. REV. 53, 77 (“[I]f 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.”).

54. DOUBLE HELIX, *supra* note 1, at 120.

55. *Id.* at 94.

56. *Id.* at 93.



In another passage, Kaye mentions the proposal in the NRC's 2009 forensic science report<sup>57</sup> recommending the creation of a National Institute of Forensic Science.<sup>58</sup> Such an institute, in his view, "might be able to identify and address emerging technological issues more nimbly and expeditiously than the current procedure."<sup>59</sup> I agree. Unfortunately, the Department of Justice does not. Its position is that there is no need for any new bureaucracies<sup>60</sup>—at least, ones that they do not control. Yet, the NRC report made it clear that the current structure is unacceptable, noting that some federal entities (that is, the FBI Lab and the National Institute of Justice) 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."<sup>61</sup> As a result, these "agencies are not good candidates to oversee the overhaul of the forensic science community."<sup>62</sup> In sum, these federal entities did not learn the lessons from the DNA wars.



*Double Helix* is a tour de force, a must-read for anyone interested in evidence law or forensic science. The DNA story, however, is far from over. A number of legal issues remain to be addressed,<sup>63</sup> including some concerning race.<sup>64</sup> The advent of familial DNA testing has arrived,<sup>65</sup> a procedure that raises significant privacy issues.<sup>66</sup> A database of convicted felons is one thing,

57. NRC REPORT, *supra* note 5.

58. *Id.* at 256.

59. *Id.*

60. See Paul C. Giannelli, Symposium, *Independent Crime Laboratories: The Problem of Motivational and Cognitive Bias*, 2010 UTAH L. REV. 247, 249 n.18.

61. NRC REPORT, *supra* note 5, at 18.

62. *Id.*

63. *E.g.*, *People v. Bennett*, 199 P.3d 535, 569 (Cal. 2009) (holding that the tactic of asking a defense expert whether sufficient biological evidence remained for retesting was not improper). The issue is addressed in Rockne P. Harmon & Edward J. Imwinkelried, *The Admissibility of Evidence of the Accused's Opportunity to Retest Physical Evidence in Criminal Cases*, 37 NEW ENG. J. ON CRIM. & CIV. CONFINEMENT 3, 29 (2011) ("If the trend continues toward the view that it is permissible for prosecutors to adduce testimony that the physical evidence analyzed by prosecution experts was available for defense retesting, that ruling will have an immediate impact on many of the participants in the criminal justice system."). See also Erin Murphy, Symposium, *The Art in the Science of DNA: A Layperson's Guide to the Subjectivity Inherent in Forensic DNA Typing*, 58 EMORY L.J. 489, 512 (2008) ("Good inculpatory DNA methods . . . entail significant exercises of discretion on the part of forensic analysts, and whenever there is discretion there is always the heightened risk of error or mistake.").

64. See, *e.g.*, Dov Fox, *The Second Generation of Racial Profiling*, 38 AM. J. CRIM. L. 49, 79 (2010) ("[A] totality-of-the-evidence approach to the use of DNA phenotyping evidence would put pressure on the narrow tailoring requirement that the state use race-neutral alternatives when possible."); Jonathan Kahn, *Race, Genes, and Justice: A Call to Reform the Presentation of Forensic DNA Evidence in Criminal Trials*, 74 BROOK. L. REV. 325, 374–75 (2009) ("Race-specific [random match probabilities] provide little or no relevant information to finders of fact. They present a significant danger of unfairly prejudicing deliberations through the gratuitous association of race with genetics and violent crime.").

65. See *supra* text accompanying note 12.

66. See, *e.g.*, SHELDON KRIMSKY & TANIA SIMONCELLI, *GENETIC JUSTICE: DNA DATA BANKS, CRIMINAL INVESTIGATIONS, AND CIVIL LIBERTIES* (2011); Erin Murphy, *Relative Doubt*:

but one that can identify their relatives is another. The constitutionality of arrestees databases awaits resolution,<sup>67</sup> perhaps by the Supreme Court. These developments may take us closer to a universal database, something that Kaye has advocated for years.<sup>68</sup> Similarly, courts continue to confront admissibility issues—for example, low-copy samples<sup>69</sup> and animal DNA.<sup>70</sup> In addition, the role of laboratory error rate in admissibility determinations remains in litigation.<sup>71</sup> Moreover, is it fair to convict someone when DNA is the only evidence?<sup>72</sup> Further, the use of “John Doe” warrants and indictments to toll the statute of limitations is another issue currently being contested.<sup>73</sup> A number of post-conviction testing issues remain to be solved. Should a defendant who has confessed be eligible for post-conviction testing?<sup>74</sup> Indeed, the Supreme Court recently recognized a limited right to access evidence for post-conviction DNA testing.<sup>75</sup> *Double Helix* addresses most of these issues; Kaye’s articles discuss the rest.

---

*Familial Searches of DNA Databases*, 109 MICH. L. REV. 291, 313–14 (2010) (“[W]ithout legal rules to cabin the scope of an investigation, nothing prevents law enforcement from getting samples from fifty or one hundred possible suspects . . . .”); Sonia M. Suter, *All in the Family: Privacy and DNA Familial Searching*, 23 HARV. J.L. & TECH. 309, 327–28 (2010) (privacy issues include “maintaining DNA databanks . . . expansion of DNA databases to include samples from arrestees, who have not yet been, and may never be, convicted . . . and civil liberty concerns.”).

67. *Compare* *United States v. Pool*, 621 F.3d 1213, 1226 (9th Cir. 2010) (ruling that extraction of DNA samples from arrestees is constitutional: “Congress’s determination to require a DNA sample as a condition of pre-trial release where the district court has made a probable cause determination similarly does not deny Pool procedural due process.”), *with* *United States v. Mitchell*, 681 F. Supp. 2d 597 (W.D. Pa. 2009) (holding federal arrestee collection statute unconstitutional).

68. *See* Kaye & Smith, *supra* note 35.

69. *See* *People v. Megnath*, 898 N.Y.S.2d 408, 413 (N.Y. Sup. Ct. 2010) (holding that low-copy DNA analysis is generally accepted in the scientific community and is therefore admissible); Natasha Gilbert, *DNA’s Identity Crisis*, 464 NATURE 347 (2010) (raising questions about low-copy-number analysis).

70. *See* Antoinette E. March, *Paw and Order: Using Animal DNA as Forensic Evidence—Not Yet Ready for Prime Time*, 3 J. ANIMAL L. & ETHICS 53 (2009).

71. *See* *State v. Tester*, 968 A.2d 895, 906 (Vt. 2009) (ruling that lab error rate goes to the weight, not admissibility, of evidence).

72. *See* Andrea Roth, *Safety in Numbers? Deciding when DNA Alone is Enough to Convict*, 85 N.Y.U. L. REV. 1130, 1185 (2010) (“At first glance, pure cold hit cases seem to require the jury to perform only two tasks: number-crunching and deciding whether the source probability given the evidence is high enough to justify conviction. . . . Even in a pure cold hit case, the ‘DNA evidence is meaningful only when it is embedded in stories that mention other evidence, possible suspects, and how the evidence itself was handled and interpreted.’”).

73. *See* *People v. Robinson*, 224 P.3d 55, 61–62 (Cal. 2010) (holding that an arrest warrant identifying defendant by his unique 13-loci DNA profile is sufficient to toll statute of limitations); *Commonwealth v. Dixon*, 938 N.E.2d 878, 885 (Mass. 2010) (holding that an indictment based on an assailant’s DNA profile comports with the state’s due process clause).

74. *See* *Commonwealth v. Wright*, 14 A.3d 798, 817 (Pa. 2011) (ruling that a confession does not bar post-conviction DNA testing).

75. *Skinner v. Switzer*, 131 S. Ct. 1289 (2011) (holding that a convicted state prisoner can institute a civil action under §1983 to seek testing of crime-scene evidence). *See also* Brandon L. Garrett, *DNA and Due Process*, 78 FORDHAM L. REV. 2919, 2959–60 (2010) (“The liberty interest recognized and the continued constitutional assumption that a[n] . . . ‘actual innocence’ right may exist placed pressure on states to facilitate access to DNA testing. Even if courts fail to rigorously enforce the *Osborne* due process right, the renewed assumption of an actual innocence right may spur the states to adopt ‘further change’ . . . .”).