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Note

The Admission of Scientific Evidence in a Post-Crawford World

Eric Nielson*

The search for truth is foundational in science¹ and law.² However, the methods and measures used by these two fields are not the same. Science defines truth as the objective result of a reproducible process or method.³ In its evaluation of scientific evidence, the courts have adopted this approach also.⁴ In contrast, the law rarely has the privilege of repeat experimentation or blind studies. Further, the law views truth as a means to the end of a just resolution of a dispute.⁵ The law necessarily

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1. See, e.g., LINUS PAULING, NO MORE WAR! 209 (1958) (“Science is the search for the truth . . .”).

2. See, e.g., FED. R. EVID. 102. The rule states that “[t]hese rules should be construed so as to administer every proceeding fairly, eliminate unjustifiable expense and delay, and promote the development of evidence law, to the end of *ascertaining the truth* and securing a just determination.” *Id.* (emphasis added).

3. Cf. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 590 (1993) (“Science is not an encyclopedic body of knowledge about the universe. Instead, it represents a *process* for proposing and refining theoretical explanations about the world . . .” (quoting Brief for American Ass’n for the Advancement of Science et al. as Amici Curiae at 7–8, *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (No. 92-102))).

4. *Daubert*, 509 U.S. at 580 (“Many considerations will bear on the inquiry [of whether testimony is scientifically valid and applies to the facts at issue], including whether the theory or technique in question can be (and has been) tested, whether it has been subjected to peer review and publication, its known or potential error rate and the existence and maintenance of standards controlling its operation, and whether it has attracted widespread acceptance within a relevant scientific community.”).

5. *Id.* at 596–97 (“Yet there are important differences between the quest for truth in the courtroom and the quest for truth in the laboratory. Scientific conclusions are subject to perpetual revision. Law, on the other hand, must resolve disputes finally and quickly.”).

takes a more pragmatic view of truth than science's Platonic ideal. Facts must be tested and proven, but not absolutely certain, before they will sustain the burden of proof.⁶ If the proven facts cannot sustain the verdict, the moving party has not established a basis for its claims and the redress sought will be denied.⁷

Prior to the *Crawford v. Washington* decision in 2004,⁸ the Supreme Court had applied a reliability standard for the admission of out-of-court testimony.⁹ This standard applied to a growing array of scientific evidence including blood alcohol testing, general forensics, and nascent DNA testing.¹⁰ *Crawford* represented a significant change, with the conservative and liberal wings of the Court joining to assert that the Sixth Amendment guaranteed the defendant a right to exclude testimonial evidence when the defendant was denied the opportunity to cross-examine the witness.¹¹ *Melendez-Diaz v. Massachusetts* subsequently extended this rule to apply to scientific evidence.¹²

The goal of this Note is to evaluate the requirements for admitting scientific evidence in criminal cases. Part I discusses Confrontation Clause case law since *Ohio v. Roberts*,¹³ examines the standards for the admission of scientific evidence, and considers the weaknesses of cross-examination and eyewitness testimony. Part II discusses actions that can be taken to improve the quality of scientific information available to defense attorneys, prosecutors, the courts, and the public. This Note

6. See, e.g., MODEL PENAL CODE § 1.12 (1962) (“(1) No person may be convicted of an offense unless each element of such offense is proved beyond a reasonable doubt. In the absence of such proof, the innocence of the defendant is assumed.”).

7. *Id.*

8. *Crawford v. Washington*, 541 U.S. 36 (2004).

9. See *infra* text accompanying notes 15–23.

10. Cf. *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 357–60 app. A (2009) (Kennedy, J., dissenting) (stating that pre-*Crawford* authorities found the Confrontation Clause did not require confrontation of, and found reliable, analysts conducting routine scientific tests (including blood alcohol testing), as well as autopsy results and hospital reports describing victims' injuries).

11. See *infra* text accompanying notes 30–39.

12. *Melendez-Diaz*, 577 U.S. at 311. See also *id.* at 330 (Kennedy, J., dissenting) (“The Court sweeps away an accepted rule governing the admission of scientific evidence. Until today, scientific analysis could be introduced into evidence without testimony from the ‘analyst’ who produced it.”).

13. *Ohio v. Roberts*, 488 U.S. 56 (1980).

concludes that holding scientific evidence to the *Daubert v. Merrel Dow Pharmacueticals, Inc.* standard, coupled with public disclosure, facilitates the just and effective operation of our criminal justice system.

I. BACKGROUND

The issue of which out-of-court statements may be considered at trial has been around for a long time.¹⁴ This issue is a central concern of the Federal Rules of Evidence¹⁵ and a foundational component of the Sixth Amendment,¹⁶ which guarantees the accused the right to confront witnesses.¹⁷ The Founders were aware of the importance of this right due, in part, to the prominent case of Sir Walter Raleigh, who was convicted, and executed, based on an affidavit from a convicted traitor seeking leniency.¹⁸ The concern over the admission of out-of-court testimony of this sort (i.e., *ex parte* examination) shaped

14. See, e.g., *John* 8:10 to 8:12 (International Standard Version) (“Jesus stood up and asked her, ‘Dear lady, where are your accusers? Hasn’t anyone condemned you?’ ‘No one, sir,’ she replied. Then Jesus said, ‘I don’t condemn you, either. Go home, and from now on don’t sin anymore.’”). See also *Roberts*, 448 U.S. at 62 (“The basic rule against hearsay, of course, is riddled with exceptions developed over three centuries.”).

15. This reflects the truism that “hearsay rules and the Confrontation Clause are generally designed to protect similar values,” and “stem from the same roots.” *California v. Green*, 399 U.S. 149, 155 (1970) (first quote); *Dutton, Warden v. Evans*, 400 U.S. 74, 86 (1970) (second quote). It also responds to the need for certainty in the workaday world of conducting criminal trials. Cf. *Roberts*, 448 U.S. at 64 (“These means of testing accuracy are so important that the absence of proper confrontation at trial calls into question the ultimate integrity of the fact-finding process.” (quoting *Chambers v. Mississippi*, 410 U.S. 284, 295 (1973) (quoting *Berger v. California*, 393 U.S. 314, 315 (1969))) (internal quotation marks omitted)). See generally FED. R. EVID. 801–07 (providing the federal rules relating to hearsay evidence).

16. *Chambers v. Mississippi*, 410 U.S. 284, 295 (1973) (“[The right of confrontation]’s denial or significant diminution calls into question the ultimate integrity of the fact-finding process and requires that the competing interest be closely examined.” (quoting *Berger v. California*, 393 U.S. 314, 315 (1969) (internal quotations omitted)); *Roberts*, 448 U.S. at 64 (using similar language).

17. U.S. CONST. amend. VI.

18. *Crawford v. Washington*, 541 U.S. 36, 44 (2004).

Sixth Amendment jurisprudence,¹⁹ and pushed for the norm that testimony in open court be subject to cross-examination.²⁰

A. CONFRONTATION CLAUSE CASE LAW

The 1980 decision of *Ohio v. Roberts* established the basis for admission of out-of-court testimony in criminal cases that did not fall within an established hearsay exception.²¹ The judge was expected to weigh the “indicia of reliability” of the out-of-court statements for “particularized guarantees of trustworthiness.”²² This required the judge to evaluate the credibility of the evidence,²³ a role traditionally reserved for the jury.²⁴ Under the *Roberts* standard, courts admitted a wide variety of scientific evidence premised on its reliability.²⁵ These admis-

19. *Id.* at 50 (“[T]he principal evil at which the Confrontation Clause was directed was the civil-law mode of criminal procedure, and particularly its use of ex parte examinations as evidence against the accused. It was these practices that the Crown deployed in notorious treason cases like Raleigh’s; that the Marian statutes invited; that English law’s assertion of a right to confrontation was meant to prohibit; and that the founding-era rhetoric decried. The Sixth Amendment must be interpreted with this focus in mind.”).

20. The Court has emphasized that the Confrontation Clause reflects a preference for face-to-face confrontation at trial. *See Green*, 399 U.S. at 157 (“[I]t is this literal right to ‘confront’ the witness at the time of the trial that forms the core of the values furthered by the Confrontation Clause.”); *see also id.* at 182 (Harlan, J. concurring) (arguing generally for an availability rule requiring “production of a witness when he is available to testify”).

21. *Ohio v. Roberts*, 448 U.S. 56 (1980).

22. *Id.* at 66 (“In sum, when a hearsay declarant is not present for cross-examination at trial, the Confrontation Clause normally requires a showing that he is unavailable. Even then, his statement is admissible only if it bears adequate ‘indicia of reliability.’ Reliability can be inferred without more in a case where the evidence falls within a firmly rooted hearsay exception. In other cases, the evidence must be excluded, at least absent a showing of particularized guarantees of trustworthiness.”).

23. *Crawford*, 541 U.S. at 61–62 (“Admitting statements deemed reliable by a judge is fundamentally at odds with the right of confrontation The *Roberts* test allows a jury to hear evidence, untested by the adversary process, based on a mere judicial determination of reliability.”).

24. In considering expert testimony, the court should consider “(1) whether the testimony is relevant; (2) whether it is within the juror’s common knowledge and experience; and (3) whether it will usurp the juror’s role of evaluating a witness’s credibility.” *United States v. Rodriguez-Felix*, 450 F.3d 1117, 1123 (10th Cir. 2006) (internal citations omitted).

25. Prior to *Crawford*, the Confrontation Clause was held not to require confrontation of the analyst who conducted the following scientific tests: laboratory drug report, blood-alcohol test, laboratory analysis of victim’s bodily fluid, footprint, fingerprint, treating physician’s report of victim’s injuries, au-

sions corresponded with an increase in the use of scientific evidence due to advances in technological availability,²⁶ as well as evolving jury expectations, sometimes attributed to the “CSI effect.”²⁷ Cases that in earlier times would have been established solely by sworn testimony of a single law enforcement officer were now supported with video recordings and analytical testing.²⁸

This reliability standard persisted until 2004, when the Court overturned the *Roberts* decision in *Crawford v. Washington*.²⁹ Crawford sought out a man who had attempted to rape his wife earlier that same day and killed the man in the result-

topsy report, hospital record stating victim’s cause of death, coroner’s written inquest stating cause of death, blood test showing presence of illegal drug, treating physician’s report describing victim’s injuries, treating physician’s report of defendant’s injuries, laboratory report stating that murder victim’s blood contained poison, certificate that police car’s speedometer was in working order, and certificate that breathalyzer was in working order. *Melendez-Diaz v. Massachusetts*, 557 U.S. 305 app. A at 357–58 (2009) (Kennedy, J., dissenting).

26. See, e.g., *Andrews v. State*, 533 So. 2d 841, 850 (Fla. Dist. Ct. App. 1988) (illustrating an early use of DNA); see also *Vargas v. State*, 640 So. 2d 1139, 1143 (Fla. Dist. Ct. App. 1994) (“In *Andrews*, the Fifth District Court of Appeal . . . held that DNA profile evidence was properly admitted in a criminal trial.”); see generally 54 AM. JUR. PROOF OF FACTS 3d 381–525 (“This article is intended to describe briefly the instrumental techniques that are in use in civil and criminal legal cases in 1999, and also to catalogue some of the substances that are commonly subject to instrumental analysis.”).

27. See Kimberlianne Podlas, “*The CSI Effect*: Exposing the Media Myth, 16 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 429 (2006). Though Podlas ultimately finds no difference between CSI viewers and non-viewers in evidence assessment, she defines the “CSI Effect” as follows:

“The CSI Effect” has been defined in three different ways. The best-known definition states that CSI creates unreasonable expectations on the part of jurors, making it more difficult for prosecutors to obtain convictions. The second definition, which runs contrary to the first, refers to the way that CSI raises the stature of scientific evidence to virtual infallibility, thus making scientific evidence impene- trable. The final definition focuses on CSI’s increasing lay interest in forensics and science.

Id. at 433.

28. *Bullcoming v. New Mexico*, 131 S. Ct. 2705, 2712 n.3 (2011) (“The trial judge noted that, when he started out in law practice, ‘there were no breath tests or blood tests. They just brought in the cop, and the cop said, ‘Yeah, he was drunk.’”). See also *Rodriguez-Felix*, 450 F.3d at 1129 (describing admission into evidence of a videotape recording of a traffic stop in the trial at issue and finding no error).

29. See *Crawford v. Washington*, 541 U.S. 36, 75 (2004) (Rehnquist, C.J., concurring) (“In choosing the path it does, the Court of course overrules *Ohio v. Roberts* . . .”).

ing fight.³⁰ Crawford was charged with murder and claimed self-defense.³¹ The prosecution sought to introduce statements made by Crawford's wife during police interrogation shortly after the incident.³² Crawford's wife did not testify in court due to spousal privilege.³³ Crawford claimed the prosecution's introduction of out-of-court testimony violated his Sixth Amendment right of confrontation, as he was not able to cross-examine the witness.³⁴ The Supreme Court, in a unanimous decision, rejected the admission of the out-of-court testimony due to its nature as "testimonial" evidence.³⁵ However, it was not clear how far the right of confrontation extended.³⁶ Specifically, it was not clear if the right only applied to traditional witnesses (like the statement in *Crawford*) or if it also applied to scientific evidence and experts. The concurrence from Justices Rehnquist and O'Connor indicated uneasiness in abandoning the *Roberts* test, which would have simply excluded the testimony as unreliable.³⁷ The Court further recognized that this definition of testimonial statements would not apply to public records and business records.³⁸

In 2006, *Davis v. Washington* unanimously held that not all statements made to police officers are testimonial and therefore subject to the confrontation right.³⁹ The admission of a 911

30. *Id.* at 38.

31. *Id.* at 40.

32. *Id.*

33. *Id.*

34. *Id.* ("Petitioner countered that . . . admitting the evidence would violate his federal constitutional right to be 'confronted with the witnesses against him.'" (quoting U.S. CONST. amend. VI)).

35. *Id.* at 37, 68–69 ("Where testimonial evidence is at issue, however, the Sixth Amendment demands what the common law required: unavailability [of the witness] and a prior opportunity for cross-examination.").

36. *Cf. Williams v. Illinois*, 132 S. Ct. 2221, 2232 (2012) ("*Crawford* has resulted in a steady stream of new cases in this Court.").

37. *Crawford*, 541 U.S. at 76 (Rehnquist, C.J., concurring); *id.* at 69 ("I believe that the Court's adoption of a new interpretation of the Confrontation Clause is not backed by sufficiently persuasive reasoning to overrule long-established precedent. Its decision casts a mantle of uncertainty over future criminal trials in both federal and state courts, and is by no means necessary to decide the present case.").

38. *Id.* at 76 ("To its credit, the Court's analysis of 'testimony' excludes at least some hearsay exceptions, such as business records and official records. . . . To hold otherwise would require numerous additional witnesses without any apparent gain in the truth-seeking process.").

39. *Davis v. Washington*, 547 U.S. 813, 822 (2006).

call in which the victim identified the defendant, who had recently assaulted her in violation of a domestic no-contact order, was nontestimonial,⁴⁰ despite the defendant having fled the scene prior to the call being made.⁴¹ In contrast, a statement written in police presence while separated from the assailant was testimonial.⁴² According to the Court, the shift from “What is happening?” to “What happened?” seemed to define whether the statement should be regarded as applying to an ongoing emergency (nontestimonial) or as building a case record for future prosecution (testimonial).⁴³

The test for whether scientific evidence could be admitted without the analyst being present for cross-examination was addressed in *Melendez-Diaz v. Massachusetts*.⁴⁴ The prosecution introduced sworn reports of forensic analyses from a state laboratory⁴⁵ certifying that the material seized from the defendant was cocaine.⁴⁶ Consistent with Massachusetts law, the analyst was not called to testify by the prosecution⁴⁷ and was not subpoenaed by the defense.⁴⁸ The Court split 4-1-4 with Justice Thomas concurring.⁴⁹ While *Crawford* caused concern about the extent of the confrontation right, *Melendez-Diaz* seemed to imply that all hearsay exceptions violated the Sixth Amendment right to confront witnesses. The four-member plurality held that the subpoena power does not rehabilitate the confrontation right.⁵⁰ That is to say, the defendant’s ability to compel the analyst’s presence did not excuse the prosecution’s failure to produce initial testimony, since the prosecution, not

40. *See id.* (“Statements are nontestimonial when made in the course of police interrogation under circumstances objectively indicating that the primary purpose of interrogation is to enable police assistance to meet an ongoing emergency.”).

41. *Id.* at 818.

42. *Id.* at 830 (explaining that statements to police deliberately recounting how past events progressed are “inherently testimonial” because “they do precisely *what a witness does* on direct examination.” (footnote omitted)).

43. *Id.* (“When the officer questioned [the witness] for the second time, and elicited the challenged statements, he was not seeking to determine . . . ‘what is happening,’ but rather ‘what happened.’”).

44. *Melendez-Diaz v. Massachusetts*, 557 U.S. 305 (2009).

45. *Id.* at 307–08.

46. *Id.* at 308.

47. *Id.* at 309.

48. Only the reports of the analyst were introduced at trial; the analyst did not give live testimony. *See id.*

49. *Id.* at 306.

50. *Id.* at 324 (plurality opinion).

the defendant, bears the burden of proof.⁵¹ Further, it was not clear what a “testimonial” statement was,⁵² or to what extent such statements would be excluded.⁵³ The plurality did agree that maintenance records were likely exempt from the confrontation right.⁵⁴ Justice Thomas’s crucial concurrence was based primarily on the sworn nature of the test results introduced into evidence.⁵⁵ This case was subject to significant dispute by both state and federal courts.⁵⁶

51. *Id.* (“[T]he Confrontation Clause imposes a burden on the prosecution to present its witnesses, not on the defendant to bring those adverse witnesses into court.”).

52. Justice Thomas gave his own definition, which has not been adopted by any of the other justices. *Id.* at 329 (Thomas, J., concurring) (“[T]he Confrontation Clause is implicated by extrajudicial statements only insofar as they are contained in formalized testimonial materials, such as affidavits, depositions, prior testimony, or confessions.”).

53. *Id.* at 311 n.1 (plurality opinion) (“[W]e do not hold, and it is not the case, that anyone whose testimony may be relevant in establishing the chain of custody, authenticity of the sample, or accuracy of the testing device, must appear in person as part of the prosecution’s case.”). However, neither this nor subsequent decisions have established who must testify.

54. *Id.* (“Additionally, documents prepared in the regular course of operation maintenance may well qualify as nontestimonial records.”); *see also supra* note 38 (citing similar language from *Crawford*).

55. *Id.* at 330 (Thomas, J., concurring).

56. *See, e.g.*, *Nardi v. Pepe*, 662 F.3d 107, 111–12 (1st Cir. 2011); *United States v. Burden*, 600 F.3d 204, 225 (2d Cir. 2010); *United States v. Okorie*, 425 F. App’x 166, 170 (3d Cir. 2011); *United States v. Johnson*, 587 F.3d 625, 636 (4th Cir. 2009); *United States v. Minnitt*, 617 F.3d 327, 333 (5th Cir. 2010); *United States v. Turner*, 591 F.3d 928, 934 (7th Cir. 2010); *United States v. Ali*, 616 F.3d 745, 752 (8th Cir. 2010); *Flournoy v. Small*, 681 F.3d 1000, 1005 (9th Cir. 2012); *United States v. Pursley*, 577 F.3d 1204, 1224–25 (10th Cir. 2009); *United States v. Green*, 396 F. App’x 573, 574–75 (11th Cir. 2010); *State v. Gomez*, 244 P.3d 1163, 1166 (Ariz. 2010); *Pendergrass v. State*, 913 N.E.2d 703, 707–08 (Ind. 2009); *Smith v. State*, 28 So. 3d 838, 854–55 (Fla. 2009); *Rector v. State*, 681 S.E.2d 157, 160 (Ga. 2009); *State v. Fitzwater*, 227 P.3d 520, 528 (Haw. 2010); *People v. Williams*, 238 Ill.2d 125, 142–58 (2010); *State v. Appleby*, 221 P.3d 525, 550–52 (Kan. 2009); *State v. Simmons*, 78 So. 3d 743, 745–48 (La. 2011); *Com. v. Barbosa*, 933 N.E.2d 93, 106–08 (Mass. 2010); *State v. Gilman*, 993 A.2d 14, 24 (Me. 2010); *People v. Nunley*, 821 N.W.2d 642, 652–56 (Mich. 2012); *Wilson v. State*, 21 So. 3d 572, 588 (Miss. 2009); *State v. Britt*, 813 N.W.2d 434, 537–38 (Neb. 2012); *State v. Dilboy*, 999 A.2d 1092, 1101–06 (N.H. 2010); *State v. Bullcoming*, 226 P.3d 1, 7–10 (N.M. 2010), *rev’d*, 131 S.Ct. 2705 (2011); *People v. Brown*, 918 N.E.2d 927, 930–33 (N.Y. 2009); *State v. Erwin*, 26 A.3d 1, 8–9 (Vt. 2011); *Aguilar v. Com.*, 699 S.E.2d 215, 218–23 (Va. 2010).

The next case in this line is *Bullcoming v. New Mexico*, which was decided 5-4 in 2011.⁵⁷ In a case highly similar to *Melendez-Diaz*, the Court found that the state's failure to produce the analyst who evaluated the defendant's blood alcohol content violated the Confrontation Clause.⁵⁸ The substitution of the in-court testimony of another analyst from the same lab was not an effective cure for this lack of opportunity to confront the analyst who actually conducted the test and wrote the report.⁵⁹ The problem in this case was that the analyst had been placed on administrative leave for reasons not revealed by the prosecution.⁶⁰ The prosecution's surprise decision to substitute another analyst denied the defendant the opportunity to inquire into the basis for the analyst's unavailability.⁶¹ However, the defendant failed to raise this issue on appeal.⁶² The four dissenting justices emphasized the negative impact that the *Melendez-Diaz* standard had on criminal prosecutions.⁶³ The deciding vote again came from Justice Thomas, whose concerns about the formality of the affidavits were the deciding factor as to whether the report was testimonial.⁶⁴

57. *Bullcoming v. New Mexico*, 131 S. Ct. 2705 (2011).

58. *Id.* at 2709–10.

59. *Id.* at 2710 (“We hold that surrogate testimony . . . does not meet the constitutional requirement.”).

60. *Id.* at 2711–12.

61. See Brief of Petitioner at 31, *Bullcoming v. New Mexico*, 131 S. Ct. 2705 (2011) (No. 09-10876) (“When petitioner’s attorney asked the surrogate why the actual analyst was placed on unpaid leave, the surrogate replied that he did not know. . . . This lack of personal knowledge prevented petitioner from discovering whether the analyst who purportedly determined that his BAC was over legal limits had been disciplined for erroneous or fraudulent work.” (citation omitted)).

62. *State v. Bullcoming*, 189 P.3d 679, 684 (N.M. Ct. App. 2008), *aff’d on other grounds*, 226 P.3d 1 (N.M. 2010), *rev’d*, 131 S. Ct. 2705 (2011) (“We note that although Defendant argued in the district court that the witness’s testimony should have been excluded because of late disclosure, Defendant does not raise that ground as a basis for reversal on appeal.”).

63. *Bullcoming*, 131 S. Ct. at 2725 (Kennedy, J., dissenting) (“[The majority] once more assumes for itself a central role in mandating detailed evidentiary rules, thereby extending and confirming *Melendez-Diaz*’s ‘vast potential to disrupt criminal procedures.’” (quoting *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 331 (2009) (Kennedy, J., dissenting))).

64. Justice Thomas did not write a separate opinion in this case, but other justices discussed the formality of the affidavits in question. *Cf. id.* at 2721 (Sotomayor, J., concurring) (“The formality inherent in the certification further suggests its evidentiary purpose.”).

In the 2011 case of *Michigan v. Bryant*,⁶⁵ the Court held in a 6-1-2 decision that ten minutes of police questioning of a shooting victim was not testimonial, but was in response to an ongoing emergency and was therefore admissible.⁶⁶ This holding suggested a limit to the nature of police questioning considered nontestimonial, as introduced in *Davis*. In their dissent, Justices Ginsburg and Scalia denounced this notion as a fiction, finding that the officers were clearly building a record for prosecution, and therefore, the statements were testimonial.⁶⁷ Surprisingly, this case did not address the issue of the traditional dying declaration hearsay exception,⁶⁸ one of the oldest and most intuitive hearsay exceptions,⁶⁹ because the state did not include it on appeal.⁷⁰

In 2012, the Court issued *Williams v. Illinois* in another 4-1-4 split decision.⁷¹ In this case, testimony was admitted under a traditional expert witness approach.⁷² Consistent with both the Illinois and Federal Rules of Evidence, an expert witness is permitted to base his or her professional opinion on materials generally accepted in the field.⁷³ In this case, a state laboratory

65. *Michigan v. Bryant*, 131 S. Ct. 1143 (2011).

66. *Id.* at 1166–67 (holding that this statement was not barred by the Confrontation Clause because the circumstances and actions of those involved indicated that the “primary purpose” of police in obtaining the statement was emergency response (citing *Davis v. Washington*, 547 U.S. 813, 822 (2006))).

67. *Id.* at 1171 (Scalia, J., dissenting) (“The five officers interrogated Covington primarily to investigate past criminal events.”).

68. FED. R. EVID. 804(b)(2). *But see* *Giles v. California*, 554 U.S. 353, 358 (2008) (“We have previously acknowledged that two forms of testimonial statements were admitted at common law The first of these were declarations made by a speaker who was both on the brink of death and aware that he was dying.”).

69. *See* FED. R. EVID. 804(b)(2) Notes of Advisory Committee on Proposed Rules (“The exception is the familiar dying declaration of the common law, expanded somewhat beyond its traditionally narrow limits. While the original religious justification for the exception may have lost its conviction for some persons over the years, it can scarcely be doubted that powerful psychological pressures are present.”).

70. *Bryant*, 131 S. Ct. at 1177 (Ginsburg, J., dissenting).

71. *Williams v. Illinois*, 132 S. Ct. 2221 (2012). Justice Alito wrote the plurality with Justice Breyer concurring and Justice Thomas concurring separately, while Justice Kagan wrote the four-justice dissent. *Id.*

72. *Id.* at 2228 (plurality opinion) (“For more than 200 years, the law of evidence has permitted the sort of testimony that was given by the expert in this case.”).

73. *See* FED. R. EVID. 703 (“The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or

employee testified that the DNA profile generated by an independent lab “matched” a profile of the defendant.⁷⁴ In doing so, she expressed her independent opinion as to the validity of her own work.⁷⁵ The expert also testified that the business records showed the DNA sample had been sent to an outside lab and received back from the same lab.⁷⁶ The plurality went further and would reverse the prior findings in *Melendez-Diaz*, stating that “[t]his conclusion will not prejudice any defendant who really wishes to probe the reliability of the DNA testing done in a particular case because those who participated in the testing may always be subpoenaed by the defense and questioned at trial.”⁷⁷

The Court distinguished *Williams* from *Melendez-Diaz* and *Bullcoming*, because the lab reports and affidavit were introduced into evidence in those cases. In *Williams*, the lab report was not introduced but was instead referenced by the expert as a source for forming her expert opinion.⁷⁸ The expert performed the ‘match’ independently of the lab report,⁷⁹ which simply generated the profile. It would be overreaching to read this as a jurisprudential change by the Court. This decision is best reconciled by the recognition of two opposing blocks of four justices each: one block holds that the Sixth Amendment confrontation right applies to scientific evidence and requires live

made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.”); see also ILL. R. EVID. 703 (using the same language).

74. *Williams*, 132 S. Ct. at 2230 (plurality opinion) (“Lambatos then testified that, based on her own comparison of the two DNA profiles, she ‘concluded that [petitioner] cannot be excluded as a possible source of the semen identified in the vaginal swabs,’ and that the probability of the profile’s appearing in the general population was ‘1 in 8.7 quadrillion black, 1 in 390 quadrillion white, or 1 in 109 quadrillion Hispanic unrelated individuals.’ . . . Asked whether she would ‘call this a match to [petitioner],’ Lambatos answered yes, again over defense counsel’s objection.”).

75. *Id.* at 2230.

76. *Id.* at 2227.

77. *Id.* at 2228. *But see* *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 324 (2009) (“But [the ability to subpoena the analysts]—whether pursuant to state law or the Compulsory Process Clause—is no substitute for the right of confrontation.”).

78. *Williams*, 132 S. Ct. at 2230 (“The Cellmark report itself was neither admitted into evidence nor shown to the fact finder. Lambatos did not quote or read from the report; nor did she identify it as the source of any of the opinions she expressed.”).

79. *Id.* at 2229.

testimony of analysts;⁸⁰ the other block holds that the Sixth Amendment does not apply to scientific evidence and analysts' reports are admissible without live testimony.⁸¹ The crucial vote in these cases is Justice Thomas, whose view of admissibility is dependent on the formality of the testimonial document, a view shared by neither block.⁸²

B. SCIENTIFIC EVIDENCE IN THE COURTROOM

Scientific evidence is a new development in criminal law.⁸³ Despite the notion of the scientific detective of the Sherlock Holmes novels,⁸⁴ the science of forensics has only recently come into practical, widespread use with the commercial availability of analytical chemistry tools.⁸⁵ University programs in forensic

80. This block includes Justices Scalia, Ginsburg, Sotomayor, and Kagan, who dissented in *Williams*. See *id.* at 2264–77.

81. This block includes Chief Justice Roberts and Justices Kennedy, Breyer, and Alito, who constituted the plurality in *Williams*. See *id.* at 2227–45.

82. See, e.g., *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 329–30 (2009) (Thomas, J., concurring) (noting that the Justice continues to “adhere to [his] position” that the Confrontation Clause is implicated only by “formalized testimonial materials” (quoting *White v. Illinois*, 502 U.S. 346, 365 (1992) (Thomas, J., concurring))).

83. Paul C. Giannelli describes the phenomenon:

Neutron activation analysis, sound spectrometry (voiceprints), psycholinguistics, atomic absorption, remote electromagnetic sensing, and bitemark comparisons are but a sample of the kinds of scientific evidence inundating the courts. In addition, prior rulings on the admissibility of scientific evidence have been challenged. In some cases, previously rejected techniques, such as polygraph and hypnotic evidence, have gained admissibility. In other cases, some well-accepted scientific techniques, such as radar and certain drug-testing procedures, have been challenged successfully.

Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, A Half-Century Later*, 80 COLUM. L. REV. 1197, 1198–99 (1980).

84. In Mike Grost's words:

While Golden Age mystery fiction largely shows little interest in science, perhaps the majority of detective stories of the Doyle era paid tribute to science and technology. Science was in fact part of the very genre of detective fiction, in many people's eyes. Some authors, such as Doyle, emphasized scientific crime detection. Sherlock Holmes was a chemist, and did lab analysis of physical clues.

Mike Grost, *Scientific Detectives*, MIKEGROST.COM, <http://mikegrost.com/moffett.htm> (last visited Apr. 6, 2013).

85. Mass Spectroscopy for proteins was available as early as 1958. See Carl-Ove Andersson, *Mass Spectrometric Studies on Amino Acid and Peptide Derivatives*, 12 ACTA CHEMICA SCANDINAVICA 1353, 1353 (1958). Fourier Transform Infrared was available in 1957. See *The Infracord Double Beam Spectrophotometer*, 16 CLINICAL SCI. 3, 3 (1957). The first commercial Scan-

chemistry have been available since 1976.⁸⁶ The first blood alcohol measurement was performed in 1927,⁸⁷ with courts accepting the data as early as 1951.⁸⁸ The first field breathalyzer was invented in 1954.⁸⁹ In 1988, the first genetic testing was used in court.⁹⁰ The question of whether this evidence would be sufficiently reliable to avoid triggering the Confrontation Clause was not addressed by the Founding Fathers.⁹¹ It is a

ning Electron Microscope (SEM) by Cambridge Scientific Instrument Company was the Stereoscan in 1965. P. J. Breton, *From Microns to Nanometers: Early Landmarks in the Science of Scanning Electron Microscope Imaging*, 13 SCANNING MICROSCOPY 1, 2 (1999). Nuclear magnetic resonance was first described and measured in molecular beams by Isidor Rabi in 1938. I. Rabi et al., *A New Method of Measuring Nuclear Magnetic Moment*, 53 PHYSICAL REV. 318, 318 (1938). The precursor to the High Pressure Liquid Chromatography was invented in 1941. Martin and Synge demonstrated the potential of the methods by separating amino acids marked in the column by the addition of methyl orange. Archer J. P. Martin, *The Development of Partition Chromatography in NOBEL LECTURES, CHEMISTRY 1942–62*, at 359–71 (1964).

86. See, e.g., *About Our Program*, OHIO UNIVERSITY, <http://www.ohio.edu/chemistry/forensic/> (last visited Apr. 6, 2013) (“Our [Forensic Science Education Programs Accreditation Commission]-accredited BS Forensic Chemistry Degree was created in 1976 by Dr. James Y. Tong, a faculty member in Chemistry and Biochemistry at Ohio University. We are one of the longest-standing programs of its kind in the country, possibly the oldest.”).

87. See Emil Bogen, *The Diagnosis of Drunkenness—A Quantitative Study of Acute Alcoholic Intoxication*, 26 CAL. W. MED. 778, 778 (1927).

88. See, e.g., *Greenwood v. United States*, 97 F. Supp. 996, 998 (W.D. Ky. 1951) (“Following the collision between the truck and the taxicab, Rayno was taken into custody by the Military Authorities and at 2:15 P.M., an alcoholic blood test was made in the laboratory at Fort Knox. The test was described as the ‘Nicolux Method’ [sic], in which it was determined that there were 3.0 milligrams of alcohol per cubic centimeter of blood.”).

89. *History of the Center for Studies of Law in Action and the Borkenstein Course*, BORKENSTEIN COURSE, <http://www.borkensteincourse.org/history/> (last visited Mar. 16, 2013). Though technologies for detecting alcohol vary, it is widely accepted that Dr. Robert Borkenstein, a captain with the Indiana State Police and later a professor at Indiana University at Bloomington, is regarded as the first to create a device that measures a subject’s blood alcohol level based on a breath sample. *Id.* In 1954, Borkenstein invented his Breathalyzer, which used chemical oxidation and photometry to determine alcohol concentration. D.M. Lucas, *Professor Robert F. Borkenstein—An Appreciation of His Life and Work*, 12 FORENSIC SCI. REV., Jan. 2000, at 1, 9.

90. *The DNA Fingerprint and Criminal Evidence*, LAWRENCE LIVERMORE NAT’L LABORATORY, <http://education.llnl.gov/bep/socsci/11/tEvi.html> (last visited Mar. 16, 2013) (“In 1988 the DNA fingerprint was first admitted as evidence in court in the case of *Florida v. Tommy Lee Andrews*.”).

91. *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 344 (Kennedy, J., dissenting) (“The Framers were concerned with a typical witness—one who perceived an event that gave rise to a personal belief in some aspect of the defendant’s guilt. There is no evidence that the Framers understood the Clause to extend to unconventional witnesses.”).

new question, created by modern technologies. Scientific evidence in federal and state courts is controlled by two key decisions: *Frye v. United States*⁹² and *Daubert v. Dow*.⁹³

Frye is a venerable and respected test from 1923, with a decision about a page in length—a feature that no doubt increased its attractiveness to readers. *Frye* concerned the admissibility of a “systolic blood pressure” lie detector test.⁹⁴ The court stated that the standard for admissibility is that the underlying method “must be sufficiently established to have gained general acceptance in the particular field in which it belongs.”⁹⁵ The court recognized the difficulty in determining when something passed from experimental to widely-accepted⁹⁶ but emphasized the necessity of keeping speculative, unestablished science out of the courtroom.⁹⁷ This “general acceptance” standard was widely adopted and remains good law in several states.⁹⁸

In the federal courts, *Daubert* replaced *Frye* in 1993. In *Daubert*, the district court had granted summary judgment against the plaintiff’s evidence of birth defects resulting from the mother’s use of an anti-nausea drug.⁹⁹ Though the evidence was presented by eight expert witnesses, the finding was not generally accepted within the scientific community and the trial court rejected plaintiff’s evidence.¹⁰⁰ This ruling was af-

92. *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923).

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

94. *Frye*, 293 F. at 1013.

95. *Id.* at 1014.

96. *Id.* (“Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized.”).

97. *See id.* (“We think the systolic blood pressure deception test has not yet gained such standing and scientific recognition among physiological and psychological authorities as would justify the courts in admitting expert testimony deduced from the discovery, development, and experiments thus far made.”).

98. *See* Edward K. Cheng & Albert H. Yoon, *Does Frye or Daubert Matter? A Study of Scientific Admissibility Standards*, 91 VA. L. REV. 471, 472 (2005) (“Although the practical effects of *Daubert* were initially ambiguous, the enduring legacy of the *Daubert* decision is now relatively clear. In federal courts, where the decision is legally binding, *Daubert* has become a potent weapon of tort reform by causing judges to scrutinize scientific evidence more closely.” (footnotes omitted)).

99. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 583 (1993).

100. *Id.*

firmed by the appellate court, which cited *Frye* as supporting the proposition that “expert opinion based on a scientific technique is inadmissible unless the technique is generally accepted as reliable in the relevant scientific community.”¹⁰¹ The Supreme Court overruled *Frye* 7-2, finding that promulgation of the Federal Rules of Evidence, including Rule 702, had eliminated the federal common law of evidence.¹⁰²

The Court then outlined what became known as the *Daubert* standard governing the admissibility of scientific evidence: 1) the method must be capable of objective testing (i.e., falsifiability);¹⁰³ 2) the method should have been subject to peer reviewed publication;¹⁰⁴ 3) the known or potential error rate has been considered;¹⁰⁵ 4) the existence of standards and controls is considered;¹⁰⁶ and 5) the general acceptance in the relevant scientific community is considered.¹⁰⁷ While *Frye* focused on novel scientific applications, the holding in *Daubert* applied to existing scientific methods as well.¹⁰⁸

C. CROSS-EXAMINATION EXAMINED

According to the Court, the purpose of confrontation is threefold; it:

(1) insures that the witness will give his statements under oath—thus impressing him with the seriousness of the matter and guarding against the lie by the possibility of a penalty for perjury; (2) forces the witness to submit to cross-examination, the greatest legal engine ever invented for the discovery of truth; (3) permits the jury that is to decide the defendant’s fate to observe the demeanor of the witness in

101. *Id.* at 584 (internal quotation marks omitted) (citing *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923)).

102. *Id.* at 589 (holding the *Frye* standard is “incompatible with . . . the Federal Rules of Evidence, [and] should not be applied in federal trials.”).

103. *Id.* at 593.

104. *Id.* at 594 (“The fact of publication (or lack thereof) in a peer reviewed journal thus will be a relevant, though not dispositive, consideration in assessing the scientific validity of a particular technique or methodology on which an opinion is premised.”).

105. *Id.*

106. *Id.*

107. *Id.*

108. *Id.* at 592 n.11 (“Although the *Frye* decision itself focused exclusively on ‘novel’ scientific techniques, we do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence. Of course, well-established propositions are less likely to be challenged than those that are novel, and they are more handily defended.”).

making his statement, thus aiding the jury in assessing his credibility.¹⁰⁹

While these three purposes clearly justify confrontation in the case of traditional witnesses, their relevance to producers of scientific evidence is dubious.

Leaving aside the issue of whether an oath actually impacts modern witnesses' willingness to lie,¹¹⁰ the statements rejected by the Court in *Melendez-Diaz* were affidavits sworn in front of a notary public.¹¹¹ The report in *Bullcoming* was rejected despite containing no sworn oath.¹¹² However, scientific evidence, especially the result of an analytical test, is an objective, not subjective, determination. Furthermore, the results of the testing, including the detection of errors, can frequently be verified from raw data in reports, such as those measuring blood alcohol level¹¹³ or analyzing DNA.¹¹⁴

Lawyers love the idea that, like Perry Mason, they can ferret out duplicity with a well-timed question during cross-examination. The facts, on the other hand, speak clearly.¹¹⁵

109. *California v. Green*, 399 U.S. 149, 158 (1970) (footnote omitted) (internal quotation marks omitted).

110. *Cf. Trevor S. Harding et al., Does Academic Dishonesty Relate to Unethical Behavior in Professional Practice? An Exploratory Study*, 10 SCI. & ENGINEERING ETHICS 311 (2004) (finding high school cheating correlated with professional dishonesty).

111. *See Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 308 (2009).

112. *See Bullcoming v. New Mexico*, 131 S. Ct. 2705, 2717 (2011) (noting that the report was "unsworn" but otherwise "[i]n all material respects, the laboratory report in this case resemble[d] those in *Melendez-Diaz*").

113. *See* Brief of the Amicus Curiae State of New Mexico Department of Health Scientific Laboratory Division in Support of Respondent at 15, *Bullcoming v. New Mexico*, 131 S. Ct. 2705 (2011) (No. 09-10876) ("The fact that the BAC.M method is used can easily be verified because most, if not all, of this and the other information the amici state they cannot obtain without cross-examining the analyst is actually shown on the GC print-out. See Appendices C & D, attached, a run-of-the-mill SLD BAC result print-out and the related chromatogram which the print-out describes numerically.").

114. *See Williams v. Illinois*, 132 S. Ct. 2221, 2231 (2012) ("Lambatos also noted that the data making up the DNA profile would exhibit certain telltale signs if it had been deduced from a degraded sample: The visual representation of the DNA sequence would exhibit 'specific patterns' of degradation, and she 'didn't see any evidence' of that from looking at the profile that Cellmark produced.").

115. *Cf. Samuel R. Gross, Expert Evidence*, 1991 WIS. L. REV. 1113, 1167 (1991) ("Effective cross-examination is a powerful tool. It does not work wonders; in particular, it is not an effective technique to force a lying witness to admit the truth."); Jules Epstein, *The Great Engine That Couldn't: Science, Mistaken Identifications, and the Limits of Cross-Examination*, 36 STETSON L.

There have been zero documented instances where cross-examination produced disclosure of scientific malfeasance.¹¹⁶ In their study of false convictions, Garrett and Neufeld found that “[d]efense counsel rarely cross-examined analysts concerning invalid testimony and rarely retained experts, since courts routinely deny funding for defense experts.”¹¹⁷

The truth is that it is difficult for experts to detect scientific fraud in reports from a single data set, even with the raw test results. Some methods do exist for detecting fabricated or “drylabbed” data, such as evaluating the frequencies of various digits¹¹⁸ or evaluating deviations and variations in the control sample gaps.¹¹⁹ Larger data sets are amenable to distribution and error analysis which are rarely options when considering a single test.¹²⁰ However, detection of scientific fakery generally requires analysis of a set or series of tests to generate enough data points.¹²¹ The reason again is simple; most people who decide to fake data recycle portions of their reports to save time

REV. 727, 772 (2007) (“Most significantly, the book iterates that there will be no ‘knock-out punch’ in cross-examination resulting in an admission that the witness is wrong.” (citing ELIZABETH F. LOFTUS & JAMES M. DOYLE, EYEWITNESS TESTIMONY: CIVIL AND CRIMINAL, at § 10-2 (3d ed. 1997))).

116. *Williams*, 132 S. Ct. at 2250 (citing David Alan Sklansky, *Hearsay’s Last Hurrah*, 2009 SUP. CT. REV. 1, 73 (2009)). In their study of 220 exonerated felons, “Garrett and Neufeld did not identify *any* cases in which hearsay from forensic analysts contributed to the conviction of innocent defendants.” David Alan Sklansky, *Hearsay’s Last Hurrah*, 2009 SUP. CT. REV. 1, 73 (2009). *See also* Gross, *supra* note 115, at 1172 (“Since experts are more likely than lay witnesses to have spent a great deal of time preparing for cross-examination, they have a better chance of anticipating and thwarting the cross-examiner’s intentions. In addition, unlike most lay witnesses, many experts are repeat performers who have learnt from past experiences what questions to expect on cross-examination and how to take advantage of any openings.”).

117. Brandon L. Garrett & Peter J. Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions*, 95 VA. L. REV. 1, 10 (2009).

118. T. W. Beer, *Terminal Digit Preference: Beware of Benford’s Law*, 62 J. CLINICAL PATHOLOGY 192, 192 (2009); Dominique Geyer, *Detecting Fraud in Financial Data Sets*, 8 J. BUS. & ECON. RESEARCH 75, 75 (2010); Bassam Hassan, *Examining Data Accuracy and Authenticity with Leading Digit Frequency Analysis*, 103 INDUST. MGMT. & DATA SYS. 121,121–25 (2003).

119. Peter Brugger, *Variables that Influence the Generation of Random Sequences: An Update*, 84 PERCEPTUAL & MOTOR SKILLS 627, 627 (1997); Theodore P. Hill, *Random-Number Guessing and the First Digit Phenomenon*, 62 PSYCHOL. REP. 967, 967 (1988) (“If people are asked to generate random numbers, their responses differ significantly from truly random sequences . . .”).

120. Theodore P. Hill, *The Difficulty of Faking Data*, 12 CHANCE, no. 3, 1999, at 27, 27.

121. Geyer, *supra* note 118.

and effort.¹²² This is because generating realistic fake raw data requires the hard work of matching the natural random distribution of the data type.¹²³ The only way this type of malfeasance will be detected is by careful examination of the raw data,¹²⁴ or by repetition of the testing.¹²⁵

Witness reliability or credibility is the third criteria identified by the Court in *Green*. However, this is another example of theory not interacting with the real world. In the courtroom, testimony by a scientific witness is based on review of the content of the witness's report, not his memories.¹²⁶ The Federal Rules of Evidence have a clear hearsay exception for such testimony, the recorded recollection, defined as

[a] record that: (A) is on a matter the witness once knew about but now cannot recall well enough to testify fully and accurately; (B) was made or adopted by the witness when the matter was fresh in the witness's memory; and (C) accurately reflects the witness's knowledge. If admitted, the record may be read into evidence but may be received as an exhibit only if offered by an adverse party.¹²⁷

While rare individuals exhibit exceptional recall of trivial or mundane events,¹²⁸ most people do not recall the minutia of

122. *Id.* at 77.

123. *See id.*

124. *See* Brief of the Amicus Curiae State of New Mexico Department of Health Scientific Laboratory Division in Support of Respondent, *supra* note 113, at 25 ("If a problem can be detected from the data, the analyst testifying at trial is effectively acting as an additional reviewer on the case."). Indeed, this is supported by the dissent's position in *Williams* where a reviewer found an error in another original report from Cellmark: "But after undergoing cross-examination, the analyst realized she had made a mortifying error. She took the stand again, but this time to admit that the report listed the victim's control sample as coming from Kocak, and Kocak's as coming from the victim." *Williams v. Illinois*, 132 S. Ct. 2221, 2264 (2012) (Kagan, J., dissenting). Note that the recognition did not come in cross examination or even as a result of cross examination but by review of the report.

125. *Cf.* INNOCENCE PROJECT, <http://www.innocenceproject.org> (last visited Apr. 28, 2013) (providing a count of U.S. post-conviction DNA exonerations; the number as of April 28, 2013, was 306); Epstein, *supra* note 117, at 729–30 ("According to the Innocence Project, sixty-one of the first seventy DNA-exoneration cases involved mistaken identification testimony.").

126. *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 341 (2009) (Kennedy, J., dissenting) ("The analyst must instead face the prospect of waiting for days in a hallway outside the courtroom before being called to *offer testimony that will consist of little more than a rote recital of the written report.*" (emphasis added)).

127. FED. R. EVID. 803(5).

128. *But see* Brief of the Amicus Curiae State of New Mexico Department of Health Scientific Laboratory Division in Support of Respondent, *supra* note

their day-to-day work activities.¹²⁹ This is why scientists use laboratory notebooks, logs, and reports. It is not reasonable to expect a scientific witness to reliably testify to more than the contents of their recently reviewed report.¹³⁰ Unless there is something unusual, and a note was made on their report, the odds that any additional details will be recalled are negligible. Such witnesses are unlikely to spontaneously decide they have been performing their work sloppily, recall an inadvertent error, or confess to malfeasance any more than other types of expert witnesses.¹³¹ The profound disjunction of this reality from our expectations underscores the problem with the current confrontation requirement. As one article noted, “In sum, the reliance of courts on the power of cross-examination, both on its own and as a sufficient substitute for expert testimony, has no support in the literature.”¹³²

In *Crawford*, Justice Scalia boldly states “[r]eliability is an amorphous, if not entirely subjective, concept.”¹³³ Certainly in the context of traditional witness testimony, especially eyewitness testimony, there are no clear rules to separate truth from fiction. But in the realm of science, Justice Scalia’s statement is clearly wrong; reliability is a measurable quantity. A reliable method is repeatable, meaning its output has low variation compared with the separation between positive and negative results.¹³⁴ This implies the method has a low error rate, since

113, at 27 (“The kind of photographic memory that would be required to remember all of the numbered vials one has tested over the course of a year would be so remarkable as to strain credulity.”).

129. *Id.* at 26 (“Petitioner gives the impression that he thinks a run of blood test vials may be limited to a dozen samples at a time. . . . Not so. Each batch consists of about 40 to 60 samples identified only by a computer-generated number. . . . Therefore, contrary to Petitioner’s assertions . . . it would be unbelievable for an analyst to say they remember any particular run, or the region from which that sample came.”).

130. *Id.* at 28 n.10 (“The [National Association of Criminal Defense Lawyers] amici raise the unusual test which may, ‘in their experience’ be remembered. . . . Anything unusual must be documented in the individual’s file per SLD SOPs and policy. . . . If the analyst didn’t think it was unusual enough to note, he or she is unlikely to remember, or associate it with, any particular sample tested.” (internal citations omitted)).

131. *Melendez-Diaz*, 557 U.S. at 339 (Kennedy, J., dissenting) (“It is not plausible that a laboratory analyst will retract his or her prior conclusion upon catching sight of the defendant the result condemns.”).

132. Epstein, *supra* note 115, at 774.

133. *Crawford v. Washington*, 541 U.S. 36, 63 (2004).

134. Screening tests are designed to have a low false negative rate, while verification tests are designed to have a low false positive rate. Some tests

positive and negative outcomes are clearly differentiated. Reliability is generally reported in a measure that allows calculation of the frequency of false test results, with 99.7% reliability being a frequently used minimum for practical applications.¹³⁵ For criminal cases where innocence or guilt is to be decided, why should we accept less reliability from the methods we choose to employ?

D. TRADITIONAL EVIDENCE

The traditional gold standard of evidence in criminal convictions is victim testimony.¹³⁶ After all, what could be more reliable than the report of the victim of the crime?¹³⁷ However over the past few decades, research has shown that factors juries and judges view as relevant do not correlate with factors that indicate reliable testimony.¹³⁸ A majority of the wrongful convictions exposed by subsequent DNA testing have involved

may perform only one function or the other. Other tests can be used for either purpose, depending on the threshold selected. See Mark H. Zweig & Gregory Campbell, *Receiver-Operating Characteristic (ROC) Plots: A Fundamental Evaluation Tool in Clinical Medicine*, 39 CLINICAL CHEMISTRY 561, 561 (1993).

135. Janet C. Hoeffel, *The Dark Side of DNA Profiling: Unreliable Scientific Evidence Meets the Criminal Defendant*, 42 STAN. L. REV. 465, 486 (1990) (“[M]ost scientific studies . . . declare two standard deviations to be statistically significant,” this corresponds to ninety-five percent reliability).

136. Britton Douglas, *“That’s What She Said”: Why Limiting the Use of Un-corroborated Eyewitness Identification Testimony Could Prevent Wrongful Convictions in Texas*, 41 TEX. TECH L. REV. 561, 574 (“[T]he criminal justice system relies heavily on eyewitness testimony, as it is often the foundation of the prosecution’s case and sometimes the only basis for proving guilt.”).

137. Edward Radin references a federal judge who estimates a five percent error rate in serious criminal trials. EDWARD RADIN, *THE INNOCENTS* 8–9 (1964). *But see* Epstein, *supra* note 115, at 734 (“In about 23% of the 21,621 [rape] cases, DNA test results excluded suspects [identified by eyewitness testimony].”).

138. Sklansky, *supra* note 116, at 74 (“For example, evidence has been accumulating for almost a century that eyewitness identifications are far less reliable than jurors (and many judges) tend to think they are, that they are prone to certain predictable forms of error, and that cross-examination offers limited protection against these risks. The evidence has grown much more compelling over the past few decades, partly because of a steadily growing body of research by experimental psychologists.”). *See also* Epstein, *supra* note 115, at 740–41 (“Kassin’s accumulation of studies and search for consensus make clear that, whether applying the *Frye* or *Daubert* standard for admitting expert testimony, the methodology and conclusions of these experts [on the limitations of eyewitnesses] are sufficiently reliable to be admissible in court.” (footnotes omitted)).

erroneous eyewitness testimony, against which cross-examination proved ineffective.¹³⁹ It is well established that people have challenges identifying people of other racial backgrounds,¹⁴⁰ when under stress,¹⁴¹ or when threatened with a weapon.¹⁴²

Traditional evidence requires cross-examination to establish its reliability. Cross-examination allows the defense to establish bad lighting, stress, the absence of glasses, rain, or other factors that would compromise the witness in the eyes of the jury.¹⁴³ Yet despite strong evidence of the dangers of eyewitness testimony¹⁴⁴ and the ineffectiveness of its cross-examination, the courts still allow its introduction, often without limiting instructions. None of these circumstantial factors are relevant to a scientific test result produced as part of an analyst's day-to-day activity in a lab.

The unreliability of traditional evidence is reconciled with the conviction rate by examining jurors' and potential jurors' understanding of "beyond a reasonable doubt." "[L]egal commentators have estimated the mathematical level of guilt to mean more than ninety percent certainty . . ."¹⁴⁵ In contrast, jurors tend to view beyond reasonable doubt at a lesser percentage.¹⁴⁶ While a district attorney may be able to convince a grand jury to "indict a ham sandwich,"¹⁴⁷ juries have shown a

139. Epstein, *supra* note 115, at 729–30 ("According to the Innocence Project, sixty-one of the first seventy DNA-exoneration cases involved mistaken identification testimony.")

140. *Id.* at 739; Sklansky, *supra* note 116, at 74–75.

141. Epstein, *supra* note 115, at 738.

142. *Id.* at 736.

143. *See id.* at 728 ("Courts have specifically focused upon cross-examination as a sufficient tool for addressing and uncovering mistaken identifications.")

144. Garrett & Neufeld, *supra* note 117, at 25 (2009) ("As noted, several of these trials [with false eyewitness identifications] involved forensic evidence—in a few cases DNA evidence—that excluded the defendant, and yet the state still secured the conviction.")

145. Podlas, *supra* note 27, at 436.

146. Erik Lillquist, *Recasting Reasonable Doubt: Decision Theory and the Virtues of Variability*, 36 U.C. DAVIS L. REV. 85, 113–16 (2002) (finding juror requirements for conviction ranging from 0.525 to 0.8 probability of guilt).

147. Former New York Court of Appeals Chief Judge Sol Wachtler was famously quoted by Tom Wolfe as saying that "a grand jury would 'indict a ham sandwich,' if that's what you wanted." TOM WOLFE, *THE BONFIRE OF THE VANITIES* 624 (1987).

willingness to convict even in the face of forensic evidence to the contrary.¹⁴⁸

E. TAINTED SCIENTIFIC EVIDENCE

While scientific data generally has greater reliability than traditional witness-based evidence, this does not excuse the admission of bad data into the courts. The *Daubert* factors identify what types of scientific evidence are appropriate for admission.¹⁴⁹ Despite the clear expectations outlined in that decision, courts continue to accept scientific evidence that has not been subject to the rigors of peer review, method validation, and error measurement.¹⁵⁰ The affidavit in *Melendez-Diaz* is a prime example of this type of problem. It failed to identify the test method used to determine that the seized material was cocaine;¹⁵¹ it failed to identify the error rate for that test method;¹⁵² it failed to state whether or not that particular test method had been subject to peer review;¹⁵³ and it failed to state whether any standards or controls had been run as part of the testing.¹⁵⁴ In short, the affidavit did not meet the *Daubert* standard.

Professor Mark Stevens at California State University Fresno identifies the following methods as having passed *Daubert*-type scrutiny: DNA evidence, spectrophotometer and gas chromatographic hair analysis for drug use, intoxilyzer tests, handwriting analysis (although generally not required to

148. Cf. Garrett & Neufeld, *supra* note 117, at 15 (“Of the 55 cases in which all [forensic] testimony was valid, 22 contained the testimony of forensic analysts who presented only evidence that was non-probative (13 cases) or exculpatory (11).”).

149. For a list of the *Daubert* factors, see *supra* notes 103–07 and accompanying text.

150. Margaret A. Berger, *Procedural Paradigms for Applying the Daubert Test*, 78 MINN. L. REV. 1345, 1354 (1994) (“Nevertheless, forensic tests and techniques have in the past made their way into the courtroom only to disappear after being discredited.”).

151. Brief for Petitioner at 7, *Melendez-Diaz v. Massachusetts*, 557 U.S. 305 (2008) (No. 07-591) (“They do not identify the testing method the analysts used to arrive at their conclusions or describe any difficulties (and accompanying error rates) associated with the particular method(s) the analysts used to test for cocaine.”).

152. *Id.*

153. *Id.*

154. See *id.* (explaining that the reports contained “largely conclusory” statements from the analysts).

exhibit *Daubert* reliability), and newer studies on polygraphs.¹⁵⁵ In contrast, many commonly accepted techniques have generally failed to meet the *Daubert* criteria: ballistics, computer simulations, eyewitness identification, hypnosis for memory recollection, psychiatric profiling and checklist style disorder diagnosis, trace evidence comparison, and voice comparison.¹⁵⁶ Compliance with *Daubert* does not avoid problems like the one in *Bullcoming*, where the underlying scientific process may have been compromised.¹⁵⁷ In such cases, the judge should deny admission of the report or testimony on it as the evidence is not reliably relevant to the determination of a material fact of issue in the case.¹⁵⁸ Such evidence, due to its erroneously perceived reliability, will also have a great tendency to mislead the jury.¹⁵⁹

It is not unreasonable to expect the agents of the court, including prosecutors and judges, to fulfill their duty of candor.¹⁶⁰ That duty includes notification of the court in the event evidence is found to be tainted due to actual or procedural errors.¹⁶¹ Alternately, the prosecution could be required to affirm that the state is unaware of any information that would potentially compromise the validity of the report as part of the foundational requirement for admission. Similarly, the prosecution has a duty to notify the court and defense of its intended witnesses in a timely manner.¹⁶² It is well established that failure

155. Mark Stevens, *Admissibility of Scientific Evidence Under Daubert*, N.C. WESLEYAN C., <http://faculty.ncwc.edu/mstevens/425/lecture02.htm> (last visited Apr. 14, 2013).

156. *Id.*

157. *Bullcoming v. New Mexico*, 131 S. Ct. 2705, 2711–12 (2011).

158. FED. R. EVID. 401 (“Evidence is relevant if . . . it has any tendency to make a fact more or less probable than it would be without the evidence . . .”).

159. *See* FED. R. EVID. 403 (“The court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, *misleading the jury*, undue delay, wasting time, or needlessly presenting cumulative evidence.” (emphasis added)).

160. This is naïve. However, if judicial officers and prosecutors will not observe the law, then fundamentally no arguments about procedure matter in the slightest. *See* MODEL RULES OF PROF'L CONDUCT, at r. 3.3 (2012) (“Candor toward the tribunal. (a) A lawyer shall not knowingly: (1) make a false statement of fact or law to a tribunal or fail to correct a false statement of material fact or law previously made to the tribunal by the lawyer . . .”).

161. *Id.*

162. FED. R. CRIM. P. 16 (failure to disclose substitute expert witness' statement is grounds for exclusion of testimony).

to do so may be grounds for exclusion.¹⁶³ In *Bullcoming*, it is clear that the defense counsel only became aware of the irregularity with regard to the analyst at trial.¹⁶⁴ However, at trial the defendant did not contest his intoxication at the time of the test, instead claiming that he had consumed vodka between the accident and his detention by the police shortly thereafter.¹⁶⁵ At the time of trial, the state failed to provide evidence that the suspension was unrelated to the technical performance of the analyst's work.¹⁶⁶ If unable to cure this defect, the state would then need to present the analyst, rerun the testing with another analyst, or drop the report from the case.

II. MEETING THE *DAUBERT* CRITERIA

A. COMPLETE SCIENTIFIC REPORTS

A well-drafted, technical report should answer all of the questions that would be asked of the analyst.¹⁶⁷ While some reports, like the affidavits in *Melendez-Diaz*,¹⁶⁸ are simply bald assertions, others, like the *Bullcoming* report,¹⁶⁹ are not organized to allow a judge (or other non-expert reviewer) to determine whether all of the necessary elements are present. These

163. *Id.*

164. *Bullcoming v. New Mexico*, 131 S. Ct. 2705, 2711–12 (2011) (“The prosecution, [defense counsel] complained, had never disclosed, until trial commenced, that the witness ‘out there [was] not the analyst [of the sample at issue].’”).

165. *State v. Bullcoming*, 189 P.3d 679, 681 (N.M. Ct. App. 2008), *aff’d on other grounds*, 226 P.3d 1 (N.M. 2010), *rev’d*, 131 S. Ct. 2705 (2011).

166. Brief of the Amicus Curiae State of New Mexico Department of Health Scientific Laboratory Division in Support of Respondent, *supra* note 113, at 31 n.11 (“The record reflects that the original analyst, Curtis Caylor, was on unpaid leave. As an employment matter, SLD [Scientific Lab Division] may not disclose the reason, but states unequivocally that if Mr. Caylor’s analytical work had been doubted, SLD policy is that it would have been rejected, and re-tested prior to trial.”).

167. See *Miller v. State*, 472 S.E.2d 74, 76–78 (Ga. 1996) (discussing how indicia of “reliability” in technical reports, including scientific evidence, can have an effect on whether or not that evidence is admissible).

168. *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 311 (2009) (discussing affidavits submitted as a way to provide “prima facie evidence of the composition, quality, and the net weight” of a substance that was analyzed as evidence).

169. *State v. Bullcoming*, 131 S. Ct. 2705, 2707 (2011) (discussing blood sample reports analyzed by a forensic science analyst).

elements, listed below, are discussed in detail in Part II.B through II.F.

Key Components of a Scientific Report:

- 1) Sample identifier, including any identifier(s) assigned to the sample during analysis.
- 2) Documentation of sample receipt and chain of custody.
- 3) Analyst's name.
- 4) Analyst's credentials.¹⁷⁰
- 5) Evidence of analyst's certification or qualification to perform the specific test.¹⁷¹
- 6) Laboratory's certification.¹⁷²
- 7) Testing method, either referencing an established standard (e.g., *ASTM E2224 - 10 Standard Guide for Forensic Analysis of Fibers by Infrared Spectroscopy*) or a copy of the method if it is not publicly available.¹⁷³
- 8) Evidence of the effectiveness and reliability of the method,¹⁷⁴ either from peer reviewed journals, method certification, or internal validation testing.¹⁷⁵
- 9) Results of testing, including the results of all standards or controls run as part of the testing.¹⁷⁶
- 10) Copies of all results, figures, graphs, etc.
- 11) Copy of the calibration log or certificate for any equipment used.
- 12) Any observations, deviations, and variances, or an affirmative statement that none were observed.

170. See generally FED. R. EVID. 702(a).

171. See generally *id.*

172. See generally FED. R. EVID. 702(c).

173. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 593–94 (1993).

174. *Id.* at 594.

175. See *id.*; Garrett & Neufeld, *supra* note 117, at 93–98. See also Brief of Amicus Curiae National Ass'n of Criminal Defense Lawyers, National Ass'n of Federal Defenders, and National College of DUI Defense in Support of Petitioners at 12, *Melendez-Diaz v. Massachusetts*, 557 U.S. 305 (2008) (No. 07-591) ("Since laboratory reports only state general conclusions, they may be given far more significance in court than they rightfully deserve." (quoting *United States v. Davis*, 14 M.J. 847, 848 n.3 (A.C.M.R. 1982)).

176. For an example of what this requirement seeks to prevent, see *Williams v. Illinois*, 132 S. Ct. 2221, 2230 (2012) ("[S]he had not seen any of the calibrations or work that Cellmark had done in deducing a male DNA profile from the vaginal swabs. . .").

- 13) Analyst's statement that all this information is true, correct, and complete to the best of their knowledge.
- 14) Analyst's statement that the information is consistent with various hearsay exceptions.
- 15) Evidence of second-party review, generally a supervisor or qualified peer.
- 16) Posting a copy to a publicly maintained database.¹⁷⁷
- 17) Notifying the authorizing entity via email of the completion of the work and the location of the posting.¹⁷⁸

"Currently, no national or widely-accepted set of standards for forensic science written reports or testimony exists."¹⁷⁹ No entity ensures that all analysts adhere to standards for permissible scientific conclusions regarding forensic evidence.¹⁸⁰ Identification and standardization of best practices may be an important step towards producing consistent scientific reports.

B. IDENTIFICATION AND CREDENTIALS

Proper documentation of sample identification and chain of custody allow test results to be tied to a specific piece of evidence submitted by an investigator.¹⁸¹ While it is important that the analyst has the proper academic training to perform his job, more important is the analyst's qualification and training to perform the specific test.¹⁸² This should include some

177. See Gross, *supra* note 115, at 1172 ("Unfortunately, what an expert says in court is generally invisible and inaudible in her own professional world. If expert witnesses were accountable to their colleagues, even informally, they might fear the consequences of irresponsible testimony far more than they do. This sort of exposure would be an incentive to be careful as well as honest." (footnote omitted)).

178. See *People v. McClanahan*, 729 N.E.2d 470, 475 (Ill. 2000) (detailing how a submitted report does not contain "any information as to how the tests are conducted, what the accepted scientific procedures are, and what qualifications and training crime lab employees must have").

179. Garrett & Neufeld, *supra* note 117, at 11.

180. *Id.* ("No entity promulgates such standards or ensures that all analysts adhere to standards for permissible scientific conclusions regarding forensic evidence.").

181. See generally Mike Byrd, *Proper Tagging and Labeling of Evidence for later Identification*, CRIME SCENE INVESTIGATOR NETWORK, <http://www.crime-scene-investigator.net/tagging.html> (last visited Mar. 28, 2013) (providing brief background of identification and chain of custody labeling used by police).

182. See FED. R. EVID. 702(a).

documented training and evaluation subject to annual or biannual renewals.¹⁸³ Periodic retraining identifies drifts in performance and also areas where the methodology is weak, vague, or inconsistently performed.¹⁸⁴ Similarly, labs should seek outside certification to assure that processes and procedures are consistent with professional norms.¹⁸⁵

C. METHODS CONSISTENT WITH *DAUBERT* CRITERIA

Regardless of whether the testimony is presented in person or by report, the methodology used in scientific analysis must conform to the criteria outlined in *Daubert* (or *Frye* in certain jurisdictions).¹⁸⁶ Most of this material may be incorporated into standard templates or remain constant for similar analyses, allowing cutting and pasting by the analyst. The technical estimates of error rate (Item 8) may be developed by professional societies.¹⁸⁷ If the statement is published in a peer reviewed journal or similar source, it may be incorporated by reference, although a paragraph summary of the error rate and other key pieces of information should be included in the report.¹⁸⁸ Failure to provide such evidence indicates that the report has failed to meet the *Daubert* criteria, since the information required is presumptively unavailable.¹⁸⁹ For instance in *Melendez-Diaz*,

183. COMM. ON IDENTIFYING THE NEEDS OF THE FORENSIC SCIENCE CMTY. ET AL., NAT'L RESEARCH COUNCIL, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 232–33 (2009) [hereinafter A PATH FORWARD] (stressing the importance of training for operational scientists and the need for continuing education of analysts).

184. *See id.* at 233 (“Continuing education is critical for all personnel working in crime laboratories as well as for those in other forensic science disciplines. . .”).

185. *See id.* at 195 (discussing the importance of accreditation standards to ensure organizational quality).

186. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 590 (1993) (“[I]n order to qualify as ‘scientific knowledge,’ an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation—i.e., ‘good grounds,’ based on what is known. In short, the requirement that an expert’s testimony pertain to ‘scientific knowledge’ establishes a standard of evidentiary reliability.”).

187. A PATH FORWARD, *supra* note 183, at 184 (“[T]he accuracy of forensic methods resulting in classification or individualization conclusions needs to be evaluated in well-designed and rigorously conducted studies.”).

188. *See id.* (“All results for every forensic method should indicate the uncertainty in the measurements that are made . . .”).

189. *See General Electric Co. v. Joiner*, 522 U.S. 136 (1997) (holding that a court may exclude expert testimony when there are gaps between the evidence relied upon by an expert and the conclusion drawn).

the failure to identify which method of drug analysis was used prevented any reasonable assumption about its reliability.¹⁹⁰

D. ALL RESULTS AND RAW DATA

A report should contain a clear, brief description of the results (e.g., “Sample ARG-0123LV exhibited a blood alcohol content of 0.163% when tested using Mass Spectroscopy (Method MPLSCLMS1200). The standard error for this method is +/- 0.004%.”). Fundamental to the ability of other persons to conduct an independent review and assessment of the validity of the report is access to the raw data.¹⁹¹ Absent raw data, the report resembles the affidavit of *Melendez-Diaz*, a bare assertion unsubstantiated by anything other than the witness’s statement. Similarly, inclusion of the calibration information of the equipment is useful to eliminate a common potential error source.¹⁹²

E. AFFIRMATION BY THE ANALYST AND REVIEWER

The inclusion of an analyst’s affirmative statement, which indicates the degree of accuracy and completeness of the submitted scientific evidence, may address concealment issues and also provide legal grounds for action against unethical practices.¹⁹³ This affirmative statement, however, potentially turns the report into an affidavit. While as a matter of principle, such statements should not be required for the report to be accurate and complete, their inclusion is similar to the purposes of the oath: namely to 1) focus the mind on the facts being established, 2) establish a clear basis for punishment in the event of

190. Brief for Petitioner, *supra* note 151, at 32 (“Indeed, there are at least *seventeen different methods* currently used for analyzing seized substances for the presence of drugs, each involving differing systematic error rates . . .”).

191. See Nigel T. James, *Scientific Method and Raw Data Should be Considered*, 169 BRIT. MED. J. 4, 4 (1996) (“Those who are concerned with validity will examine raw data . . .”).

192. See generally MICHAEL P. GALLAHER ET AL., THE IMPACT OF CALIBRATION ERROR IN MEDICAL DECISION MAKING (2004) (providing an example of how calibration errors can lead to substantial costs).

193. See Margot Iverson, *Should There Be an Oath for Scientists and Engineers*, AM. ACAD. ARTS & SCI. COMMITTEE ON SCI. FREEDOM & RESP. (Sept. 27, 2000), <http://www.aaas.org/spp/sfrl/projects/oath/oathsummary.htm> (discussing the purposes, pros, cons, and possible methods of enforcement of an oath)

fraud, and 3) provide circumstantial guarantees of truthfulness.¹⁹⁴

Placing these reports within the ambit of a number of traditional hearsay exceptions by use of affirmative statements could provide the court with a broad basis for admission. These potential exceptions include present sense impressions, recorded recollections, business records, and public records. Sample statements include:

- This report consists of results observed by the analyst.¹⁹⁵
- This report consists of the observations of the analyst recorded shortly after their occurrence and adopted by the analyst as true, accurate, and complete.¹⁹⁶
- This report was produced by the analyst, a person with personal knowledge, at the time of testing, as part of the normal operation of this laboratory. This report is subject to independent review and confirmation of its validity.¹⁹⁷
- This report was produced as part of the state's normal operation and is recorded as a public record.¹⁹⁸

F. PUBLIC POSTING

The only dependable guarantee of the reliability of a lab's activities is review by competent, independent observers. The classic question of "Who watches the watchmen?"¹⁹⁹ remains a powerful challenge when defense lawyers, prosecutors, judges, and other public officials lack the expertise, resources, and disposition to investigate and evaluate the functioning of public and private labs. One of the lasting legacies of the Watergate era was the Freedom of Information Act: a tool for the citizenry to keep tabs on the government and the actions it takes in our names by forcing information into the public sphere.²⁰⁰ Our ju-

194. *See id.*

195. FED. R. EVID. 803(1).

196. FED. R. EVID. 803(1), (5).

197. FED. R. EVID. 803(6).

198. *See* FED. R. EVID. 803(8)(A)(i), (8)(B).

199. *See* JUVENAL, THE SATIRES OF JUVENAL 78 (Rolfe Humphries trans., Indiana University Press 1958) ("Who will be guarding the guards?").

200. *See generally* 5 U.S.C. § 552 (2006).

dicial system has significant, even overwhelming, caseloads for prosecutors, public defenders, and judicial officers. The absence of data in the public sphere prevents private actors such as academics, the media, or professional societies from assessing the validity of the work.²⁰¹ Problems in forensic labs have only been uncovered by investigation, often triggered by inquiries in false conviction cases.²⁰²

Courts have rejected the use of the public records hearsay exception when the documents were prepared for trial.²⁰³ *Melendez-Diaz* is a plurality decision and, thus, should be read narrowly. However, current cases do not appear to prevent states from promulgating statutes establishing that posting test results, coupled with informing defense counsel of these results, say, thirty days prior to trial, is considered notice of the states' intent to use the report to establish the facts therein.²⁰⁴ This is the vein of the notice and demand statutes identified as acceptable to the plurality in *Melendez-Diaz*.²⁰⁵ This burden shifting is not trivial, but "notice and demand" is considered the most "benign" of the *ipse dixit* statutory approaches allowing admission of scientific evidence without cross-examination.²⁰⁶

Requiring public posting of this information also encourages standardization of the report format between laboratories and jurisdictions—something that aids prosecutors, defense at-

201. See Gross, *supra* note 115, at 1178–79.

202. See Garrett & Neufeld, *supra* note 117, at 14.

203. *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 324 (2009) ("Business and public records are generally admissible absent confrontation not because they qualify under an exception to the hearsay rules, but because—having been created for the administration of an entity's affairs and not for the purpose of establishing or proving some fact at trial—they are not testimonial.")

204. *Williams v. Illinois*, 132 S. Ct. 2221, 2248 (2012) (Breyer, J., concurring) ("In particular, the States could create an exception that presumptively would allow introduction of DNA reports from accredited crime laboratories."). *But see* Pamela R. Metzger, *Cheating the Constitution*, 59 VAND. L. REV. 475, 517 ("The United States Supreme Court . . . has firmly rejected the suggestion that a court may presume the 'waiver of a fundamental right from inaction.'" (quoting *Barker v. Wingo*, 407 U.S. 514, 525 (1972))).

205. *Melendez-Diaz*, 557 U.S. at 326 ("[M]any [other states] permit the defendant to assert (or forfeit by silence) his Confrontation Clause right after receiving notice of the prosecution's intent to use a forensic analyst's report."); *see also Williams*, 132 S. Ct. at 326–27. *But see Metzger*, *supra* note 204, at 500 ("The forensic *ipse dixit* statutes swindle defendants out of the Confrontation Clause's 'bedrock procedural guarantee.'" (quoting *Crawford v. Washington*, 541 U.S. 36, 42 (2004))).

206. Metzger, *supra* note 204, at 481.

torneys, and the courts.²⁰⁷ Finally, availability means that subsequent issues with the same defendant will be available for the courts to review.²⁰⁸ Online records are available to the judge from the bench at a moment's notice.²⁰⁹ For instance, adjudication of DUI is an ongoing challenge; having the test results searchable and retrievable empowers courts to more effectively evaluate defendants' past activity.

III. CONCLUSION

The Court faces a new challenge with the ongoing development of scientific evidence. What standards should apply to ensure that defendants are protected from unfounded accusations? The Court's groundbreaking *Crawford* decision rightly provided protection against the "note taking police officer" by preventing the admission of unsubstantiated hearsay. However, the current cases—*Melendez-Diaz*, *Bullcoming*, and *Williams*—do not effectively delineate when a nontraditional witness will be required to be confronted, even when the issue is not contested by the defendant at trial.²¹⁰ More troubling, the Court has not demanded that scientific evidence, presented live or by report, live up to the standard established in *Daubert*. While all sides agree that scientific evidence is especially probative, the refusal to demand evidence of reliability, method validation, and scientific consensus has allowed shoddy work and practices to impersonate dependable science in our courts. This is an injustice to the innocent and the guilty alike, and the Court should require *Daubert* validity for foundation before accepting scientific evidence into court.

In contrast, the ongoing dispute in the Court about requiring analysts to testify before admitting scientific findings misses the mark. Such testimony does not reveal sloppy or criminal behavior at crime labs. The requirement for direct confronta-

207. See, e.g., Cal. Dep't of Pub. Health, *California Influenza Surveillance Project*, CA.GOV, <http://www.cdph.ca.gov/programs/dcdc/Pages/CaliforniaInfluenzaSurveillanceProject.aspx> (last modified Mar. 29, 2013) (noting that laboratories that report data regarding influenza and other respiratory virus detections help standardize treatment and detection).

208. Author's observation of Assistant Chief Judge Ivy Bernhardson, Hennepin County District Court (May–Aug. 2012). I requested her clerk to access publicly available records to assess statements by one of the defendants in a case.

209. Author's observation of Assistant Chief Judge Ivy Bernhardson, Hennepin County Courts (May–Aug. 2012).

210. E.g., *Melendez-Diaz*, 557 U.S. at 305.

tion of laboratory technicians does not prevent unjust incarceration. In contrast, the use of scientific testing has freed hundreds of wrongfully convicted persons.²¹¹ Diverting resources from the second use to the first will result in more innocent persons spending more time in prison.²¹² While the Court's requirement would not matter in an ideal, non-resource constrained world, this is not the world of the district and state courts.²¹³ More, not fewer, unjust convictions are the cost of applying *Crawford* to scientific evidence, and it is a cost inconsistent with our principles.²¹⁴

The move to require the analyst to be present and testify will result in lower quality scientific evidence in our courts. In addition to the resource argument advanced above, the requirement for testimony will discourage the use of national laboratories, such as the FBI crime lab. The result will be that local labs will conduct a wider variety of analyses on a less frequent basis and with a greater opportunity for error. Alternatively, the state may choose to generate or present only a single type of DNA analysis instead of both STR (Short Tandem Repeats) and PCR (Polymerase Chain Reaction) as was done in the *Kocak* case.²¹⁵ This decision will result in less scientific

211. See INNOCENCE PROJECT, *supra* note 125.

212. Brief of the States of Alabama, Alaska, Arizona, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Indiana, Kansas, Kentucky, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Virginia, Washington, Wyoming, & the District of Columbia as Amici Curiae in Support of Respondent at 2, *Melendez-Diaz v. Massachusetts*, 557 U.S. 305 (2008) (No. 07-591) ("As stewards of the public's resources, the amici States have two interests. The first is to spend the lion's share of the public's money where it matters most: on the front lines, fighting and preventing continued drug abuse. The second is to keep our technicians in the laboratory, whenever possible, to handle the daily influx of drug analysis requests . . .").

213. See, e.g., Reporter's Partial Transcript at 7, *State of California v. Kocak*, No. SCD110465 (Cal. App. Dep't Super. Ct. Nov. 17, 1995) ("Mr. Aragon [Defense counsel]: 'First of all, Mr. Carpenter, does this mean that Cellmark still gets their \$1200 a day?' Mr. Carpenter [prosecutor]: 'I believe so.'"). That was in addition to expenses, in this case including flying the analyst to California to testify. See *id.*

214. See FED. R. CRIM. P. 2 ("These rules are to be interpreted to provide for the just determination of every criminal proceeding, to secure simplicity in procedure and fairness in administration, and to eliminate unjustifiable expense and delay.").

215. See Reporter's Partial Transcript, *supra* note 213, at 5.

data being available to all parties, including juries,²¹⁶ which surely hurts innocent defendants.

The ineffectiveness of the courts in detecting the rare but real instances of scientific fraud or misconduct must be corrected. The courts have failed to act as gatekeepers against unreliable evidence, allowing shoddy work and bare accusations to be placed into evidence. Only by exposing lab reports to public scrutiny will crime labs be motivated to engage in the improvement of operations and procedures that will assure defendants and courts access to accurate and reliable testing. Fortunately, advances in information technology have made publishing this information cheaper and more effective than was previously imaginable. Without reliable, early access to the test results, defendants have little chance to effectively contest those results in court. By not requiring labs to conform to the *Daubert* standard for the admission of scientific evidence, the courts continue to allow unreliable conjecture to masquerade as scientific fact to juries.

216. See *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 341 (2009) (Kennedy, J., dissenting) (“By requiring analysts also to appear in the far greater number of cases where defendants do not dispute the analyst’s result, the Court imposes enormous costs on the administration of justice.”).