

No. 09-10876

In the Supreme Court of the United States

DONALD BULLCOMING, *Petitioner*,

v.

NEW MEXICO, *Respondent*.

ON WRIT OF CERTIORARI TO THE
NEW MEXICO SUPREME COURT

**BRIEF FOR THE STATES OF CALIFORNIA, ALABAMA, ALASKA,
ARIZONA, COLORADO, DELAWARE, DISTRICT OF COLUMBIA,
FLORIDA, HAWAII, IDAHO, ILLINOIS, INDIANA, IOWA,
LOUISIANA, MAINE, MARYLAND, MASSACHUSETTS,
MICHIGAN, MINNESOTA, MONTANA, NEVADA, NEW
HAMPSHIRE, NEW JERSEY, OHIO, OKLAHOMA, RHODE
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INTEREST OF AMICI CURIAE

Petitioner seeks an extension of *Melendez-Diaz v. Massachusetts*, 557 U.S. ___, 129 S. Ct. 2527 (2009), that would severely impair Amici States' ability to introduce independent and reliable scientific testimony from qualified experts in criminal trials. His desired expansion of *Melendez-Diaz* would inhibit the development of efficient laboratory procedures that involve more than a single centralized analyst. And it would impair the search for truth in state criminal prosecutions dependent on high-volume forensic science disciplines as well as in many other cases—typically homicides and sexual assaults—solved with DNA database matches years or even decades after the original testing of forensic evidence.

Amici States also have a strong interest in maintaining their existing rules of evidence. Those rules generally permit expert witnesses—who appropriately draw upon information from non-testifying scientists, technicians, and programmers—to render reliable opinions concerning physical evidence. Petitioner's proposed extension of *Melendez-Diaz* would suddenly treat these well-established rules as out of compliance with the Confrontation Clause.

SUMMARY OF ARGUMENT

The New Mexico Supreme Court correctly held that trial testimony by a competent expert rendering an independent opinion on forensic evidence satisfies the Confrontation Clause.

1. The application of scientific techniques to physical evidence is a crucial part of the criminal justice system. Following *Melendez-Diaz v. Massachusetts*, many criminal courts correctly continue to allow into evidence a qualified scientific expert's independent opinion, subject to cross-examination, based in part upon data or observations generated from forensic testing by a non-testifying examiner or analyst. Petitioner's proposed extension of *Melendez-Diaz*, which would require production of every analyst at trial, would constrict, if not end, this reliable practice.

Requiring testimony from every analyst who performed some part of a scientific test or procedure, and who may have no specific recollection of any particular test, would advance no interest protected by the Confrontation Clause. Instead it would do harm. It would pull valuable analysts away from their underresourced laboratories and into courthouses. And it would stifle continued development and improvement of reliable and efficient evidence-processing protocols that rely on multiple technicians or analysts in a given case.

Such a regime, also, would introduce perverse incentives for the accused to gamble on an analyst's nonappearance at trial by resisting an early plea bargain. Similarly, it often would force the prosecutor to mitigate the risk of such nonappearance by offering a more lenient sentence disposition than the merits of the case would justify. The risk would be most acute in cases involving forensic science disciplines where high volumes of physical evidence are tested, and disciplines in which evidence cannot easily or inexpensively be retested.

Indeed, an overly rigid extension of *Melendez-Diaz* would result in a de facto statute of limitations for crimes where an unavailable examiner or analyst played any role in developing crucial scientific proof. This burden on the justice system would be offset by little or no improvement in the truth-finding function of the criminal trial. And, with their forensic services already overtaxed, the impact on Amici States would be further exacerbated.

2. In-court testimony from a qualified expert who renders an independent opinion about forensic evidence satisfies the Confrontation Clause. The defense, in turn, may cross-examine the expert about her opinion and her reasons for it.

Nothing in *Melendez-Diaz* conflicts with this practice. The Court in that case merely disapproved use of a formalized testimonial statement about physical evidence, offered at trial in the absence of the person who rendered that scientific conclusion. Nor does *Melendez-Diaz* justify petitioner's emphasis on identifying and producing at trial all analysts who processed physical evidence. Whether or not the in-court expert personally facilitated the production of data, the in-court opinion itself is the evidence against the accused, and the defendant retains his constitutional right to confront that expert. The expert is not a "surrogate," as petitioner asserts. Rather, the expert is the witness against the accused whose testimony satisfies the Confrontation Clause. Thus, here, petitioner was confronted with the expert witness against him.

Conversely, the testing data produced from the scientific instruments in this case were not testimonial statements of witnesses subject to the

confrontation right. Raw testing data, laboratory observations, scientific theories, and forensic examination methods commonly undergird an expert witness's opinion. But all these are only premises of the experts' testimony. Although they represent the contributions of scientists, programmers, analysts, or technicians other than the testifying expert, they rarely have standalone evidentiary significance in court. To isolate and label "testimonial" any statement made by a person in the network of scientific data and principles underlying an opinion would be unworkable. It would open the door to defense demands to cross-examine not only the expert providing evidence, but also a multitude of participants deeper in the scientific process.

State evidence rules, similar to Federal Rules of Evidence 702 and 703, take proper account of the realities of forensic testing and scientific testimony, and of concerns of fairness, by providing trial courts with discretion to control the content and form of expert testimony. They permit scientific experts to testify to their independent opinions based upon multiple sources of necessary data and information. But they impose on the trial judge the duty to ensure that the underlying bases of the expert's opinion testimony are reliable. In ruling on the admissibility of the expert opinion, the judge considers whether the bases of the opinion have been independently evaluated in view of laboratory protocols, methods, and quality controls. The judge's scrutiny thus provides constitutionally adequate protection against an in-court expert acting as a mere reader of, or conduit for, another analyst's conclusion.

ARGUMENT

I. THE CRUCIAL IMPORTANCE OF RELIABLE FORENSIC SCIENCE EVIDENCE IN MODERN CRIMINAL LITIGATION SHOULD BE CONSIDERED IN INTERPRETING THE CONFRONTATION CLAUSE

Many courts have struggled with the question of whether and how *Melendez-Diaz v. Massachusetts*, 129 S. Ct. 2527, applies to an expert witness's in-court, independent, testimonial opinion where it is based in part upon forensic science test data recorded by an analyst who does not testify.¹ This unresolved scenario was not presented in *Melendez-Diaz*, but lies at the core of the present case, J.A. 13-14, and is a routine occurrence in criminal cases nationwide. The Court's prediction in *Melendez-Diaz* that "the sky will not fall" in the wake of its decision, 129 S. Ct. at 2540, thus was premature at best.

A. The Stresses on Forensic Science Services Should Not Be Exacerbated

1. Concerns about *Melendez-Diaz's* impact upon the criminal justice system have been consistently reported and remain unabated. A

¹ For instance, in several pending appeals, the California Supreme Court will address the admissibility of expert witness testimony based in part upon the observations and results recorded by a non-testifying analyst or pathologist. *People v. Dungo*, 102 Cal. Rptr. 3d 282, 220 P.3d 240 (2009); *People v. Lopez*, 102 Cal. Rptr. 3d 283, 220 P.3d 240 (2009); *People v. Rutterschmidt*, 102 Cal. Rptr. 3d 281, 220 P.3d 239 (2009); *People v. Gutierrez*, 102 Cal. Rptr. 3d 281, 220 P.3d 239 (2009).

national report cited in *Melendez-Diaz* noted that “a number of factors have combined in the past few decades to place increasing demands on an already overtaxed, inconsistent, and underresourced forensic science infrastructure.” Comm. on Identifying the Needs of the Forensic Sci. Cmty., Nat’l. Research Council of the Nat’l. Academies, *Strengthening Forensic Science in the United States: A Path Forward* 39 (2009) [2009 NAS Report], available at http://www.nap.edu/catalog.php?record_id=12589. This corroborates information, received previously by the Court from a number of sources, documenting adverse results from imposing additional burdens upon forensic science service providers. E.g., Brief for Indiana et al. as Amici Curiae, at 5-11, *Briscoe v. Virginia*, ___ U.S. ___, 130 S. Ct. 1316 (2010) (No. 07-11191); Brief for Alabama et al. as Amici Curiae, at 25-28, *Melendez-Diaz v. Massachusetts*, 129 S. Ct. 2527 (2009) (No. 07-591). These warnings continue to resonate.

Forensic science service systems cannot absorb the demands on their resources that would result if every forensic analyst who generates data in connection with a criminal case is required to personally testify in order to satisfy the Confrontation Clause. For example, a typical blood-and-breath alcohol analyst in California completed 3,220 requests for analysis in 2007; and controlled-substances analysts each completed an average of 1,053 requests.² Calif. Crime Lab’y Rev. Task Force,

² The volume of work in these forensic science disciplines strongly suggests that when an analyst does testify, she will routinely do so without actual recollection of one test
(continued...)

An Examination of Forensic Science in California 64 (2009), available at http://ag.ca.gov/publications/crime_labs_report.pdf. Even this volume of forensic casework has failed to keep up with demand, however, leading to statewide backlogs in these and other forensic science disciplines. *Id.* at 63, 64.

In addition to processing evidence, forensic analysts must attend to laboratory administrative duties, training, and quality assurance activities, as well as spend time traveling to court, waiting in court, and testifying. In a recent twelve-month period, the ten toxicologists working for the Los Angeles Police Department's (LAPD) Scientific Investigation Division collectively spent more than 782 hours attending 261 court appearances. E-mails from Gregory Matheson, Lab. Director, Los Angeles Police Dept. Criminalistics Lab., to Michael Chamberlain, Counsel of Record for the Amici States (Nov. 2, 2010, 14:46 PST; Nov. 8, 2010, 11:37 PST) (on file with author). The sixteen LAPD narcotics analysts spent 428 hours making 140 court appearances during the same period. *Id.*

2. The still-life observation that only a fraction of cases proceed to trial, see *Melendez-Diaz*, 129 S. Ct. at 2540, thus fails to capture the real-world dynamic of forensic science services. Were this Court to adopt petitioner's argument, case-disposition offers to defendants in prosecutions requiring alcohol, controlled substance, toxicology, DNA, or other forensic science evidence would be

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out of hundreds or even thousands. See, e.g., *State v. Coombs*, 149 N.H. 319, 323, 821 A.2d 1030, 1033 (2003).

distorted by the real risk that an analyst, attenuated from the in-court expert's testimony, might become unavailable at trial for any one of many possible reasons. The analyst might take ill, use parental leave, experience conflicting court obligations, retire, or worse. Defendants, calculating the odds, would be presented with a new disincentive to enter into early plea bargains. That disincentive would be acute in cases involving older investigations and in cases where physical evidence is not easily or inexpensively reanalyzed. The palpable consequences of petitioner's argument, then, extend beyond necessitating more trials. They also would include unduly lenient plea bargains for defendants in a position to exploit the chance that an analyst will become unavailable.

B. Extending *Melendez-Diaz* Will Adversely Affect Laboratory Efficiency and Technology

1. Extending *Melendez-Diaz*, to categorically ban expert scientific opinion testimony where raw data is generated by non-testifying analysts, would bring about other ill effects. It would strongly discourage, if not end, a growing practice in forensic laboratories of engaging in high-volume processing of evidence samples by teams of analysts instead of just one.

For example, the Office of the Chief Medical Examiner for New York City conducts DNA testing in more than 3,000 cases each year, and "rotates" its forensic biology staff through weekly assignments that focus on an isolated analytical task carried out in many different cases. M. Samples et al., *The Rotating Analyst – The NYME Casework System*, 8

Progress in Forensic Genetics 619, 619 (2000). Multiple analysts are thus responsible for the data generated in a given case. *Id.* at 620. This method “allows high throughput without sacrificing quality,” and permits flexible and predictable staffing schedules. *Id.* Courtroom testimony is provided by an interpreting analyst who “is confident of the training of the entire staff and can rely on an extensive review process of each DNA report” *Id.*

The unworkable alternative—threatened by petitioner’s reading of the Sixth Amendment—is illustrated by a recent robbery prosecution in Orange County, California. There, concern about confrontation claims motivated the prosecutor to call all twelve forensic analysts who had participated in the batch processing of DNA samples. *People v. Acosta* (Orange Cty. No. 07CF1858); E-mail from Mary Hong, Senior Forensic Scientist/DNA Supervisor, Orange County Crime Laboratory, to Michael Chamberlain, Counsel of Record for the Amici States (Nov. 5, 2010, 11:04 PST) (on file with author). The witnesses comprised half of the DNA analysts employed by the laboratory. *Id.* Each analyst-witness spent more time traveling to and from court, speaking with the prosecutor, and waiting in the courthouse hallway than he or she did testifying. *Id.* One analyst spent more than twelve hours away from the laboratory for approximately thirty minutes of testimony. *Id.*

2. Adopting petitioner’s position would also reduce incentives to develop new and better forensic science technologies. The state laboratory in Ohio, for instance, recently began using robotics in its

batch-processing of DNA samples: “Assisted by robots, one analyst performs the first stages of testing on a large batch of samples encompassing many cases—extracting the DNA, determining the amount of human DNA present, and amplifying and processing it through a genetic analyzer. Then, other analysts interpret the profiles, make comparisons and conclusions and write reports for the individual cases.” Supplemental Brief for Ohio Att’y Gen’l as Amicus Curiae, at 18, *State v. Crager*, 124 Ohio St. 3d 1446, 920 N.E.2d 375 (2010) (Nos. 2006-0294 & 2006-0298). An unnecessarily rigid interpretation of the Confrontation Clause, however, would chill technological developments that would permit decentralized processing of forensic science casework. The law should encourage technological innovation, not inhibit it.

C. Extending *Melendez-Diaz* Would Hinder DNA Data Bank Programs

Finally, expansion of *Melendez-Diaz* would threaten the efficacy of DNA database programs. Such programs have proven highly successful in solving serious cases that had gone “cold” for years, if not decades. See generally David Kaye, *Rounding Up the Usual Suspects: A Legal and Logical Analysis of DNA Trawling Cases*, 87 N.C. L. Rev. 425, 427 (2009) (describing DNA database matches that solved two-and three-decade-old rapes and murders); Federal Bureau of Investigation, CODIS-NDIS Statistics, <http://www.fbi.gov/about-us/lab/codis/ndis-statistics> (last visited Jan. 10, 2011) (“As of November 2010, CODIS has produced over 130,900 hits assisting in more than 127,600 investigations.”).

All fifty States and the Federal Government maintain DNA database programs designed to provide investigative leads in unsolved cases—primarily crimes of violence and sexual assaults—where there exists DNA evidence attributable to the perpetrator. *United States v. Sczubelek*, 402 F.3d 175, 181, 185 n.5 (3d Cir. 2005). The welcome prospect of bringing perpetrators of serious crimes to justice following DNA database matches has inspired legislators to modify statutes of limitations to permit prosecution many years after the fact where DNA evidence is available. E.g., 18 U.S.C. § 3297 (2010).

Along with the possibility of prosecuting “cold” crimes, however, comes a higher probability that analysts, examiners, and pathologists who originally worked on the old cases will have retired, died, or otherwise become unavailable. For example, Dr. Boyd Stephens died in April 2005 after serving as the Chief Medical Examiner for the City and County of San Francisco since 1971. Obituary, *Dr. Boyd Stephens*, S.F. Chron., April 5, 2005, at B5. Dr. Pierce A. Rooney, Jr. died in January 2009 after serving as a pathologist for the Sacramento County Coroner’s Office since 1969. Obituary, *Dr. Pierce A. Rooney, Jr.*, Sac. Bee, Jan. 25, 2009, at B5. It is not unlikely that among the thousands of autopsies these and other now-deceased medical examiners performed are homicide cases that yet will be solved using DNA database technology. But the death of the pathologist should not sound the death knell for the prosecution of the case, as well. See generally Carolyn Zabrycki, *Comment: Toward a Definition of “Testimonial”: How Autopsy Reports Do Not Embody the Qualities of a Testimonial Statement*, 96 Cal. L.

Rev. 1093, 1115-17 (2008) [Zabrycki, *Autopsy Reports*].

The Confrontation Clause does not require the near monopolization of laboratory and courthouse resources that petitioner's argument implies. Still less does the Clause envision that the ongoing availability or life spans of scientists, medical examiners, and laboratory analysts should work as a de facto statute of limitations in forensic science criminal cases. That cannot serve as the norm in any rational system of criminal justice.

II. A DEFENDANT'S CONFRONTATION RIGHT IS SATISFIED BY THE OPPORTUNITY TO CROSS-EXAMINE A QUALIFIED EXPERT PRESENTING AN IN-COURT OPINION ON FORENSIC EVIDENCE

When forensic science evidence is provided to a finder of fact in the form of an expert opinion, the person who renders that opinion is not a "surrogate." She is the constitutionally significant witness against the defendant. Her testimony, subject to cross-examination at trial, satisfies the Confrontation Clause. The fact that the expert rendering an independent opinion might rely on hearsay, testimonial or not, gives rise to no Confrontation Clause violation.

A. The Forensic Expert Who Offers An Opinion With Evidentiary Value Is the Witness Against the Defendant

1. A scientific expert giving her independent opinion is the witness whose presence on the stand satisfies the Confrontation Clause. The defense may

fully cross-examine her on her opinion and her reasons for it.

Melendez-Diaz is not to the contrary. The Court in that case, instead, held that where an expert opinion is set forth in a formalized document offered as evidence in place of live testimony, it is a testimonial statement subject to the restrictions of the Confrontation Clause as interpreted in *Crawford v. Washington*, 541 U.S. 36 (2004). *Melendez-Diaz*, 129 S. Ct. at 2531, 2532. Similarly, *Crawford* and its progeny imply that an expert opinion recorded in an unsworn laboratory report may not simply be read into evidence at trial by a custodian of records, or another expert who acts as a conduit for the original analyst's hearsay opinion. E.g., *United States v. Johnson*, 587 F.3d 625, 635 (4th Cir. 2009).

When scientific evidence is presented as an independent opinion formed by a qualified expert witness, however, that opinion is the evidence and that expert is the witness for purposes of the Confrontation Clause. This holds true even when the witness bases her opinion on data or observations recorded by other analysts.

2. The only “testimonial” portions of a laboratory report are those that operate as the functional equivalent of in-court testimony. See *Crawford*, 541 U.S. at 51-52. Testimonial statements in a report offer a conclusion for evidentiary purposes—as distinguished from the scientific theory and raw data or empirical observations underlying that conclusion. For example, the New Mexico Supreme Court recognized that the report at issue in *Bullcoming*'s companion case of *State v. Aragon*, 147 N.M. 474, 225 P.3d 1280 (2010), went “directly to an

issue of guilt in that it identifies the white, crystal-like substance located near Defendant's hiding place as methamphetamine, a necessary element of the crime . . . for which Defendant was charged. As such, [the] report serves to bear testimony against Defendant, and is the functional equivalent of live, in-court testimony that would otherwise be offered directly by [the analyst] herself." 225 P.3d at 1288.

Empirical data or observations underlying a conclusion, however, are distinctly non-testimonial, whether or not transcribed into a report. See *Aragon*, 225 P.3d at 1290 (distinguishing an expert's judgments "whether a substance is narcotic and its degree of purity" from "the computerized analytical results" and "reference data" that are assessed to reach that conclusion); *United States v. Washington*, 498 F.3d 225, 229-30, 232 (4th Cir. 2007) (distinguishing computer-generated chromatography graphs and raw data from an expert's evidentiary conclusion that the blood sample contained a drug and alcohol); see also *United States v. Moon*, 512 F.3d 359, 361 (7th Cir. 2008) ("The report has two kinds of information: the readings taken from the instruments, and Olson's conclusion that these readings mean that the tested substance was cocaine. The latter is testimonial as the Supreme Court used that word in *Crawford*.").

The fundamental difference between scientific data and a scientific conclusion is that the former are merely a premise of the latter, and usually lack evidentiary significance when considered in isolation outside the context of an applied scientific theory, a methodology, and an explanatory expert opinion. "[T]he expert's testimony is a syllogism: the major premise is the validity of the general theory or

technique, the minor premise is the case specific data, and the application of major to minor yields a conclusion relevant to the merits of the case.” Kenneth S. Broun, 1 *McCormick on Evidence* 72 (6th ed. 2006); see also Edward J. Imwinkelried, *The “Bases” Of Expert Testimony: A Syllogistic Structure Of Scientific Testimony*, 67 N.C. L. Rev. 1, 2-3 (1988) [Imwinkelried, “*Bases*” of *Expert Testimony*].

Professors Imwinkelried and Faigman offer the following example of “the typical syllogistic structure of expert testimony” about forensic science:

1. I am a molecular biologist.
2. If the DNA fragments on two autoradiographs are in the same position and within acceptable limits of the same length, then the two samples that have been fragmented contain the same DNA markers.
3. The DNA fragments on these two autoradiographs are in the same position and within acceptable limits of the same length.
4. Therefore, the samples that were fragmented contain the same DNA markers.

Edward J. Imwinkelried & David L. Faigman, *Evidence Code Section 802: The Neglected Key to Rationalizing the California Law of Expert Testimony*, 42 Loy. L.A. L. Rev. 427, 434 (2009) [Imwinkelried & Faigman, *Evidence Code 802*]. The empirical data and scientific principles involved are premises, *id.* at 435, and neither has standalone evidentiary value. Instead, it is their synthesis in the form of an independent expert opinion that gives

them meaning, whether that opinion is expressed in a written report or rendered by an expert on the witness stand. Imwinkelried, *“Bases” of Expert Testimony*, 67 N.C. L. Rev. at 3 (“The result of applying the major to the minor premise is a conclusion, the witness’ opinion on the merits of the case.”).

Most often, the data or observations that comprise a premise of an opinion will be meaningless to a layperson without the expert’s explanatory conclusion. They thus should not be considered “testimonial.” By analogy, an out-of-court statement that is not “incriminating on its face,” but becomes incriminating “only when linked with evidence introduced later at trial,” is likewise not subject to Sixth Amendment confrontation requirements. *Richardson v. Marsh*, 481 U.S. 200, 208 (1987); *Gray v. Maryland*, 523 U.S. 185, 191, 196 (1998).

As a practical example of the relationship between data and opinion, consider the raw data from DNA analysis known as an electropherogram. It is a “graph that displays a series of different-colored peaks of different heights.” *Roberts v. United States*, 916 A.2d 922, 927 (D.C. Ct. App. 2007). By itself, an electropherogram would have little or no meaning to a layperson, let alone evidentiary value to a trier of fact. An expert is required to interpret and explain: “A DNA analyst . . . interprets the data displayed on the electropherogram to determine the DNA profile Once the DNA profiles from the evidence and known samples are determined, the DNA profile from the evidence is compared to the DNA profiles from known individuals to see if any of those individuals can be excluded as possible

contributors to the evidence (or ‘questioned’) DNA.”
Id.

Similarly, blood-alcohol analysis using gas chromatography—as in the present case—results in a graph representing chemical components and their concentrations in a manner unlikely to be comprehensible to a layperson. See, *e.g.*, Edward F. Fitzgerald, *Intoxication Test Evidence* § 24:13 (2nd ed. 2010) (displaying various ethanol test chromatograms); *United States v. Washington*, 498 F.3d at 228 (noting that blood alcohol raw data consisted of “mechanical computer printouts with each page headed by the date of the test, the machine operator, an identification of the sample, its dilution factor, and other similar information, and containing computer-generated graphs and data reporting the results produced by the chromatograph machine”).

A final example is a pathologist’s observation in an autopsy report that a subject’s hyoid bone was broken. This fact would have little meaning absent an expert’s explanation that such a finding is indicative of forceful strangulation. See, *e.g.*, *Schad v. Ryan*, 595 F.3d 907, 911 (9th Cir. 2010).

In sum, raw data is not “testimonial” under *Crawford*. They are neither produced as standalone evidence nor used as a substitute for live testimony. Rather, raw data such as ethanol-test chromatograms or DNA electropherograms are premises for a conclusion. The conclusion invariably draws upon still other premises to become “evidence.” When the expert articulates her conclusion in court, she gives evidence against the accused. She then is subject to cross-examination on her evidence. She is the witness against the accused, so allowing the

defendant to confront and cross-examine her satisfies the Confrontation Clause.

3. There is another reason instrument data generated by an analyst, even if later relied upon for a conclusion by an in-court expert witness, does not amount to “testimony.” While the Sixth Amendment gives a defendant the right “to be confronted with the witnesses against him,” U.S. Const., amend. VI, instrument-generated data are not witnesses. An instrument is not a person and cannot bear testimony. *United States v. Lamons*, 532 F.3d 1251, 1263 (11th Cir. 2008); see also 1 Edward J. Imwinkelried et al., *Courtroom Criminal Evidence* § 1005, at 405-06 (4th ed. 2007). Also, as an inanimate object, an instrument is disinterested in the reasons for or implications of its own output, e.g., whether a substance is sugar or cocaine. Cf. *Melendez-Diaz*, 129 S. Ct. at 2532 (drug certificates testimonial in part because the analysts’ “sole purpose” in preparing them was for their use in court as evidence against the accused). Finally, instrument-generated data cannot plausibly be considered statements attributed to the instruments’ human operators.

A Fourth Circuit decision, *United States v. Washington*, 498 F.3d 225, illustrates these points. Following the defendant’s arrest, gas chromatography testing of his blood sample generated some 20 pages of data and graphs. *Id.* at 228. Based on the raw data, the laboratory’s chief toxicologist issued a report and subsequently testified that the defendant had specified quantities of both alcohol and phencyclidine (PCP) in his blood. *Id.* The chief toxicologist had not participated in the physical testing: “three lab technicians operating

under his protocols and supervision conducted the tests and then presented the raw data from the tests to him.” *Id.* The defendant argued that the chief toxicologist’s testimony denied him confrontation because “the machine-generated data amounted to testimonial hearsay statements of the machine operators” *Id.* at 227.

Rejecting this contention, the court of appeals held that the non-testifying instrument technicians did not make or record testimonial statements because “[t]he raw data generated by the diagnostic machines are the ‘statements’ of the machines themselves, not their operators.” *Washington*, 498 F.3d at 230. Neither were the machine “statements” testimonial. Relying on *Davis v. Washington*, 547 U.S. 813 (2006), the court of appeals observed that the data “did not involve the relation of a past fact of history as would be done by a witness.” 498 F.3d at 232. Instead, the instrument recorded “the current condition of the blood in the machines.”³ *Id.*; see also *United States v. Darden*, 656 F. Supp. 2d 560, 563 (D. Md. 2009) (printed data from blood-testing instrument are not testimonial, and the laboratory supervisor’s in-court interpretation of those data satisfied the Confrontation Clause).

The Seventh Circuit has reached a similar conclusion. As it explained,

A physician may order a blood test for a patient and infer from the levels of sugar

³ “Science is merely a tool that paints a picture of what, for want of a better term, we call the ‘real world.’” David L. Faigman, *Truth, with a Small “t,”* 49 *Hastings L.J.* 1185, 1185 (1998).

and insulin that the patient has diabetes. The physician's diagnosis is testimonial, but the lab's raw results are not, because data are not "statements" in any useful sense. Nor is a machine a "witness against" anyone. If the readings are "statements" by a "witness against" the defendants, then the machine must be the declarant. Yet how could one cross-examine a gas chromatograph? Producing spectrographs, ovens, and centrifuges in court would serve no one's interests. That is one reason why Rule 703 provides that the expert's source materials need not be introduced or even admissible in evidence. The vital questions—was the lab work done properly? what do the readings mean?—can be put to the expert on the stand.

United States v. Moon, 512 F.3d at 362; accord, *State v. Appleby*, 289 Kan. 1017, 1057-58, 221 P.3d 525, 551-52 (2009) (population databases and computer software used to generate DNA profile rarity statistics do not produce testimonial statements); *People v. Brown*, 13 N.Y.3d 332, 340, 918 N.E.2d 927, 931 (2009) (DNA testing raw data not testimonial).

4. The constitutional significance bestowed upon "the analysts" in *Melendez-Diaz* dissipates in cases where an expert provides independent opinion testimony from the witness stand and does not act as a surrogate to transmit another's testimonial conclusions. It is of no constitutional consequence that a testifying expert witness did not personally generate data that becomes one among other premises for her opinion.

Such data is like the academic body of scientific knowledge upon which expert witnesses also rely for their opinion evidence. Scientific evidence is the product of collective and cumulative knowledge from an amalgam of different sources. *Ethyl Corp. v. EPA*, 541 F.2d 1, 37-38 (D.C. Cir. 1976).⁴ “[A]n expert is permitted wide latitude to offer opinions, including those that are not based on firsthand knowledge or observation.” *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579, 592 (1993). This is so because the truth of conclusions expressed by any expert, even the analyst who performed testing in a case, depends upon the validity of statements from a regressing line of predicate experts, technicians, programmers, and theorists who contributed to the scientific theory and methodology employed. 2 J. Wigmore, *Evidence* § 665a, at 917, § 665b, at 919 (J. Chadbourn rev. ed. 1979). The factfinder at trial almost never hears live testimony from all these sources of relevant scientific authority that often if not necessarily provide support for expert opinion evidence.

For example, in a typical DNA case where the analyst performs testing and declares a match between DNA profiles, she will offer a statistical expression of the rarity of the shared profile in order to give evidentiary meaning to the match. E.g., *McDaniel v. Brown*, ___ U.S. ___, 130 S. Ct. 665, 668 (2010). The rarity statistic is critical to the

⁴ “Scientific evidence is accretionary,” wrote E.O. Wilson, “built from blocks of evidence joined artfully by the blueprints and mortar of theory.” Edward O. Wilson, *Consilience, The Unity of Knowledge* 59 (1998).

factfinder’s assessment of whether the profile is so infrequent that the DNA match becomes compelling identification evidence. *United States v. Morrow*, 374 F. Supp. 2d 51, 63 (D.D.C. 2005). But, in providing a rarity statistic, the analyst must rely on many out-of-court statements of other persons: researchers who compile and report population databases used to determine allele frequencies; mathematicians and geneticists who construct the formulae used to convert allele frequencies into profile frequencies; and computer programmers who write the software used by analysts to apply published data and formulae to instrument output in a laboratory. See John M. Butler, *Fundamentals of Forensic DNA Typing* 229-49 (2009).

Similarly, where—as here—an expert bases an opinion in part on instrument-generated data, the opinion implicitly depends upon factors determining the functionality of the instrument itself. Many of those factors—such as programming and calibration of the machines—are uninfluenced by the instrument operator. The strength of inculpatory forensic evidence often depends, therefore, on factors and people much deeper in the scientific process than the analyst. Making the analyst the constitutionally significant reference point is unrealistic where the courtroom witness offering independent opinion evidence against the defendant is a different person.⁵

⁵ Nor is it always a simple matter to identify “the analyst.” In a DNA case, for example, one person may examine physical evidence for the presence of cellular material, after which one or more separate analysts will process the evidence to develop a DNA profile. See, e.g., FBI Laboratory Services: DNA-Nuclear, <http://www.fbi.gov/about-us/lab/dna-nuclear>.

(continued...)

5. The New Mexico Supreme Court properly recognized these realities when it held that “the live, in-court testimony of a separate qualified analyst is sufficient to fulfill a defendant’s right to confrontation.” J.A. 14. The original technician “was a mere scrivener” of data from an instrument; the witness against the defendant for Sixth Amendment purposes was the testifying expert. As the basis for his opinion about petitioner’s blood-alcohol content, the testifying expert discussed standard procedures used at the lab to record blood-alcohol levels, the testing methods, and the petitioner’s blood-alcohol level at the time of the test. J.A. 13, 14. Most important, the testifying expert was subject to cross-examination on all those topics at trial. J.A. 14.

In *State v. Aragon*, 225 P.3d 1280, the New Mexico Supreme Court further explained that, while the Confrontation Clause will not tolerate an expert witness who simply restates another analyst’s “conclusory opinion,” an expert witness may conduct “his own analysis of the underlying facts and data contributing to [the original analyst’s] opinion to arrive at his own, independent conclusion.” *Id.* at 1290. *Aragon*’s holding, as in *Bullcoming*, implicitly

(...continued)

Most laboratory reports also undergo a technical review process before issuance, raising the question of whether the technical reviewer is “an analyst.” See, *e.g.*, DNA Advisory Board Quality Assurance Standards for Forensic DNA Testing Laboratories, <http://www.cstl.nist.gov/div831/strbase/dabqas.htm> (last visited Dec. 8, 2010) (“The laboratory shall conduct administrative and technical reviews of all case files and reports to ensure conclusions and supporting data are reasonable and within the constraints of scientific knowledge.”).

affirmed the constitutionality of the New Mexico rule of evidence that permits testifying experts to “rely upon or otherwise base their opinions on ‘facts or data’ generated by ‘non-testifying experts.’” *Id.* at 1288; J.A. 16-17; see N.M. R. Evid. 11-703.

The New Mexico court’s reasoning is sound. Under this Court’s *Crawford* jurisprudence, laboratory data are significantly different from the expert’s evidentiary conclusion drawn from her evaluation and interpretation of the data. While an expert witness necessarily relies on a variety of information, sources, and statements in forming an opinion, “[a]s long as he is applying his training and experience to the sources before him and reaching an independent judgment, there will typically be no *Crawford* problem. The expert’s opinion will be an original product that can be tested through cross-examination.” *United States v. Johnson*, 587 F.3d at 635.

B. Federal Rule of Evidence 703 and State Equivalents Appropriately Permit An Expert To Base an Opinion on Data Generated By Another Analyst

Long before *Crawford*, courts and legislatures struck a considered and thoughtful balance in this area. They allowed experts to provide relevant, reliable opinion testimony based on scientific data and theories generated by others. But they interposed the trial judge as a gatekeeper to preclude those opinions from becoming mere vehicles for transmitting inadmissible hearsay to the factfinder. Those rules pass constitutional muster.

In federal courts, Rule 703 of the Federal Rules of Evidence allows an expert witness to base an opinion on facts or data “perceived by or made known to the expert at or before the hearing,” even if those facts or data are not themselves admissible into evidence. The facts or data must be “of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject.” Accordingly, experts in federal court may give opinions using information they normally rely upon, even if that information is not admissible independently. *Mannino v. Int’l Mfg. Co.*, 650 F.2d 846, 852 (6th Cir. 1981); *Mendes-Silva v. United States*, 980 F.2d 1482, 1485 (D.C. Cir. 1993). The intent of the rulemakers was to “bring the judicial practice in line with the practice of the experts themselves when not in court.” Fed. R. Evid. 703 advisory committee’s notes.

Forty-two States and two Territories have adopted rules of evidence patterned after the federal rules. Jack B. Weinstein & Margaret A. Berger, 6 *Weinstein’s Federal Evidence*, T-128 to T-135 (2d ed. 2010). Other states independently have developed evidentiary principles that operate to similar effect. E.g., Cal. Evid. Code § 801(b);⁶ *Wilson v. Clark*, 84 Ill. 2d 186, 194-95, 417 N.E.2d 1322, 1327 (1981).

Under such rules, trial courts maintain control over the content of information received by the jury. The court may preclude testimony about the facts and data underlying the expert’s opinion, or permit it

⁶ California Evidence Code section 801 was the model for the federal rule. Fed. R. Evid. 703 advisory committee’s notes.

if the probative value of facts and data “in assisting the jury to evaluate the expert’s opinion substantially outweighs their prejudicial effect.” Rule 703. In addition, the jury may be given, upon request, a limiting instruction that the information is not to be used for substantive purposes but only to assess the basis of the expert’s opinion. See Fed. R. Evid. 703 advisory committee’s notes to 2000 amendments. Thus, “when the expert witness has consulted numerous sources, and uses that information, together with his own professional knowledge and experience, to arrive at his opinion, that opinion is regarded as evidence in its own right and not as hearsay in disguise.” *United States v. Williams*, 447 F.2d 1285, 1290 (5th Cir. 1971) (en banc); see also *State v. Dilboy*, 160 N.H. 135, 150, 999 A.2d 1092, 1104 (2010); *Vann v. State*, 229 P.3d 197, 207-08 (Alaska Ct. App. 2010); *State v. Gomez*, No. 09-0339, 2010 WL 5173627, at *5-*6 (Ariz. Dec. 22, 2010).

The discretion accorded trial courts to determine the scope and content of expert testimony helps ensure that an expert is the appropriate witness to confront, and not merely a surrogate conveying another’s testimonial conclusion. *United States v. Johnson*, 587 F.3d at 635-36. Trial courts may evaluate whether the expert can assess the validity of facts or data recorded by others and thus reasonably rely upon them. See Fed. R. Evid. 104(a).

To this end, relevant considerations could include (1) whether raw data or recorded observations exist in their original form and can be interpreted independently; (2) whether the data or observations were generated in a laboratory governed by standards, protocols, or accreditation mandates

that permit independent review and assessment of their quality; and (3) whether and to what extent erroneous data resulting from analyst mistake, incompetence, or even fraud could be recognized as such. See generally Joanne A. Epps, *Clarifying the Meaning of Federal Rule of Evidence 703*, 36 B.C. L. Rev 53, 81-84 (1994).

Post-*Crawford*, state and federal appellate courts nationwide have held that it does not violate the Confrontation Clause to admit testimony by an independent expert who relies upon forensic science testing performed by other analysts. E.g., *United States v. Pablo*, 625 F.3d 1285, 1292-94 (10th Cir. 2010); *United States v. Johnson*, 587 F.3d at 635-36; *United States v. Turner*, 591 F.3d 928, 933-94 (7th Cir. 2010); *United States v. Moon*, 512 F.3d at 361-62; *Commonwealth v. Barbosa*, 457 Mass. 773, 787 n.12, 933 N.E.2d 93, 108 n.12 (2010) (citing numerous cases in accord). Cases involving other kinds of expert testimony are in accord. E.g., *United States v. Law*, 528 F.3d 888, 912 (D.C. Cir. 2008); *United States v. Lombardozi*, 491 F.3d 61, 73 (2nd Cir. 2007).

Upsetting Rule 703 and its state law equivalents based on strained extrapolation of this Court's *Crawford* jurisprudence "would disqualify broad swaths of expert testimony, depriving juries of valuable assistance in a great many cases." *United States v. Johnson*, 587 F.3d at 635. Manifest injustice would result.

C. Additional Evidentiary Controls Ensure Protection of Confrontation Clause Rights

Additional rules of evidence take account of the fact that the regressing line of programmers, technicians, researchers, and theorists from the various fields that contribute to a scientific result typically need not appear as courtroom witnesses in criminal trials. These evidence rules assure that a witness who provides scientific testimony is subject to confrontation.

First, the law permits trial court judges to act as gatekeepers of scientific evidence, screening scientific reasoning and methods relied upon by expert witnesses for both relevance and reliability. *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. at 589. This filter eliminates the need to test scientific validity further in the courtroom by subjecting to cross-examination the lineages of people whose work contribute to the theories and methods underlying the forensic testing. The proper exercise of this judicial authority within the meaning of *Daubert* means that experts have “good grounds” for their testimony because the trial court’s finding of “scientific validity” creates “evidentiary reliability.”⁷ *Id.* at 590, 594-95.

⁷ In jurisdictions that evaluate the validity of scientific evidence pursuant to *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923), the core standard is whether a new scientific technique has “gained general acceptance in the particular field in which it belongs.” *Id.* at 1014; see, e.g., *People v. Kelly*, 17 Cal. 3d 24, 30, 549 P.2d 1240, 1244 (1976).

Second, trial court judges considering the admissibility of proffered forensic scientific evidence can determine whether the expert has the necessary “knowledge, skill, experience, training, or education” to render the opinion at issue. Fed. R. Evid. 702. When the testifying expert does not perform the original forensic testing, this rule and its state counterparts provide the trial court with discretion to preclude testimony from an expert who cannot speak to—and be cross-examined about—factors that contribute to the reliability of data generated in a particular laboratory. Such factors can include those that speak to the original analyst’s “honesty, proficiency, and methodology.” *Melendez-Diaz*, 129 S. Ct. at 2538.

Third, a trial judge may assess whether “correct scientific procedures were used in the particular case.” See, e.g., *People v. Kelly*, 549 P.2d at 1244. Qualifying an expert under Rule 702 or comparable state rules may include, as a required showing, that he or she can testify about the quality of the testing process by describing scientific techniques or methods actually implemented by another analyst. Expert opinion that rest on nothing more than blind trust of another analyst’s test results can be foreclosed.

These well-developed rules of evidence are designed to facilitate reliable scientific testimony. Witness knowledge of the scientific procedures employed in case-specific testing may be assured under such rules. There is no need to read the Constitution in a way that would preclude otherwise admissible scientific expert testimony should any of the analysts become unavailable.

D. Cross-Examination of A Qualified Expert Other Than the Analyst Provides Meaningful Confrontation

The Confrontation Clause ensures the reliability of evidence by giving defendants a specific procedural opportunity to challenge it through cross-examination. *Crawford*, 541 U.S. at 61; *Delaware v. Fensterer*, 474 U.S. 15, 22 (1985). “[T]he main and essential purpose of confrontation is to secure for the [defendant] the opportunity for cross-examination.” *Delaware v. Van Arsdall*, 475 U.S. 673, 678 (1986). But the accused has no right to “cross-examination that is effective in whatever way, and to whatever extent, the defense may wish.” *Delaware v. Fensterer*, 474 U.S. at 20. The Sixth Amendment does not dictate which expert must testify without regard to the myriad of factors a trial court may consider in determining whether a proffered expert’s testimony will present the defendant with a sufficient opportunity to challenge an opinion through cross-examination.

“The reliability of evidence derived from a scientific theory or principle depends upon three factors: (1) the validity of the underlying theory, (2) the validity of the technique applying that theory, and (3) the proper application of the technique on a particular occasion.” 1 Paul C. Giannelli & Edward J. Imwinkelried, *Scientific Evidence* 1 (2nd Ed. 1993). The opportunity to explore each area on cross-examination satisfies the Confrontation Clause, even where the expert witness did not perform original testing in the laboratory. Nowhere in that scenario is there the specter of “ex parte in-court testimony or its

functional equivalent” that is prohibited by the Confrontation Clause. *Crawford*, 541 U.S. at 51.

Scientific evidence may be generated and recorded in a manner that permits its reliability to be assessed by a qualified expert other than the original analyst. Effective cross-examination may occur where “the original test was documented with sufficient detail for another expert to understand, interpret, and evaluate the results” such that “the legitimacy of the original analyst’s conclusions and interpretations” can be explored and challenged. David H. Kaye et al., *The New Wigmore: A Treatise on Evidence* 64 (Supp. 2010). “[S]cientific evidence can usually be double-checked by other scientists for error or contributing factors” Imwinkelried & Faigman, *Evidence Code Section 802*, 42 Loy. L.A. L. Rev. at 446.

Of course, sometimes a forensic science opinion may prove unreliable:

The scientific methodology may be unsound. The testing equipment may malfunction. The testing specimen may be contaminated, either deliberately or inadvertently. The chain of custody may be broken, so that substances are linked to the wrong defendants. The tester may err in conducting the forensic examination or in interpreting the test results. Clerical errors may occur in the transcription and recording of forensic test results, and tester dishonesty may produce deliberate misrepresentation of test results.

Pamela R. Metzger, *Cheating the Constitution*, 59 Vand. L. Rev. 475, 492 (2006). There is no basis for the assertion, however, that cross-examination about

such concerns becomes meaningless if not directed to the analysts. In fact, the criminalist who operated an instrument and reported a result may be a less productive witness than an independent expert who can provide a separate perspective on the testing process, who may well have more skill and training in data interpretation than the analyst, and who may know more about topics such as laboratory quality control procedures, standards, and accreditation than the analyst himself. In many cases, the testifying expert may be the person who technically reviewed the original analyst's work in the laboratory, or another member of the laboratory's supervisory team.

Protocols that permit an expert to critically assess another analyst's work are mandated by laboratory accreditation standards, and may exist as well in unaccredited laboratories. Protocols governing blood-alcohol testing, of particular interest here, can permit independent verification of test results reported by another analyst. See Edward F. Fitzgerald, *Intoxication Test Evidence*, at pp. 24-20 to 24-21 (authors confirm a high probability that reported ethanol values were accurate and reliable, "in large part because the reported data were indeed obtained in accord with proper protocol").

Earning accreditation by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB),⁸ requires a laboratory to have

⁸ The ASCLD/LAB accreditation program "inspects, evaluates, and identifies laboratories that meet or exceed national ASCLD-LAB standards that ensure that evidence is
(continued...)"

procedures to protect evidence from loss, cross-transfer, contamination, and/or deleterious change; validated and documented technical procedures; the use of appropriate controls and standards; calibration procedures; complete documentation of all evidence examination; documented training programs that include competency testing; technical review of a portion of each examiner's work product; testimony monitoring of all who testify; and a comprehensive proficiency testing program.

2009 NAS Report, at 198.⁹ “[C]ontrols and standards” are quality control measures, which

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examined properly and reported completely. Areas reviewed and inspected under ASCLD-LAB include the operations, management, physical plant, safety, and security of crime laboratories. A key element of the program involves the random selection of case files and all associated analyses, notes, and data gathered. Interviews are also held with case examiners to verify that laboratory procedures documented in the files actually conform with written procedures maintained by the laboratory.” Joseph L. Peterson & Anna S. Leggett, *The Evolution of Forensic Science: Progress Amid the Pitfalls*, 36 *Stetson L. Rev.* 621, 632-33 (2007). “ASCLD/LAB has been one of the most effective reform mechanisms in forensic science over the last two decades. Only 10 percent of laboratories pass muster on the first inspection.” Paul C. Giannelli, *Science for Judges VII: Evaluating Evidence of Causation & Forensic Laboratories: Current Issues & Standards: Regulating Crime Laboratories: The Impact of DNA Evidence*, 15 *J.L. & Pol’y* 59, 75 (2007).

⁹ As of mid-2008, 397 laboratories had earned ASCLD/LAB accreditation. *2009 NAS Report* at 199. As of 2005, there were 389 publically funded forensic crime
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ASCLD/LAB-International standard 5.9 describes as including “reference collections; certified reference materials and internally generated reference materials; statistical tables; positive and negative controls; control charts; replicate testing; alternative methods; repeat testing; spiked samples, standard additions and internal standards; [and] independent checks (verification) by other authorized personnel.” ASCLD/LAB Int’l, *Supplemental Requirements for the Accreditation of Forensic Science Testing Laboratories*© 19-20 (2006) [hereinafter ASCLD/LAB Int’l, *Supplemental Requirements*]. A system of quality assurance in laboratories enhances the ability of other experts to critically evaluate forensic science test results reported by others without assuming skill and judgment on the part of the analyst or blindly trusting the functionality of the test.

Of particular importance is the requirement for documentation of test results, set forth in detail by ASCLD/LAB-International standard 4.13.2.5: “Documentation to support conclusions shall be such that in the absence of the analyst, another competent analyst or supervisor could evaluate what was done

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laboratories in the United States. *Id.* at 58. In addition to ASCLD/LAB accreditation, “the National Forensic Science Technology Center accredits individual laboratory programs under the auspices of the International Organization for Standardization (ISO). The National Association of Medical Examiners (NAME) runs an accreditation program for Coroners and Medical Examiner Offices, and the American Board of Forensic Toxicology accredits toxicology laboratories.” Paul C. Giannelli, *Forensic Science*, 34 J.L. Med. & Ethics 310, 312 (2006).

and interpret the data.” ASCLD/LAB Int’l, *Supplemental Requirements* 10. This principle was key to the Tenth Circuit’s recent conclusion that independent expert opinion evidence based in part upon DNA testing performed by another analyst did not violate the Confrontation Clause: “[DNA] analysts are trained to record their data and processes in a manner that allows other analysts to review the information in order to draw an independent judgment about the DNA analysis and to testify to that independent judgment drawn from others’ reports.” *United States v. Pablo*, 625 F.3d at 1294. Recordation of data and conclusions that are designed to permit independent evaluation of their reliability, therefore, goes far in eliminating need for a myopic constitutional focus on the analyst.

This Court, it is true, has said that “[c]onfrontation is designed to weed out not only the fraudulent analyst, but the incompetent one as well.” *Melendez-Diaz*, 129 S. Ct. at 2537. But it is merely petitioner’s article of faith, nothing more, which holds that confrontation of the analysts—however many might underlie the expert opinion—must be the chosen instrument for uncovering fraud or incompetence from forensic science in criminal trials. An independent expert witness who did not perform the testing may, in fact, feel less compelled to defend and justify results that are vulnerable to challenge. See, e.g., *Zabrycki, Autopsy Reports*, 96 Cal. L. Rev. at 1116-17 (suggesting that confrontation of a pathologist’s supervisor may be more effective than confronting the pathologist who performed the autopsy where the goal is to reveal “any ambiguity in the findings, variations in standard procedure, or problems in the office”).

In the end, adequate confrontation of an expert scientific witness depends not as much on what she did in the laboratory as it does on what she knows and how she knows it. The Constitution should not be read to require an artificial focus on “the analysts.” That would belie the realities of scientific evidence and dispense with the proven effectiveness of longstanding rules of evidence.

CONCLUSION

The judgment of the Supreme Court of New Mexico should be affirmed.

Dated: January 14, 2011

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