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The Myth of the Reliability Test

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The Myth of the Reliability Test

Erratum
Law; Criminal Law; Evidence; Courts; Judges

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THE MYTH OF THE RELIABILITY TEST

Brandon L. Garrett & M. Chris Fabricant***

The U.S. Supreme Court's ruling in Daubert v. Merrell Dow Pharmaceuticals, Inc.*, and subsequent revisions to Federal Rule of Evidence 702, was supposed to usher a reliability revolution. This modern test for admissibility of expert evidence is sometimes described as a reliability test. Critics, however, have pointed out that judges continue to routinely admit unreliable evidence, particularly in criminal cases, including flawed forensic techniques that have contributed to convictions of innocent people later exonerated by DNA testing. This Article examines whether Rule 702 is in fact functioning as a reliability test, focusing on forensic evidence used in criminal cases and detailing the use of that test in states that have adopted the language of the 2000 revisions to Rule 702. Surveying hundreds of state court cases, we find that courts have largely neglected the critical language concerning reliability in the Rule. Rule 702 states that an expert may testify if that testimony is "the product of reliable principles and methods," which are "reliably applied" to the facts of a case. Or as the Advisory Committee puts it simply, judges are charged to "exclude unreliable expert testimony." Judges have not done so in state or federal courts, and in this study, we detail how that has occurred, focusing on criminal cases, where the vast majority of criminal cases are brought in state and not federal court.*

We assembled a collection of 229 state criminal cases that quote and in some minimal fashion discuss the reliability requirement. This archive will hopefully be of use to litigators and evidence scholars. We find, however, that in the unusual cases in which state courts discuss reliability under Rule 702 they invariably admit the evidence, largely by citing to precedent and qualifications of the expert or by acknowledging but not acting upon the reliability concern. In short, the supposed reliability test adopted in Rule 702 is rarely applied to assess reliability. We call on judges do far more to ensure

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reliability of expert evidence and recommend sharper Rule 702 requirements. We emphasize, though, that it is judicial inaction and not the language of Rule 702 that has made the reliability test a myth.

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INTRODUCTION

The U.S. Supreme Court's ruling in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,[1] and subsequent revisions to Federal Rule of Evidence 702, was intended to usher in a reliability revolution, requiring judges to act as "gatekeepers" to exclude expert testimony lacking sufficient indicia of scientific validity.[2] This modern approach to expert evidence frequently used in both civil and criminal cases is often summarized as a "reliability test."[3] In this Article, we examine whether it is in fact functioning as a reliability test, focusing on forensic evidence used in state criminal cases. We detail the use of that reliability test in states that have adopted the language of the 2000 revisions to Rule 702, collecting all opinions that cite to it.[4] We find that even in rulings that do cite to Rule 702, state courts have neglected the critical language concerning reliability in the Rule and have instead reflexively cited precedent and the putative "flexibility" of the Rule to justify the admission of forensic evidence.

Rule 702 states that an expert may testify if that testimony is "the product of reliable principles and methods," which are "reliably applied" to the facts of a case.[5] Or as the Advisory Committee puts it simply, judges are charged to "exclude unreliable expert testimony."[6] Legal and scientific observers

1. 509 U.S. 579 (1993).
2. FED. R. EVID. 702 advisory committee's notes to 2000 amendments.
3. *See, e.g.*, Jessica G. Cino, *An Uncivil Action: Criminalizing* Daubert *in Procedure and Practice to Avoid Wrongful Convictions*, 119 W. VA. L. REV. 651, 655 (2016) (suggesting that *Daubert* fashioned "a new reliability test").
4. *See infra* Appendix I.
5. FED. R. EVID. 702(c)–(d).
6. *Id.* r. advisory committee's notes to 2000 amendments.

have noted that judges have largely not done so in state or federal courts.[7] In this study, we detail how that has occurred in the larger body of state court rulings, where most criminal cases are brought. We find that the reliability test in Rule 702 has largely been ignored. More clear and prescriptive language or direct regulation may be needed to address the laissez-faire nonregulation of scientific evidence in criminal cases.[8]

Legal and scientific scholars have much lamented the failure of modern scientific-evidence standards to address, much less remedy, the introduction of unreliable forensic evidence, including techniques that have been implicated in wrongful convictions.[9] The use of invalid and unreliable forensic science has been documented in large numbers of cases later shown by postconviction DNA tests to have been wrongful convictions of innocent defendants.[10] One of us has detailed the role that forensics played in those exonerations.[11] The scientific community has repeatedly issued authoritative reports finding that unreliable and unscientific evidence nevertheless continues to be routinely admitted—including evidence so unreliable that it is not "foundationally valid."[12] Scholars have been concerned that courts simply admit evidence based on precedent.[13] Many evidence scholars have argued that first *Daubert* and then the revisions to Rule 702 in 2000 have not been evenhandedly applied in civil and criminal cases, even following adoption of new evidentiary standards.[14] They have observed how judges tilt

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7. *See* NAT'L RESEARCH COUNCIL, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 95–97 (2009), https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf [https://perma.cc/CLW3-Y6VQ].

8. The term "scientific" raises the question of what types of expertise should be included in the concept of "science." We generally discuss in this Article expert evidence used in criminal cases. We do not attempt to draw the distinction between scientific and technical expertise, and while the Supreme Court has raised in rulings like *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999), that not all forms of expertise have the same scientific underpinnings, *id.* at 147–49, courts have similarly not drawn firm lines between scientific and technical expertise. Instead, the rules and court rulings highlight how concepts like reliability matter regardless of how one characterizes the expertise, whether technical or scientific.

9. NAT'L RESEARCH COUNCIL, *supra* note 7, at 42; Michael J. Saks & Jonathan J. Koehler, *The Coming Paradigm Shift in Forensic Identification Science*, 309 SCIENCE 892, 894–95 (2005).

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

11. *See generally* BRANDON L. GARRETT, CONVICTING THE INNOCENT: WHERE CRIMINAL PROSECUTIONS GO WRONG (2011); Brandon L. Garrett, *Convicting the Innocent Redux*, *in* WRONGFUL CONVICTIONS AND THE DNA REVOLUTION (Daniel Medwed ed., 2017); Garrett & Neufeld, *supra* note 10.

12. *See* PRESIDENT'S COUNCIL OF ADVISORS ON SCI. & TECH., EXEC. OFFICE OF THE PRESIDENT, FORENSIC SCIENCE IN CRIMINAL COURTS: ENSURING SCIENTIFIC VALIDITY OF FEATURE-COMPARISON METHODS 7–14 (2016), https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf [https://perma.cc/R76Y-7VU] (finding that bite-mark comparison evidence, shoeprint evidence, and firearms evidence are not foundationally valid).

13. *See* Simon A. Cole, *Grandfathering Evidence: Fingerprint Admissibility Ruling from* Jennings *to* Llera Plaza *and Back Again*, 41 AM. CRIM. L. REV. 1189, 1195–97 (2004).

14. *See generally* Cino, *supra* note 3; Deirdre Dwyer, *(Why) Are Civil and Criminal Expert Evidence Different?*, 43 TULSA L. REV. 381 (2007); Paul C. Giannelli, *The Supreme Court's "Criminal"* Daubert *Cases*, 33 SETON HALL L. REV. 1071 (2003); Peter J. Neufeld,

toward the prosecution to allow unreliable or unvalidated evidence in criminal cases and that judges may more carefully scrutinize evidence when the defense seeks to offer expert testimony.[15] This has also been observed in civil cases, in which there may more commonly be a "battle of the experts" between both sides.[16] Empirical study of judicial opinions on scientific evidence tends to confirm that concern.[17]

A paradigmatic example of this lax approach in criminal cases is the anomalous jurisprudence associated with bite-mark evidence, a largely discredited forensic technique.[18] In dismissing a civil rights suit brought by a man whose wrongful conviction was obtained largely through the introduction of bite-mark evidence, a federal court cited the technique's "[s]ixty-three percent!" error rate and found it "doubtful that 'expert' bite mark analysis would pass muster under Federal Rule of Evidence 702 in a case tried in federal court," because Rule 702(c) requires that "expert testimony be 'the product of reliable principles and methods.'"[19]

In light of the data cited by this civil court, its findings are perhaps to be anticipated. Yet just four months later, a criminal court in Florida admitted bite-mark evidence under that state's version of Rule 702,[20] which was adopted in 2013 and mirrors the federal rule.[21] That court simply recounted the expert's credentials, described the assay's methodology and concluded that the proffered bite-mark testimony was the product of reliable principles.[22] The lack of a statistical database to support the proposed testimony and the "limited studies" establishing an error rate were, according to the court, irrelevant—including the study finding error rates as high as 63 percent—because bite-mark evidence "is a comparison-based science and . . . the lack of such studies or databases is not an accurate indicator of its reliability."[23] Finally, the court undertook what amounted to a *Frye*

The (Near) Irrelevance of Daubert *to Criminal Justice and Some Suggestions for Reform*, 95 AM. J. PUB. HEALTH S107 (2005).

15. *See supra* note 14.

16. *See supra* note 14.

17. *See infra* Part I.A.

18. PRESIDENT'S COUNCIL OF ADVISORS ON SCI. & TECH., *supra* note 12, at 87 (finding that "bitemark analysis does not meet the scientific standards for foundational validity, and is far from meeting such standards"); Michael J. Saks et al., *Forensic Bitemark Identification: Weak Foundations, Exaggerated Claims*, 3 J.L. & BIOSCIENCES 538, 543–46 (2016); M. Chris Fabricant & Tucker Carrington, *The Shifted Paradigm: Forensic Science's Overdue Evolution from Magic to Law*, 4 VA. J. CRIM. L. 1, 38 (2016) ("Perhaps no discredited forensic assay has benefited more from criminal courts' abdication of gatekeeper responsibilities than bite mark analysis.").

19. Starks v. City of Waukegan, 123 F. Supp. 3d 1036, 1051–52 (N.D. Ill. 2015) (quoting FED. R. EVID. 702(c)).

20. State v. O'Connell, No. 10-CF-12600-B, 2015 WL 10384608, at *4 (Fla. Cir. Ct. Nov. 30, 2015).

21. FLA. STAT. ANN. § 90.702 (West 2013).

22. *O'Connell*, 2015 WL 10384608, at *3.

23. *Id.* at *5 ("[B]ecause bite mark analysis is based partly on experience and training, the hard science methods of validation, such as assessing the potential rate of error, are not always appropriate for testing its reliability." (quoting Coronado v. State, 384 S.W.3d 919, 927 (Tex. Crim. App. 2012))). The court found the absence of a valid error rate irrelevant to its

analysis, concluding that "bite mark identification or analysis has been accepted in Florida courts as early as 1984, and has been found to be generally accepted in the relevant scientific community in other jurisdictions."[24]

For a more rigorous use of the modern reliability rule, a recent North Carolina appellate ruling in *State v. McPhaul*[25] can be contrasted with the ruling in Florida. The prosecution had introduced latent fingerprint comparison testimony at trial, and the expert testified that prints found at the crime scene matched the defendant's known prints.[26] The appellate court highlighted that in 2011 the legislature had amended Rule 702 to adopt the "federal standard," which required that expert testimony "applied" principles and methods "reliably" in a case.[27] When the expert testified about how she reached conclusions in the case, she could only say that she did so based on her "training and experience."[28] The appellate court emphasized that she provided no "detail in testifying how she arrived at her actual conclusions *in this case*."[29] As a result, the panel held that it was error to admit the testimony since there was no evidence that the methods and principles were reliably applied.[30]

Rulings like the *McPhaul* opinion are especially rare considering the evidence was proffered by the prosecution, as we will detail. Yet the adoption of Rule 702 in 2000 could have been expected to increase the focus of courts on the admissibility of expert evidence. We focus here on state courts, where the vast bulk of criminal cases are brought in state and not federal court. In state courts adopting the text of that rule, one might have expected to observe a change in focus to address questions of reliability more carefully. In this Article, we examine state court rulings in criminal cases regarding the two reliability prongs of Rule 702(c), which requires that expert evidence be "the product of reliable principles and methods," and Rule 702(d), which asks that those principles and methods be "reliably applied" to the facts of the case. Thus, we did not identify or examine cases that did not result in a written opinion or cite to Rule 702 or its state equivalent.

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admissibility determination in *Coronado*; while the *O'Connell* court, citing *Coronado*, found a potential 63 percent error rate irrelevant to its *Daubert* ruling. *Id.* at *5 & n.3.

24. *Id.* (relying on the standard set out in *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923), in which the admissibility of a novel form of expertise is assessed based on its general acceptance in the relevant scientific community). It is worth noting that the court's *Frye* analysis was also flawed because it defined the "relevant scientific community" as limited to bite-mark experts themselves. *Compare id.* at *1, *4 (assessing the reliability of a forensic odontologist based on the "techniques, materials, and methodology" of a forensic odontology standards and certification board), *with* State *ex rel.* Collins v. Superior Court, 644 P.2d 1266, 1285 (Ariz. 1982) ("This [general acceptance] requirement is not satisfied with testimony from a single expert or group of experts who personally believe the challenged procedure is accepted or is reliable.").

25. No. COA16-924, 2017 WL 5145969 (N.C. Ct. App. Nov. 7, 2017).

26. *Id.* at *8.

27. *Id.* at *7.

28. *Id.* at *8.

29. *Id.*

30. *Id.* at *9–10 (finding the error to be harmless given other evidence in the case tying the defendant to the crime scene).

Of the more than 850 cases identified that referred to reliability standards in their text, we identified 229 cases that quoted Rule 702 and then in some minimal fashion discussed one of its two reliability prongs. In Appendix I, we supply this archive of state court rulings. This archive should prove a useful resource for litigators and scholars seeking case law that discusses reliability across a host of forensic disciplines—from ballistics, to fingerprint comparisons, to cell-tower location, to drug analysis.

Very few of those rulings, however, discussed the term "reliability" in any meaningful way, much less the two ways in which Rule 702 sets out reliability requirements. State judges rarely addressed error rates or the consistency of forensic techniques between examiners or even consistency by the same examiner over time. They chiefly ruled that the evidence should be admissible based on prior rulings admitting that type of evidence, the qualifications of the expert, and supposed general acceptance in the field (typically without carefully engaging with questions concerning which field is the relevant one).[31] The few exceptions in which the reliability prongs of Rule 702 were more rigorously applied were largely in rulings excluding defense experts; thirty-four cases were rulings affirming the exclusion of such experts, while sixteen cases ruled that prosecution witnesses should have been excluded.

Unfortunately, these findings are not surprising. They track what had been observed in federal rulings on expert evidence in the years following *Daubert*'s adoption. We discuss each of the federal appellate cases evaluating fingerprint evidence and its admissibility, and none of those panel rulings discuss the requirements of the post-2000 Rule 702. As the bulk of criminal cases occur in state and not federal courts, this suggests that some new intervention is needed. The language of Rule 702 is not the sole problem—after all, that language squarely addresses reliability, both of methods and their application to the facts. That reliability language, however, has largely been ignored by state and federal judges. More forceful language might make the importance of assessing reliability more salient to judges, perhaps with more detailed accompanying guidance in Advisory Committee notes.

We suggest that Rule 702 can and should be improved by, for example, clarifying that precedent cannot serve as a proxy for reliability and that the threshold standard for expert qualification should be based on the objective proficiency of an expert. Future efforts, however, must go far beyond the text of the rule. Regulation of expert reliability and proficiency may be more important. While such legislation and regulation exists in the area of clinical laboratories, efforts to enact such legislation have largely stalled at the federal level. Some states have done more to examine and regulate the reliability of forensics, but such efforts have also been slow and idiosyncratic. A

31. Other articles in this Symposium address that issue carefully, including Karen Kafadar's piece describing the importance of statistical methods to forensics and the errors that can result when statistical expertise is not relied upon. *See generally* Karen Kafadar, *The Critical Role of Statistics in Demonstrating the Reliability of Expert Evidence*, 86 FORDHAM L. REV. 1617 (2018).

recognition that Rule 702 is not working as intended in criminal cases might add some impetus to such nascent efforts and national applicability.

In Part I describes the *Daubert* ruling and its focus on reliability. It then analyzes the 2000 revisions to Rule 702 and the reliability language adopted in those revisions. Next, Part II presents an overview of the study findings and an analysis of the state court decisions that discuss state reliability rules in decisions regarding admissibility of expert evidence in criminal cases. Part III goes on to discuss the implications of these findings. It concludes that the supposed reliability test is largely not used to test reliability in criminal cases. This raises an enormous challenge because the language of the rule is quite clear. It could be strengthened, but the larger problem seems to lie with judicial attitudes and approaches—not the text of the rule. We discuss possible reforms to encourage better use of expert evidence in criminal cases, which others have long advanced. We hope, however, that these empirical and qualitative findings help to show how the problem at both the state and federal levels requires urgent attention.

I. THE RELIABILITY TEST

A. Daubert *and Reliability*

The Supreme Court's ruling in *Daubert* transformed the adjudication of expert evidence in federal and also many state courts that adopted the same approach by focusing the inquiry on questions of the reliability and validity of the expert's methodology and conclusions.[32] The *Daubert* approach is often summarized as a "reliability test" for expert evidence. What did the opinion actually say about reliability? The *Daubert* Court stated that "the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable."[33] What does reliable mean? The Court noted that the rules assume that "the expert's opinion will have a reliable basis in the knowledge and experience of his discipline."[34] The Court also noted that "scientists typically distinguish between 'validity' (does the principle support what it purports to show?) and 'reliability' (does application of the principle produce consistent results?)."[35] The Court stated that its emphasis on reliability in a case involving scientific evidence "will be based upon *scientific validity*."[36]

Apparently, then, the focus is on whether the principles relied upon support what they purport to show and not on consistency of results. However, the Court separately discussed the need for a known or potential error rate and standards for the use of the technique, which relate to consistency of results or reliability.[37] Thus, reliability and validity seem to be a part of the inquiry

32. Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 591 (1993) (noting that the helpfulness consideration "has been aptly described . . . as one of 'fit'").

33. *Id.* at 589.

34. *Id.* at 592.

35. *Id.* at 590 n.9.

36. *Id.*

37. *Id.* at 594.

called for by *Daubert*. The reality is somewhat more nuanced. On the one hand, the Supreme Court has since described the resulting "exacting standards of reliability."[38] On the other hand, the Court has described the *Daubert* inquiry as "a flexible one."[39] Federal trial courts have "considerable leeway" in determining "how to test an expert's reliability."[40] And, "the relevant reliability concerns may focus upon personal knowledge or experience."[41]

B. Rule 702 and Reliability

In 2000, Rule 702 was amended to reflect the changes announced in *Daubert* and to make additional changes to the handling of expert evidence.[42] Rule 702 provides that a witness who is qualified as an expert may testify if:

> (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
>
> (b) the testimony is based on sufficient facts or data;
>
> (c) the testimony is the product of reliable principles and methods; and
>
> (d) the expert has reliably applied the principles and methods to the facts of the case.[43]

Our focus is on subsections (c) and (d), which both focus on "reliability." What does reliability mean in those sections? The Rule clearly calls for a higher level of scrutiny of the reliability of expert testimony than would be required under a Rule 403 analysis of the reliability of any type of evidence.[44] Rule 702 directs courts to assess reliability in the two specific ways noted and as part of a threshold inquiry. The text of the Rule focuses on both the reliability of the principles and methods used by the putative expert and on the manner in which the expert applied those principles and methods to the facts of the case. Both are important. A method can be sound, but the expert can extrapolate a method beyond its validated application or apply that method to unsuitable facts or in an unsuitable manner. A method can be reliable when applied carefully, but highly inconsistent or inaccurate in its results if it is applied poorly by a given expert. Rule 702 clearly calls on a judge to scrutinize reliability both at the level of methods used and application in a given case.

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

39. Kumho Tire Co. v. Carmichael, 526 U.S. 137, 150 (1999) (citing *Daubert*, 509 U.S. at 594).

40. *Id.* at 152.

41. *Id.* at 150.

42. *See* ADVISORY COMM. ON EVIDENCE RULES, REPORT OF THE ADVISORY COMMITTEE ON EVIDENCE RULES 5–8 (1999), http://www.uscourts.gov/sites/default/files/fr_import/EV05-1999.pdf [https://perma.cc/V79Z-ZL2Z].

43. FED. R. EVID. 702.

44. Federal Rule of Evidence 403 precludes the introduction of "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." *Id.* r. 403.

The Advisory Committee notes to the 2000 amendments to Rule 702 shed little further light on what is meant by "reliability," although they do refer to the term. The notes state, "If the expert purports to apply principles and methods to the facts of the case, it is important that this application be conducted reliably."[45] Both the notes and the way that reliability is discussed in the Rule suggest that scientific concepts of validity and reliability, as noted in *Daubert*, are relevant. They are both concerned with whether the technique does what it purports to and whether it can produce consistent results as applied.

To be sure, the Committee also noted that the Rule 702 "amendment is not intended to . . . preclude the testimony of experience-based experts."[46] The notes also emphasize, however, "An opinion from an expert who is not a scientist should receive the same degree of scrutiny for reliability as an opinion from an expert who purports to be a scientist."[47] The notes also state, "In certain fields, experience is the predominant, if not sole, basis for a great deal of reliable expert testimony."[48] Importantly, the expert must also be able to show "how that experience is reliably applied to the facts."[49] The Committee also stated that "[t]he evidentiary requirement of reliability is lower than the merits standard of correctness" since experts can reach different conclusions, including because they rely on different facts. That experts might do so does not necessarily bar their testimony.[50]

C. *Expert Reliability in Federal Courts*

Studies of the use of *Daubert* and Rule 702 have found a marked tilt toward civil litigation in the use of that expert gatekeeping standard. Early studies showed that the bulk of federal cases citing to *Daubert* were in civil, not

45. *Id.* r. 702 advisory committee's notes to 2000 amendments.

46. *Id.*

47. *Id.*

48. *Id.* (citing United States v. Jones, 107 F.3d 1147 (6th Cir. 1997) (finding no abuse of discretion in admitting the testimony of a handwriting examiner who had years of practical experience and extensive training and who explained his methodology in detail); Tassin v. Sears Roebuck, 946 F. Supp. 1241, 1248 (M.D. La. 1996) (admitting a design engineer's testimony when the expert's opinions "are based on facts, a reasonable investigation, and traditional technical/mechanical expertise, and he provides a reasonable link between the information and procedures he uses and the conclusions he reaches")); *see also* Kumho Tire Co. v. Carmichael, 526 U.S. 137, 156 (1999) (stating that "no one denies that an expert might draw a conclusion from a set of observations based on extensive and specialized experience").

49. FED. R. EVID. 702 advisory committee's notes to 2000 amendments. For criticism of the notes' treatment of experience and the failure to recognize that experience can be assessed using proficiency tests to measure the reliability of subjective expertise, see Brandon L. Garrett & Gregory Mitchell, *The Proficiency of Experts*, 166 U. PA. L. REV. (forthcoming 2018).

50. FED. R. EVID. 702 advisory committee's notes to 2000 amendments (quoting Se. Pa. Transp. Auth. v. Brown (*In re* Paoli R.R. Yard PCB Litig.), 35 F.3d 717, 744 (3d Cir. 1994)). The Advisory Committee further explained that:

> [w]hen facts are in dispute, experts sometimes reach different conclusions based on competing versions of the facts. The emphasis in the amendment on "sufficient facts or data" is not intended to authorize a trial court to exclude an expert's testimony on the ground that the court believes one version of the facts and not the other.

Id.

criminal, cases.[51] A study by Peter Neufeld noted that in the seven years after *Daubert*, there were just 211 reported challenges to the admissibility of prosecution expert evidence.[52] During that time there were sixty-seven reported federal appellate decisions, and the government prevailed in all but six, with only one resulting in a reversed conviction.[53] Neufeld called *Daubert* largely "irrelevant" to criminal justice.[54] Some scholars, focusing on both civil and criminal cases, have observed that *Daubert* did not change the practice in federal or state courts, while others have found a qualitative difference and a measurably stricter analysis in civil cases in state and federal courts.[55]

One study has also suggested that judges do not carefully apply factors in *Daubert* but rather look at more general features of testimony like the credentials of the expert, prior rulings admitting that type of evidence, and general acceptance by others in the field.[56]

The reliability language in Rule 702, which is our focus in this Article, is widely perceived to have been neglected by federal judges. While, as noted, there is an empirical debate whether *Daubert* and then Rule 702 made judicial review of admissibility of expert evidence more strict in practice, there is evidence that judges do not focus their review on the reliability inquiry.[57] For example, a 2014 Ninth Circuit ruling held that the reliability of principles and methods should be assessed but that the question whether they were reliably applied to the facts of the case could be left for the jury to decide.[58] As David Bernstein and Eric Lasker describe, "this is far from the only circuit court opinion to ignore amended Rule 702 in favor of more lenient admissibility standards" because federal appellate courts often cite and rely on *Daubert* or even pre-*Daubert* standards rather than the text of Rule 702.[59]

51. D. Michael Risinger, *Navigating Expert Reliability: Are Criminal Standards of Certainty Being Left on the Dock?*, 64 ALB. L. REV. 99, 104–05 (2000).

52. Neufeld, *supra* note 14, at S110.

53. *Id.* at S109.

54. *Id.* at S107.

55. Edward K. Cheng & Albert H. Yoon, *Does* Frye *or* Daubert *Matter?: A Study of Scientific Admissibility Standards*, 91 VA. L. REV. 471, 503 (2005) (finding that "a state's adoption of *Frye* or *Daubert* makes no difference in practice"); *see also* DAVID H. KAYE ET AL., THE NEW WIGMORE ON EVIDENCE: EXPERT EVIDENCE § 6.3.2 (2d ed. 2010). *But see* LLOYD DIXON & BRIAN GILL, CHANGES IN THE STANDARDS FOR ADMITTING EXPERT EVIDENCE IN FEDERAL CIVIL CASES SINCE THE *DAUBERT* DECISION, at xv (2001) (analyzing federal district court opinions and finding support for "stricter standards"); Andrew Jurs & Scott DeVito, *The Stricter Standard: An Empirical Assessment of* Daubert*'s Effect on Civil Defendants*, 62 CATH. U. L. REV. 675, 680–81 (2013) (finding evidence, based on changes in removal rates from state to federal court depending on state court adoption of *Daubert* standards, that civil litigants view *Daubert* as more restrictive).

56. Jennifer L. Groscup et al., *The Effects of* Daubert *on the Admissibility of Expert Testimony in State and Federal Criminal Cases*, 8 PSYCHOL. PUB. POL'Y & L. 339, 344–46, 352, 358 (2002).

57. A. Leah Vickers, Daubert*, Critique and Interpretation: What Empirical Studies Tell Us About the Application of* Daubert, 40 U.S.F. L. REV. 109, 126–37 (2005).

58. City of Pomona v. SQM N. Am. Corp., 750 F.3d 1036, 1047 (9th Cir. 2014).

59. David E. Bernstein & Eric G. Lasker, *Defending* Daubert*: It's Time to Amend Federal Rule of Evidence 702*, 57 WM. & MARY L. REV. 1, 7–8 (2015); *see also* David E. Bernstein,

On the reliability prongs of Rule 702 specifically, as Victor Gold has put it, "when lower courts are confronted with expert testimony in disciplines outside of science, they follow *Daubert* but struggle to identify concrete factors indicative of reliability in the specific area of expertise at issue."[60] One reason why, according to Gold, is that "[r]eliability is not exactly the same thing as trustworthiness, but it's a broad concept."[61]

In criminal cases, this has been particularly true. One example is in the area of latent fingerprint testimony. Of the federal appellate courts to have discussed the question whether fingerprint testimony is admissible, none have actually addressed the question of reliability under Rule 702 by claiming to apply the requirements of Rule 702(c) and (d). All of the federal courts of appeals except the Second Circuit have considered whether fingerprint identifications should be admissible, and all but a Ninth Circuit ruling occurred after the 2000 revisions to Rule 702.[62] Yet those rulings do

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The Misbegotten Judicial Resistance to the Daubert *Revolution*, 89 NOTRE DAME L. REV. 27, 35–40 (2013).

60. Victor Gold, *The Three Commandments of Amending the Federal Rules of Evidence*, 85 FORDHAM L. REV. 1615, 1622 (2017).

61. *Conference on Possible Amendments to Federal Rules of Evidence 404(b), 807, and 801(D)(1)(a)*, 85 FORDHAM L. REV. 1517, 1552 (2017).

62. *See* United States v. Straker, 800 F.3d 570, 631 (D.C. Cir. 2015) (noting that Rule 702 governs but not quoting or discussing any of the requirements of the rule and stating that the admissibility of fingerprint evidence was "properly taken for granted" (quoting *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 152 (1999))); United States v. Watkins, 450 F. App'x 511, 515–16 (6th Cir. 2011) (failing to discuss the requirements of Rule 702 and noting that, despite the expert's "mistaken" claim that there is no error rate in fingerprinting, the error rate is just one of several factors to be considered and further noting that examiner testified regarding "the system of proficiency testing within her lab" at the *Daubert* hearing); United States v. John, 597 F.3d 263, 275 (5th Cir. 2010) (noting that "the error rate is low" and without discussing the requirements of Rule 702 and stating that no *Daubert* or Rule 702 hearing was required for fingerprint evidence); United States v. Baines, 573 F.3d 979, 989–92 (10th Cir. 2009) (finding that reliable identifications may be made and citing to the manner in which law enforcement agencies have "extensively" used fingerprint evidence for "almost a century" but not discussing the requirements of Rule 702); United States v. Spotted Elk, 548 F.3d 641, 663 (8th Cir. 2008) (failing to discuss the requirements of Rule 702 but noting that fingerprint evidence has been recognized by other courts as "generally accepted" (quoting United States v. Collins, 340 F.3d 672, 682 (8th Cir. 2003))); United States v. Vargas, 471 F.3d 255, 264–66 (1st Cir. 2006) (discussing, in an immigration case, the requirements of Rule 702 but finding that the defendant did not sufficiently preserve reliability-related objections at trial and finding no error regardless because the defendant asked questions relating to reliability of the method during the trial); United States v. Abreu, 406 F.3d 1304, 1306–07 (11th Cir. 2005) (stating that "[w]e agree with the decisions of our sister circuits and hold that the fingerprint evidence admitted in this case satisfied *Daubert*" and quoting the text of Rule 702 but failing to discuss or analyze the requirements of Rule 702); United States v. Janis, 387 F.3d 682, 690 (8th Cir. 2004) (calling fingerprint evidence generally accepted and finding that the defendant did not sufficiently preserve the question of the evidence's reliability); United States v. Mitchell, 365 F.3d 215, 238–46 (3d Cir. 2004) (discussing the adoption of the 2000 amendments to Rule 702 but not quoting or analyzing its text or requirements, instead discussing reliability generally under *Daubert* and rejecting defense evidence that raised objections regarding the admissibility of fingerprint testimony, including a concerning over error rates); United States v. George, 363 F.3d 666, 672–73 (7th Cir. 2004) (finding fingerprint testimony admissible and noting the view that fingerprinting has a "low rate of error" without discussing the requirements of Rule 702 in any detail); United States v. Crisp, 324 F.3d 261, 269–73 (4th Cir. 2003) (stating that Rule 702 applies but not quoting or discussing its text or

not claim to apply the Rule 702 "reliability" language; most do not even quote the text of the Rule. They instead largely discuss the factors set out in *Daubert* rather than the requirements set out in Rule 702. In doing so, they typically do not conduct any meaningful analysis of reliability of fingerprint evidence. Several courts discuss error rates in a limited way, noting that the error rate is "low" or crediting the experience of the fingerprint examiner and the description of the methods used as reliable ones, even in the absence of data to support that assertion.[63] These courts have largely sidestepped questions regarding reliability of the method and reliability as applied under Rule 702(c) and (d). These courts of appeals instead say that whatever the error rate is, it must be low; they may discuss the experience of the particular examiner; and they emphasize that fingerprint evidence has long been "generally accepted."[64]

For example, in one of the more detailed among these opinions—the Tenth Circuit's 2009 ruling in *United States v. Baines*[65]—the panel emphasized that fingerprinting is "reliable" not based on scientific studies, which have documented error rates, but based on a century of common use by law enforcement.[66] Thus, although the panel mentioned error rates and reliability, it actually conducted what amounted to a *Frye* "general acceptance" analysis. Since the defendant raised the understandable concern that not only was *Frye* displaced by *Daubert* but also that a rote analysis of factors under *Daubert* is not the proper analysis post-2000 amendments to Rule 702, the panel acknowledged that it "need not either accept or reject this contention."[67] Without conducting a Rule 702 analysis, the panel simply noted that the Rule 702 analysis is "a flexible one."[68]

Or take the Third Circuit ruling in *United States v. Mitchell*,[69] in which the panel acknowledged a lack of testing of the reliability of fingerprint testimony. The panel instead relied on a "long history of implicit testing"—in which fingerprint experts have conducted analysis in their casework and

reliability requirements, citing to a long history of admissibility and the expert community's claim of a very low error rate, and noting that "[i]n sum, the district court heard testimony to the effect that the expert community has consistently vouched for the reliability of the fingerprinting identification technique over the course of decades"); United States v. Sherwood, 98 F.3d 402, 408 (9th Cir. 1996) (finding, in a pre-2000 amendments case, that fingerprint testimony is generally accepted). In *George*, the Seventh Circuit affirmed its prior ruling in *United States v. Havvard*, 260 F.3d 597 (7th Cir. 2001). *See George*, 363 F.3d at 672. In *Havvard*, the court noted that Rule 702 applied but did not quote its text or discuss its requirements. *See Havvard*, 260 F.3d at 599–600. Instead, the court quoted *Daubert* and *Kumho Tire* and concluded that the known "error rate" factor was satisfied because the expert testified that the error rate for fingerprint comparison was "essentially zero." *Id.*

63. *See supra* note 62.

64. *Baines*, 573 F.3d at 991–92. *See generally supra* note 62. At the same time, courts have precluded questioning examiners on known misidentifications in latent fingerprint cases. *See* United States v. Bonds, No. 15 CR 573-2, 2017 WL 4511061, at * 4 (N.D. Ill. Oct. 10, 2017).

65. 573 F.3d 979 (10th Cir. 2009).

66. *Id.* at 989–90.

67. *Id.* at 991–92.

68. *Id.* at 992.

69. 365 F.3d 215 (3d Cir. 2004).

not reported making errors—and on evidence that the error rate they report is "very low."[70] In effect, that panel substituted experience, as self-reported by fingerprint examiners, for reliability. At the same time, the panel claimed that in its analysis "[r]eliability remains the polestar."[71] In a dissent, one Fourth Circuit judge explained that there was simply no evidence of reliability: "The government did not offer any record of testing on the reliability of fingerprint identification" and "[t]he history of fingerprint identification and the dogged certainty of its examiners are insufficient to show that the technique is reliable."[72] Such rulings, even in dissent, are vanishingly rare in federal courts. The majority opinion in that case, like in the other circuits, did not discuss the requirements of Rule 702 and instead emphasized how fingerprint evidence has "a long history of admissibility in the courts of this country" and credited the expert community's claim that there was an "essentially zero" error rate in the field.[73]

Thus, as critics have described, federal courts avoid conducting any substantive discussion of the reliability language in Rule 702. Instead, the analysis resembles a cursory *Frye* analysis rather than a *Daubert* analysis or the analysis actually required by Rule 702.

II. EXPERT RELIABILITY IN STATE COURTS

We conducted a study to assess whether state courts have engaged more meaningfully with the reliability requirements in Rule 702 in criminal cases since many states have adopted the language of the 2000 revisions of Rule 702. As this Part describes, the federal appellate rulings concerning fingerprint evidence mirror the entire body of state court rulings that commonly do not discuss Rule 702 at all, much less its reliability language, and discuss reliability if at all only in a very general way, without engaging with the specific requirements of Rule 702. While state courts do at times cite to the language of Rule 702, they often at most then recite *Daubert* factors regarding reliability without explaining what reliability means and without demanding that experts demonstrate any type of reliability as prescribed by the Rule. The courts instead largely rely on other judicial opinions that have previously admitted the form of evidence, state that the qualifications or expertise of the expert suffice as a proxy for reliability, or find that defendants have not adequately preserved objections to reliability. It is incredibly rare to find any discussion of reliability, except in one context: when courts exclude defense experts.

A. *Overview of Study Findings*

We examine how state courts have used the reliability prongs of Rule 702 in criminal cases in the states that have adopted some version of the federal Rule 702 or an equivalent with language regarding the reliability of the

70. *Id.* at 238, 240–41.
71. *Id.* at 244.
72. United States v. Crisp, 324 F.3d 261, 273, 278 (4th Cir. 2003) (Michael, J., dissenting).
73. *Id.* at 269, 271.

proffered expert evidence. Those states, and the year that they adopted Rule 702 or an analogue that contains a reliability rule, are indicated in Appendix II.[74] Importantly, we could only examine published and nonsummary written judicial decisions; thus, these data consisted entirely of appellate rulings. Appellate rulings with non-summary decisions and on evidentiary questions are not common in state courts. Moreover, we only examined decisions that cited to Rule 702, and not rulings failing entirely to cite to the Rule.

For those reasons, the data cannot provide the full picture conveying what state practice looks like. These data are limited to years in which states adopted Rule 702. For some states, that includes far more years and more time for the case law to develop than in others. We excluded cases not applying the post-2000 version of Rule 702, except in states that had included reliability-related language in their rule pre-2000. We examined criminal rulings—not rulings on other constitutional or evidentiary claims. As a result, we excluded cases that did not discuss reliability in any way but rather relied on whether the expert testimony was relevant to disputed issues in the case[75] or whether the expert was properly qualified with sufficient education, training, and experience.[76] These searches were limited to state court rulings in criminal cases since our focus is on forensic evidence. Rulings that quoted the language from the state rule 702 but did not say anything about that language were not included. We were looking for cases that said something in their reasoning about the reliability requirements in Rule 702, even if it was a summary statement that the expert evidence in question was reliable.

We identified over 850 cases that quoted either of the two Rule 702 reliability standards in their text or that were cited as discussing Rule 702's gatekeeping requirement. From those, we identified 229 cases that discussed one of the two standards, including language concerning "reliable principles and methods" and reliable application to the facts of the case. Appendix I includes citations to each of those cases. We included rulings that, in interpreting state rule 702 reliability requirements, applied the federal *Daubert* standard. We did not include rulings that did not quote from state rule 702 requirements. Nor did we include cases that applied *Daubert* but not the state rule 702.[77] To identify these cases, we conducted searches for cases quoting the language from the relevant state rule 702 and KeyCite searches. We had assistance from a research assistant and pro bono

74. *See infra* Appendix II. The following states have either not adopted an analogue to Rule 702 or do not have rules of evidence: Alaska, Arkansas, California, Colorado, Connecticut, Hawaii, Idaho, Illinois, Iowa, Maine, Maryland, Minnesota, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Dakota, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, Washington, and Wyoming.

75. *See, e.g.*, People v. Stafford, No. 332007, 2017 WL 3642652, at *3 (Mich. Ct. App. Aug. 24, 2017).

76. While we excluded cases that relied on whether a person was properly qualified as an expert, instead of applying a reliability standard, *see generally* State v. Farris, 210 So. 3d 877 (La. Ct. App. 2016); Gray v. Commonwealth, 480 S.W.3d 253 (Ky. 2016), we included cases in which the court stated that the expert testimony was reliable, and, in explaining the reason why, simply referred to the expert's training and experience, *see* People v. Lay, No. 330880, 2017 WL 3276845 (Mich. Ct. App. Aug. 1, 2017).

77. *See generally* State v. Johnson, 860 N.W.2d 235 (S.D. 2015).

associates at two law firms, all of whom conducted duplicative searches in an effort to locate any cases that the others might have missed. While it is certainly possible that we have still omitted cases, we hope that with so many people assisting in reviewing these state court rulings that we have a good collection of the rulings that exist on state expert-reliability standards. Appendix II lists the number of these cases with a nonsummary discussion of state rule 702 reliability elements.

The rulings were not concentrated in any set of forensic disciplines but reflected a wide variety of disciplines and types of proffered expertise.[78] For example, the cases involved disciplines ranging from blood alcohol testing (thirteen cases) to ballistics (seven cases), fingerprint comparisons (six cases) to different forms of drug testing (seventeen cases), modern DNA testing (sixteen cases) to firearms analysis (eight cases), and evidence concerning false confessions (six cases) and eyewitness memory (six cases). A larger grouping of fifty-three cases includes psychological testimony, which ranges from syndrome evidence, child-abuse evidence, forensic interviewing, and false-confession-related evidence. Those contain very different disciplines, but it is noteworthy that within those cases, the defense was excluded six of eleven times that the evidence was proffered in these cases. The prosecution expert was excluded in only one case. As discussed below, such exclusions are unlikely to be appealed, but they may also be far less likely to occur.

B. State Rule 702 Rulings

We then analyzed the content of these state court rulings that discussed the reliability language in the relevant expert-admissibility rule. Much of the legal reasoning in these opinions was brief and largely superficial in nature. Many state courts hold that it is unnecessary to conduct a Rule 702 analysis if the forensics are not novel, which is typically a component of a *Frye* analysis, not a Rule 702 inquiry. For example, the Court of Criminal Appeals of Oklahoma ruled in a shaken baby syndrome case that a trial court "has discretion to avoid unnecessary reliability proceedings in ordinary cases where the reliability of an expert's methods is properly taken for granted, in order to avoid unjustifiable expense and delay."[79] Many state courts did not analyze the language of their rule in any detail but instead conducted a *Daubert* analysis. Of the 229 rulings identified, 104 relied at least in part on a *Daubert* analysis. Forty of the rulings stated that expert evidence satisfied Rule 702 or *Daubert* because prior rulings had already approved of such evidence.[80] Many decisions quoted the text of their rule but did not do more than summarily state that the relevant expert testimony was reliable; we included such decisions in our analysis.[81]

78. *See infra* Appendix I.
79. Day v. State, 303 P.3d 291, 295 (Okla. Crim. App. 2013).
80. *See, e.g.*, State v. Frye, No. COA16–362, 2016 WL 6440555, at *3–4 (N.C. Ct. App. Nov. 1, 2016).
81. *See, e.g.*, Cripps v. State, 387 P.3d 906, 908 (Okla. Crim. App. 2016).

For example, we located only five rulings in Louisiana discussing reliability in the context of Louisiana's analogue to Rule 702, adopted in 2014. The first of those cases merely noted that reliability is a threshold determination and then emphasized the "broad latitude" that judges have when making reliability determinations.[82] It then proceeded to recount the credentials of the prosecution experts.[83]

The second such ruling repeated verbatim the same boilerplate language concerning judges' "broad latitude."[84] However, it then discussed the defendant's motion challenging admissibility of firearms testimony.[85] The motion, the court noted, cited to a National Research Council (NRC) report[86] and the lengthy hearing that the trial judge had conducted, during which the defense questioned the expert about his proficiency and about the reliability of the method.[87] The court discussed concerns that expert credentials and experience are not sufficient.[88] However, the court cited prior rulings in Louisiana, all predating the adoption of the new Rule 702 analogue, and concluded that "according to the jurisprudence of this State, testimony regarding the witness's background, qualifications, training, and experience . . . supports the trial court's ruling that [the analyst's] testimony was reliable per *Daubert*."[89] The court discussed evidence regarding error rates and discussed federal rulings on similar evidence before concluding that "even after publication of the [NRC] Report, courts have addressed, in detail, the reliability of such testimony and ruled it admissible, although to varying degrees of specificity."[90]

A third opinion relied upon factors in *Daubert*, instead of the text of the Rule 702 analogue, for its analysis.[91] There, an appellate court affirmed the trial court's ruling by similarly citing to the expert's credentials and experience in pediatric medicine.[92] The fourth opinion concerned DNA testing, which is statutorily admissible in Louisiana.[93] The court acknowledged, however, that new advances in methods of using DNA may raise reliability concerns, emphasized the importance of the trial judge's gatekeeping function concerning reliability, and remanded with an order that the trial judge conduct a reliability hearing.[94] The fifth and final opinion, in

82. State v. Cogar, No. 2017 KA 0426, 2017 WL 4082432, at *10–11 (La. Ct. App. Sept. 15, 2017) (citing Kumho Tire Co. v. Carmichael, 526 U.S. 137 (1999)).

83. *Id.*

84. State v. Lee, 217 So. 3d 1266, 1271 (La. Ct. App. 2017).

85. *Id*. at 1272.

86. *See generally* NAT'L RESEARCH COUNCIL, *supra* note 7.

87. *Lee*, 217 So. 3d at 1272–75.

88. *Id.* at 1272–73.

89. *Id.* at 1276.

90. *Id.* at 1278.

91. State v. Haley, 222 So. 3d 153, 164–66 (La. Ct. App. 2017). While such a technique, involving subjective experience-based judgments, may not have error-rate data for the entire method, any such expert can be proficiency tested. *See generally* Garrett & Mitchell, *supra* note 49.

92. *Haley*, 222 So. 3d at 164–66.

93. State v. Hampton, 183 So. 3d 769, 774, 779 (La. Ct. App. 2015) (citing LA. STAT. ANN. § 15:441.1 (1989)).

94. *Id.* at 776–79.

2014, found that IQ-test expert testimony was admissible because such testimony was based on reliable principles and methods.[95] Thus, none of the above rulings denied admissibility. Only two of the five cases engaged in any detailed discussion of the evidence concerning reliability of the method proffered.

Written judicial rulings in favor of the defense were rare. We located sixteen cases that reversed and found that the trial court erred in admitting proffered prosecution expert evidence. Only three cases remanded for additional consideration of admissibility. A Delaware ruling reversed admissibility in a drug-testing case involving a field test to identify marijuana.[96] Two Indiana cases upheld the admission of expert testimony related to marijuana. One found harmless error where the trial court admitted the prosecution expert's in-court identification of actual marijuana,[97] while the other found harmless error where the trial court excluded the defendant's evidence of a negative urinalysis.[98] A Massachusetts case involving canine narcotics-scent identification found the dog's evidence inadmissible as expert evidence.[99]

Several Michigan cases are also instructive. The court in one Michigan case found that an expert interpreting homicide scene evidence should have been excluded but that any error was harmless.[100] Without assessing the actual reliability of the expert, a second Michigan ruling found harmless error as to expert testimony on the psychology of substance abuse.[101] After the Michigan Supreme Court vacated and remanded that ruling for further review,[102] the Michigan Court of Appeals found that the expert should have been excluded but that the error was not outcome determinative and, therefore, constituted harmless error.[103] A third case from Michigan excluded the prosecution's expert testimony regarding linguistic analysis.[104]

A Mississippi case ruled that a prosecution witness, who would have presented shooting-distance and trajectory measurements, should have been excluded.[105] A second Mississippi ruling rejected proffered testimony from

95. State v. Mullins, No. 14-260, 2014 WL 4926162, at *2 (La. Ct. App. Oct. 1, 2014). An additional ruling quoted from the state's rule 702 but did not make any statement concerning the reliability of the expert, although it noted the expert's qualifications. *See* State v. Farris, 210 So. 3d 877, 892 (La. Ct. App. 2016).

96. State v. Lucas, No. Cr.A. No.1503008254, 2015 WL 5157030, at *3–4 (Del. Ct. Com. Pl. Sept. 2, 2015).

97. Doolin v. State, 970 N.E.2d 785, 790 (Ind. Ct. App. 2012).

98. Barnhart v. State, 15 N.E.3d 138, 143, 146 (Ind. Ct. App. 2014).

99. Commonwealth v. Corniel, No. 2004-0571, 2005 WL 1668448, at *8 (Mass. Super. Ct. June 23, 2005).

100. People v. Dixon-Bey, No. 331499, 2017 WL 4272135, at *6 (Mich. Ct. App. Sept. 26, 2017).

101. People v. Hamilton, No. 319980, 2016 WL 514288, at *6–7 (Mich. Ct. App. Feb. 9, 2016), *vacated*, 889 N.W.2d 508 (Mich. 2017).

102. People v. Hamilton, 889 N.W.2d 508, 508–09 (Mich. 2017).

103. People v. Hamilton, No. 319980, 2017 WL 3316958, at *4–5 (Mich. Ct. App. Aug. 1, 2017).

104. People v. Spitler, No. 331962, 2017 WL 2664729, at *1 (Mich. Ct. App. June 20, 2017).

105. Parvin v. State, 113 So. 3d 1243, 1252 (Miss. 2013).

a coroner who would have testified that the victim was in a "guarded position" when killed.[106] A North Carolina court found that the trial court abused its discretion by admitting blood-alcohol testing evidence due to its lack of reliability.[107]

Three additional cases involved remands on appeal. A Louisiana case regarding DNA evidence, as noted above, was remanded due to concerns about the age of the samples and the procedures used.[108] A West Virginia ruling that predated its current Rule 702 analogue was remanded not for reasons related to the admissibility of the testimony but rather to judicial instructions bolstering the expert evidence.[109] An Arizona case was similarly remanded for additional inquiry into whether gas chromatography evidence had been reliability applied to the facts of the case.[110]

Many of the cases that found prosecution expert evidence to be admissible emphasized prior precedent as the reason for doing so; of the 229 cases, 41 chiefly relied on precedent in their reasoning.[111] For example, an Arizona appellate court emphasized that "our supreme court has sustained convictions based solely on expert testimony about fingerprint or palm print evidence because the evidence is sufficiently reliable."[112]

As noted, we did not include in this analysis rulings that were more cursory and that did not discuss reliability in any way. Many decisions did not even mention reliability but simply cited to prior precedent. Some rulings quoted to the state rule 702 but did not discuss reliability or the text of the rule. For example, a Michigan case quoted to the state rule 702 and noted that the police officer had used a "widely accepted" marijuana test, but the court could not support the claim that the test was in fact widely accepted, explain how it worked, or provide evidence of its accuracy.[113] Without speaking to reliability, the court said that the defendant did not do enough to affirmatively challenge the evidence and dismissed the claim.[114] Still other rulings did not quote the state rule 702 but rather described reliability in a cursory way without addressing that language. A Wisconsin court did just that when it ruled on an ineffective assistance of counsel claim instead of a direct evidentiary challenge.[115] There, the court briefly noted that the trial court conducted a *Daubert* hearing under the state evidentiary rule but without quoting the language of that rule or discussing reliability under *Daubert*.[116] The court stated that the fingerprint analyst in question had performed

106. Newell v. State, 176 So. 3d 78, 79 (Miss. Ct. App. 2014).
107. State v. Babich, 797 S.E.2d 359, 363 (N.C. Ct. App. 2017).
108. State v. Hampton, 183 So. 3d 769, 779 (La. Ct. App. 2015).
109. State v. Leep, 569 S.E.2d 133, 147 (W. Va. 2002).
110. State v. Bernstein, 349 P.3d 200, 204–05 (Ariz. 2015).
111. As noted, we did not include cases solely relying on precedent in admitting the evidence and not applying a state analogue to Rule 702. *See, e.g.*, People v. Hawkins, No. 305965, 2012 WL 5290309, at *1 (Mich. Ct. App. Oct. 25, 2012).
112. State v. Favela, 323 P.3d 716, 718 (Ariz. Ct. App. 2014).
113. People v. Creager, No. 264417, 2007 WL 624529, at *2 (Mich. Ct. App. Mar. 1, 2007).
114. *Id.*
115. State v. Khalid, No. 2014AP251–CRNM, 2014AP252-CRNM, 2014 WL 12666820, at *1 (Wis. Ct. App. July 15, 2014).
116. *Id.*

thousands of comparisons, had four years of training, and was certified, so there was "no arguable basis for challenging the scientific validity of the fingerprint analysis."[117] We did not include the opinion because it did not quote or rely on a Rule 702 analogue.

Other courts emphasized that issues of reliability should be addressed at trial through cross-examination, and not by judges assessing whether expert evidence is minimally reliable.[118] In doing so, they failed to conduct either Rule 702 reliability assessments or more general Rule 403 assessments; they instead adopted a laissez-faire approach toward the reliability of expert evidence.

In addition to cases that discuss the qualifications of an expert but do not discuss reliability, which we did not include, there were additional rulings which did discuss reliability but concluded that the expert was reliable simply because of the person's background and experience. For example, a Michigan court stated that an officer could testify about drug trafficking operations because his "experience in investigating drug trafficking operations" in that county was in itself "sufficient to establish the reliability requirement."[119] Another case described the process followed by an expert who showed the jurors images that he relied on and explained what observations he made.[120] The court then stated, in a cursory way, that this process was itself sufficient to show reliable principles and methods—leaving out any discussion of whether those principles and methods were in fact reliable.[121]

In contrast, in a telling discussion, the Delaware Supreme Court disregarded the lack of documentation in a firearms case.[122] While the court noted that it would have been better if the expert had been able to recall how conclusions regarding ballistics had been reached in the case, the court still found the evidence reliable citing the state rule 702 and the expert's qualification.[123] The court also noting that in, cross-examination, the defendant was "able to expose [the analyst's] lack of recollection about the application of the methodology to the facts here."[124]

C. Defense Experts

Some state appellate decisions affirm the exclusion of expert evidence that the defense sought to introduce. Critics have long complained that a different standard applies when defendants, as opposed to prosecutors, seek to introduce expert evidence. We observed more detailed discussions of proffered defense expert evidence, and many of the small set of rulings

117. *Id.*
118. *See, e.g.*, Turner v. State, 953 N.E.2d 1039, 1050–51 (Ind. 2011).
119. People v. Dado, No. 266962, 2007 WL 778489, at *3 (Mich. Ct. App. Mar. 15, 2007).
120. People v. Spencer, No. 271844, 2007 WL 4125378, at *9 (Mich. Ct. App. Nov. 20, 2007).
121. *Id.*
122. McNally v. State, 980 A.2d 364, 369 (Del. 2009).
123. *Id.*
124. *Id.*

affirming exclusion of expert evidence were in that context. We note again that excluding defense experts would be far more likely to result in an appeal. While prosecutors may rarely have experts excluded, we cannot say so based on the observed appellate opinions.

There were thirty-four such cases in our set that involved the trial exclusion of defense expert evidence. An Arizona case excluded a defense expert regarding causation of the victim's injuries—largely on grounds of qualification—but noted the lack of reliable data or methodology.[125] One Indiana case affirmed exclusion of a defense expert regarding a voice comparison[126] and another did so regarding a urinalysis.[127] While another Indiana case did the same regarding a breathalyzer test result, the court in that instance declined to publish the opinion.[128] A Kansas case affirmed the exclusion of the testimony of a defendant's breathalyzer expert.[129] A Massachusetts case affirmed the exclusion of a defendant's DNA expert,[130] another affirmed the exclusion of a defense expert on false confessions,[131] and a third related to a defense psychologist.[132] Two Michigan cases affirmed the exclusion of a defendant's testimony regarding the sources for false confessions.[133] Other rulings from Michigan include those related to child sexual-abuse expertise,[134] sex offender profiling,[135] battered-woman-defense-related testimony,[136] eyewitness identification expert evidence,[137] evidence on analyzing hair for drugs,[138] and a defendant's ballistics evidence.[139] In Mississippi, cases affirmed the exclusion of a defendant's eyewitness identification expert,[140] the exclusion of a defendant's false confessions expert,[141] the exclusion of a defendant's crime-scene

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125. State v. Johnson, No. S1100 CR-201201686, 2013 Ariz. Super. LEXIS 401, at *3–5 (Dec. 17, 2013).

126. Hyppolite v. State, 774 N.E.2d 584, 595–96 (Ind. Ct. App. 2002).

127. Barnhart v. State, 15 N.E.3d 138, 143–45 (Ind. Ct. App. 2014).

128. Kryza v. State, No. 64A05-1305-CR-239, 2014 WL 345734, at *7–8 (Ind. Ct. App. Jan. 30, 2014).

129. City of Topeka v. Lauck, No. 116,316, 2017 WL 4216191, at *6 (Kan. Ct. App. Sept. 22, 2017).

130. Commonwealth v. DiCicco, 25 N.E.3d 859, 872–73 (Mass. 2015).

131. Commonwealth v. Hoose, 5 N.E.3d 843, 863 (Mass. 2014).

132. Commonwealth v. Weaver, 54 N.E.3d 495, 515 (Mass. 2016).

133. People v. Thames, No. 306313, 2013 WL 5663112, at *2 (Mich. Ct. App. Oct. 17, 2013); People v. Kowalski, 821 N.W.2d 14, 19 (Mich. 2012).

134. People v. Piontek, No. 268048, 2007 WL 1227705, at *5–7 (Mich. Ct. App. Apr. 26, 2007); People v. Schneider, No. 273421, 2007 WL 1202322, at *1 (Mich. Ct. App. Apr. 24, 2007).

135. People v. Steele, 769 N.W.2d 256, 264 (Mich. Ct. App. 2009); People v. Dobek, 732 N.W.2d 546, 570–71 (Mich. Ct. App. 2007).

136. People v. Sandoval-Ceron, No. 286985, 2010 WL 3021861, at *3 (Mich. Ct. App. Aug. 3, 2010).

137. People v. Buchanan, No. 275660, 2008 WL 681884, at *1–2 (Mich. Ct. App. Mar. 13, 2008).

138. People v. Farrsiar, No. 320376, 2015 WL 2329071, at *4–5 (Mich. Ct. App. May 14, 2015).

139. People v. Payne, No. 248708, 2005 WL 433538, at *3 (Mich. Ct. App. Feb. 24, 2005).

140. Corrothers v. State, 148 So. 3d 278, 298 (Miss. 2014).

141. Edmonds v. State, 955 So. 2d 787, 791 (Miss. 2007).

reconstruction expert,[142] the exclusion of a defendant's DNA expert,[143] the exclusion of a defense eyewitness expert,[144] and two cases involving the exclusion of a proffered defense crime-scene investigations expert.[145] Two rulings in a North Carolina case affirmed the exclusion of a proffered expert relevant to a self-defense claim and use of force.[146] An Ohio case affirmed the exclusion of a defense psychiatric witness,[147] a second the exclusion of a defense firearms witness,[148] a third the exclusion of a defense witness on fish size,[149] and a fourth the exclusion of a defense expert chemically analyzing soot,[150] and a fifth a defense witness on biomechanics.[151] A Utah case affirmed the exclusion of a defendant's eyewitness-identification witness.[152] A Vermont case affirmed exclusion of a defendant's voice-print analysis expert.[153] A Wisconsin case affirmed exclusion of a defendant's chromatography expert.[154]

III. IMPLICATIONS

The sheer paucity of judicial opinions regarding expert evidence in criminal cases is a real concern, apart from the quality of the opinions when they do occur. One contributing factor to the lack of judicial rulings engaging with the substance of the reliability rule is the deference to trial court rulings in this area, the abuse of discretion review adopted by the Supreme Court in *General Electric, Co. v. Joiner*,[155] and the similar rules adopted by state courts.

However, our findings regarding the quality of judicial decisions, and in particular, the nonuse of the reliability elements of Rule 702, raise yet additional reasons for concern. Few decisions discussed the meaning or content of the reliability rules adopted in each jurisdiction. Even fewer rulings discussed the Rule 702(d) prong regarding reliable application of

142. Grant v. State, 8 So. 3d 213, 218 (Miss. Ct. App. 2008).
143. Williams v. State, No. 2016-KA-00634-COA, 2017 WL 3601170, at *8 (Miss. Ct. App. Aug. 22, 2017).
144. Flowers v. State, 158 So. 3d 1009, ¶¶ 33–38 (Miss. 2014), *rev'd on other grounds*, 136 S. Ct. 2157 (2016).
145. Powers v. State, 945 So. 2d 386, ¶¶ 11–13 (Miss. 2006) (en banc); Ross v. State, 22 So. 3d 400, 420–21 (Miss. Ct. App. 2009).
146. State v. McGrady, 787 S.E.2d 1, 15 (N.C. 2016); State v. McGrady, 753 S.E.2d 361, 367–370 (N.C. Ct. App. 2014), *aff'd*, 787 S.E.2d 1 (N.C. 2016).
147. State v. Ream, No. 1-12-39, 2013 WL 5447606, at *20–22 (Ohio Ct. App. Sept. 30, 2013).
148. State v. Wegmann, No. 1-06-98, 2008 WL 434981, at *12–13 (Ohio Ct. App. Feb. 19, 2008).
149. State v. Whites Landing Fisheries, LLC, No. E-16-040, 2017 WL 3981167, at *2 (Ohio Ct. App. Sept. 8, 2017).
150. State v. Wangler, No. 1-11-18, 2012 WL 5207546, at *14–19 (Ohio Ct. App. Oct. 22, 2017).
151. State v. Calise, No. 26027, 2012 WL 4897840, at *4 (Ohio Ct. App. Oct. 17, 2012).
152. State v. Guard, 371 P.3d 1, 2–3 (Utah 2015).
153. State v. Forty, 989 A.2d 509, 519 (Vt. 2009).
154. State v. Garba, No. 2015AP1243-CR, 2016 WL 5794346, at *2 (Wis. Ct. App. Oct. 5, 2016).
155. 522 U.S. 136 (1997).

methods and principles to the facts of a case. We identified 30 of the 229 rulings that did so.

Proposals to sharpen the language regarding reliability in Rule 702, or to adopt a separate reliability rule for forensic identification evidence, might help to address this concern by making the reliability language more salient. Such a proposal might be accompanied by Advisory Committee notes that highlight the importance of addressing error and reliability of expert methods and their application in particular cases. Our findings highlight how the existing reliability language is largely ignored by judges who continue to rely on precedent, the credentials and experience of a proffered expert, and other traditional factors.

New research findings, reports from scientific bodies, and changes in the law have had little impact on this analysis. Very few rulings cited to the 2009 NRC report[156] or the 2016 report by the President's Council of Advisors on Science and Technology.[157] One Louisiana ruling did cite the reports but did not rely on them.[158] Instead, the court based the decision on prior rulings in other courts and affirmed the prosecution's use of firearms testimony.[159] A Michigan ruling noted the defense's reliance on the NRC report but nonetheless found the relevant DNA testing to be reliable.[160] An Ohio case cited to the NRC report regarding firearms, but, rather than rely on it, found the experts' methods to be generally accepted.[161] Finally, a Utah case noted the defense's citation to the NRC report's challenge of the reliability of fingerprint evidence but found the expert evidence admissible nonetheless.[162]

Another approach to improving the consideration of expert reliability is to focus on the courtroom and, specifically, to permit careful questioning of experts on studies of error rates, the expert's own proficiency, and reliability in application of the method. Doing so may require far more discovery than judges often provide in criminal cases concerning the work that an expert actually does in a criminal case.[163] Doing so may also require regulation to assure that demanding and realistic proficiency testing is actually performed in crime laboratories. One of us has advocated for the use of proficiency testing first to assess expert qualification and again at trial to determine and demonstrate an expert's own accuracy. Such information appears to be highly probative to jurors.[164]

Scholars and scientific bodies have for years recommended that forensic evidence be regulated by a scientific entity at the national level, but no such

156. *See generally* NAT'L RESEARCH COUNCIL, *supra* note 7.
157. *See generally* PRESIDENT'S COUNCIL OF ADVISORS ON SCI. & TECH., *supra* note 12.
158. State v. Lee, 217 So. 3d 1266, 1272 (La. Ct. App. 2017).
159. *Id.* at 1275–76.
160. People v. Jackson, No. 313455, 2014 WL 3973378, at *5 (Mich. Ct. App. Aug. 14, 2014), *rev'd in part on other grounds*, 870 N.W.2d 884 (Mich. 2015).
161. State v. Langlois, 2 N.E.3d 936, 944–46 (Ohio Ct. App. 2013).
162. State v. Woodard, 330 P.3d 1283, 1288 (Utah Ct. App. 2014).
163. Nat'l Comm'n on Forensic Sci., *Recommendations to the Attorney General Regarding Pretrial Discovery*, U.S. DEP'T JUST. (Nov. 5, 2016), https://www.justice.gov/archives/ncfs/page/file/865011/download [https://perma.cc/G5VH-8LCA].
164. *See* Garrett & Mitchell, *supra* note 49, at 42–43.

national entity has been created to date, and state- and federal-level efforts to improve standards for forensic evidence have been halting.[165] To the extent, then, that the problem rests on the shoulders of judges, chiefly state judges, far more must be done to introduce reliability into the reliability test that judges ostensibly apply to review expert testimony in criminal cases.

CONCLUSION

Reliability should be central to the task of judicial examination of expert evidence before trial and it should inform how expert evidence is litigated and presented during trial. The modern Rule 702 was drafted to emphasize the concept of reliability both as to methods used by experts and their application to the facts of a case. The concept of reliability is particularly important in the expert-evidence context because expert testimony may be given great weight by jurors and because experts can form opinions and reach conclusions that lay witnesses cannot.

District of Columbia Superior Court Judge Herbert B. Dixon Jr. explains, "Foundational validity for forensic science requires reliability. It must be based on empirical studies, repeatable, reproducible, and accurate at appropriate levels—a scientific concept intended to correspond to the legal requirement in Rule 702(c) of 'reliable principles and methods.'"[166] Despite the centrality of reliability to the use of expert evidence, as we describe, state and federal courts have largely avoided the subject of reliability in criminal cases. The reliability test adopted in Rule 702 appears, at least in written appellate opinions, to be rarely used in practice to test reliability and, when used, it tends to exclude defense witnesses.

The clear language of the modern Rule 702 calls for a twin analysis of expert reliability, but we observed an entrenched judicial unwillingness to review expert evidence at all in criminal cases, much less to assess reliability and restrict expert testimony that is unreliable. Errors, including wrongful convictions, predictably result from this lax attitude toward judicial gatekeeping. Several types of judicial interventions as well as regulatory interventions could improve this state of affairs. We conclude, however, that judges in most states already have a reliability test that they can and should use. The reliability of judgments in criminal cases, in which life and liberty is at stake, depends on the sound judicial use of the reliability test.

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165. NAT'L RESEARCH COUNCIL, *supra* note 7, at 14–21.

166. Judge Herbert B. Dixon Jr., *Another Harsh Spotlight on Forensic Sciences*, JUDGES' J., Winter 2017, at 36, 37.

Appendix I: Expert Reliability Rulings

	Case Citation	Ruling	Evidence Type	Δ or Π Expert
AL	Payne v. State, CR-15-0225, 2017 WL 543151 (Ala. Crim. App. Feb. 10, 2017)	Admit	Medical examination	Π
AZ	State v. Bernstein, 317 P.3d 630 (Ariz. Ct. App. 2014), *vacated in part*, 349 P.3d 200 (Ariz. 2015)	Admit	Blood alcohol content	Π
AZ	State v. Brown, No. 2 CA-CR 2015-0154, 2016 WL 4256875 (Ariz. Ct. App. Aug. 11, 2016)	Admit	Shaken baby syndrome	Π
AZ	State v. Buccheri-Bianca, 312 P.3d 123 (Ariz. Ct. App. 2013)	Admit	Child abuse	Π
AZ	State v. Chacon, No. 2 CA-CR 2014-0150, 2015 WL 3536584 (Ariz. Ct. App. May 28, 2015)	Admit	Drugs	Π
AZ	State v. Clary, No. 1 CA-CR 13-0694, 2016 WL 4525041 (Ariz. Ct. App. Aug. 30, 2016)	Admit	Automobile computer-generated crash data	Π
AZ	State v. Democker, No. 1 CA-CR 14-0137, 2016 WL 5899733 (Ariz. Ct. App. Oct. 11, 2016)	Admit	Shoe prints, bike-tire tracks	Π
AZ	State v. Favela, 323 P.3d 716 (Ariz. Ct. App. 2014)	Admit	Fingerprint	Π
AZ	State v. Foshay, 370 P.3d 618 (Ariz. Ct. App. 2016)	Admit	3D ballistics imaging, firearms	Π
AZ	State v. Foshee, No. 1 CA-CR 12-0249, 2014 WL 346110 (Ariz. Ct. App. Jan. 30, 2014)	Admit	Blood alcohol content	Π
AZ	State v. Harold, No. 2 CA-CR 2012-0316, 2014 WL 632280 (Ariz. Ct. App. Feb. 14, 2014)	Admit	Toxicology, urinalysis	Π
AZ	State v. Johnson, No. S1100 CR-201201686, 2013 Ariz. Super. LEXIS 401 (Dec. 17, 2013)	Exclude	Causation	Δ
AZ	State v. Moore, No. 1 CA-CR 15-0589, 2017 WL 56267 (Ariz. Ct. App. Jan. 5, 2017)	Admit	Sexual assault victim	Π

AZ	State *ex rel.* Montgomery v. Miller, 321 P.3d 454 (Ariz. Ct. App. 2014)	Admit	Blood alcohol content	Π
AZ	State v. Romero, 365 P.3d 358 (Ariz. 2016)	Admit	Firearms	Π
AZ	State v. Salazar-Mercado, 304 P.3d 543 (Ariz. Ct. App. 2013), *aff'd*, 325 P.3d 996 (Ariz. 2014)	Admit	Forensic interview	Π
AZ	State v. Saunders, No. 1 CA-CR 15-0416, 2016 WL 3264105 (Ariz. Ct. App. June 14, 2016)	Admit	Paper matching, handwriting	Π
AZ	State v. Stephen, No. CR-2009-4604-001, 2012 Ariz. Super. LEXIS 871 (Feb. 1, 2012)	Admit	Child abuse	Π
DE	State v. Cooke, 914 A.2d 1078 (Del. Super. Ct. 2007)	Admit	Trace hair, toolmarks, fingerprint, footwear, handwriting	Π
DE	*Id.*	Exclude	Voice identification, handwriting	Π
DE	State v. Lucas, No. Cr.A. No. 1503008254, 2015 WL 5157030 (Del. Ct. Com. Pl. Sept. 2, 2015)	Exclude	Drug identification	Π
DE	McNally v. State, 980 A.2d 364 (Del. 2009)	Admit	Firearms	Π
DE	State v. Salasky, 2013 WL 5487363 (Del. Super. Ct. Sept. 26, 2013)	Admit	Medical toxicology, psychiatry	Π
FL	Andrews v. State, 181 So. 3d 526 (Fla. Dist. Ct. App. 2015)	Admit	Psychiatry	Π
IN	Alcantar v. State, 70 N.E.3d 353 (Ind. Ct. App. 2016)	Admit	DNA	Π
IN	Barnhart v. State, 15 N.E.3d 138 (Ind. Ct. App. 2014)	Exclude	Urinalysis	Δ
IN	Bond v. State, 925 N.E.2d 773 (Ind. Ct. App. 2010)	Admit	Fingerprint	Π
IN	Burnett v. State, 815 N.E.2d 201 (Ind. Ct. App. 2004)	Admit	Fingerprint	Π

IN	Camm v. State, 908 N.E.2d 215 (Ind. 2009)	Admit	Blood spatter	Π
IN	Carter v. State, 766 N.E.2d 377 (Ind. 2002)	Admit	Bite mark	Π
IN	Doolin v. State, 970 N.E.2d 785 (Ind. Ct. App. 2012)	Exclude	THC	Π
IN	Evans v. State, No. 79A04-1308-CR-386, 2014 WL 1775728 (Ind. Ct. App. May 1, 2014)	Admit	Chemicals (ammonia)	Π
IN	Hyppolite v. State, 774 N.E.2d 584 (Ind. Ct. App. 2002)	Exclude	Voice analysis	Δ
IN	Kryza v. State, No. 64A05-1305-CR-239, 2014 WL 345734 (Ind. Ct. App. Jan. 30, 2014)	Exclude	Breathalyzer	Δ
IN	Lee v. State, No. 71A03-1301-CR-5, 2013 WL 2718079 (Ind. Ct. App. June 12, 2013)	Admit	Causation	Π
IN	Mogg v. State, 918 N.E.2d 750 (Ind. Ct. App. 2009)	Admit	Secure continuous remote alcohol monitor system	Π
IN	Patterson v. State, 742 N.E.2d 4 (Ind. Ct. App. 2000)	Admit	DNA	Π
IN	Prewitt v. State, 819 N.E.2d 393 (Ind. Ct. App. 2004)	Admit	Causation	Π
IN	Troxell v. State, 778 N.E.2d 811 (Ind. 2002)	Admit	DNA	Π
IN	Turner v. State, 953 N.E.2d 1039 (Ind. 2011)	Admit	Firearms, toolmark	Π
IN	Sciaraffa v. State, 28 N.E.3d 351 (Ind. Ct. App. 2015)	Admit	Drugs	Π
IN	West v. State, 805 N.E.2d 909 (Ind. Ct. App. 2004)	Exclude	Fire extinguisher	Π
KS	City of Topeka v. Lauck, No. 116,316, 2017 WL 4216191 (Kan. Ct. App. Sept. 22, 2017)	Exclude	Breathalyzer	Δ

KY	Epperson v. Commonwealth, 437 S.W.3d 157 (Ky. Ct. App. 2014)	Admit	Toxicology	Π
KY	Futrell v. Commonwealth, 471 S.W.3d 258 (Ky. 2015)	Admit	Child abuse	Π
KY	Holbrook v. Commonwealth, 525 S.W.3d 73 (Ky. 2017)	Admit	Cell site location information	Π
LA	State v. Cogar, No. 2017 KA 0426, 2017 WL 4082432 (La. Ct. App. Sept. 15, 2017)	Admit	Medical examination	Π
LA	State v. Haley, 222 So. 3d 153 (La. Ct. App. 2017)	Admit	Pediatric age assignment from photographs	Π
LA	State v. Hampton, 183 So. 3d 769 (La. Ct. App. 2015)	Remand	DNA	Π
LA	State v. Lee, 217 So. 3d 1266 (La. Ct. App. 2017)	Admit	Ballistics	Π
LA	State v. Mullins, No. 14-260, 2014 WL 4926162 (La. Ct. App. Oct. 1, 2014)	Admit	IQ test	Π
MA	Commonwealth v. Corniel, No. 2004-0571, 2005 WL 1668448 (Mass. Super. Ct. June 23, 2005)	Exclude	Drug odor (cocaine)	Π
MA	Commonwealth v. DiCicco, 25 N.E.3d 859 (Mass. 2015)	Exclude	DNA analysis	Δ
MA	Commonwealth v. Hoose, 5 N.E.3d 843 (Mass. 2014)	Exclude	False confessions	Δ
MA	Commonwealth v. Meeks, Nos. 2002-10961, 2003-10575, 2006 WL 2819423 (Mass. Super. Ct. Sept. 28, 2006)	Admit	Ballistics	Π
MA	Commonwealth v. Shanley, 919 N.E.2d 1254 (Mass. 2010)	Admit	Dissociative amnesia, recovered memory	Π
MA	Commonwealth v. Weaver, 54 N.E.3d 495 (Mass. 2016)	Exclude*	Psychology	Δ
MD	Savage v. State, 166 A.3d 183 (Md. 2017)	Exclude	Neuropsychological effect of brain tumor	Δ

MI	People v. Altman, No. 267592, 2007 WL 2609448 (Mich. Ct. App. Sept. 11, 2007) (per curiam)	Admit	Causation	Π
MI	People v. Anderson, No. 331466, 2017 WL 4699734 (Mich. Ct. App. Oct. 19, 2017) (per curiam)	Exclude	Cell phone	Π
MI	People v. Bailey, No. 285638, 2009 WL 3323252 (Mich. Ct. App. Oct. 15, 2009) (per curiam)	Admit	Sexual abuse	Π
MI	People v. Barnard, No. 265068, 2007 WL 1159977 (Mich. Ct. App. Apr. 19, 2007) (per curiam)	Admit	Forensic interview	Π
MI	People v. Bowne, No. 316283, 2014 WL 5364076 (Mich. Ct. App. Oct. 21, 2014) (per curiam)	Admit	Child sexual abuse	Π
MI	People v. Brown, No. 325115, 2016 WL 555928 (Mich. Ct. App. Feb. 11, 2016) (per curiam)	Admit	Cell site location information	Π
MI	People v. Brown, No. 323887, 2016 WL 2731069 (Mich. Ct. App. May 10, 2016) (per curiam)	Admit	Gunshot residue, cell site location information	Π
MI	People v. Buchanan, No. 275660, 2008 WL 681884 (Mich. Ct. App. Mar. 13, 2008) (per curiam)	Exclude	Eyewitness identification	Δ
MI	People v. Burns, No. 327179, 2016 WL 6495853 (Mich. Ct. App. Nov. 1, 2016) (per curiam)	Admit	Injuries diagnostic to abuse	Π
MI	People v. Caldwell, No. 318915, 2015 WL 558322 (Mich. Ct. App. Feb. 10, 2015) (per curiam)	Admit	Delayed disclosures in child abuse	Π
MI	People v. Carpenter, No. 302231, 2012 WL 933615 (Mich. Ct. App. Mar. 20, 2012) (per curiam)	Admit	Domestic abuse	Π
MI	People v. Carter, No. 318511, 2015 WL 302693 (Mich. Ct. App. Jan. 22, 2015) (per curiam)	Admit	Fire causation	Π
MI	People v. Ceasor, No. 268150, 2007 WL 2011747 (Mich. Ct. App. July 12, 2007) (per curiam)	Admit	Shaken baby syndrome	Π
MI	People v. Dado, No. 266962, 2007 WL 778489 (Mich. Ct. App. Mar. 15, 2007) (per curiam)	Admit	Characterizing drug sales	Π
MI	People v. Daniel, Nos. 308230, 308231, 308575, 2014 WL 3844010 (Mich. Ct. App. Aug. 5, 2014) (per curiam)	Admit	Shooting reconstruction	Π

MI	People v. Dixon-Bey, No. 331499, 2017 WL 4272135 (Mich. Ct. App. Sept. 26, 2017)	Exclude	Homicide scene interpretation	Π
MI	People v. Dobek, 732 N.W.2d 546 (Mich. Ct. App. 2007)	Exclude	Psychological profiling of sex offenders	Δ
MI	People v. Farraj, No. 264235, 2007 WL 861100 (Mich. Ct. App. Mar. 22, 2007) (per curiam)	Admit	Causation	Π
MI	People v. Fathi, No. 288330, 2010 WL 2836275 (Mich. Ct. App. July 20, 2010) (per curiam)	Admit	Sexual abuse	Π
MI	People v. Farrsiar, No. 320376, 2015 WL 2329071 (Mich. Ct. App. May 14, 2015) (per curiam)	Exclude	Hair drug testing	Δ
MI	People v. Fawaz, No. 264703, 2007 WL 861104 (Mich. Ct. App. Mar. 22, 2007) (per curiam)	Admit	Blood spatter	Π
MI	People v. Garten, No. 323670, 2016 WL 555834 (Mich. Ct. App. Feb. 11, 2016) (per curiam), *perm. app. denied*, 886 N.W.2d 433 (Mich. 2016)	Admit	Cell site location information	Π
MI	People v. Graham, No. 263702, 2007 WL 861173 (Mich. Ct. App. Mar. 22, 2007) (per curiam)	Admit	Handwriting	Π
MI	People v. Hamilton, No. 319980, 2017 WL 3316958 (Mich. Ct. App. Aug. 1, 2017) (per curiam)	Exclude	Psychology of substance abuse and addiction	Π
MI	People v. Hammock, No. 277672, 2008 WL 4330176 (Mich. Ct. App. Sept. 23, 2008) (per curiam)	Admit	Cell site location information	Π
MI	People v. Harvey, Nos. 319482, 319483, 2015 WL 8953522 (Mich. Ct. App. Dec. 15, 2015) (per curiam)	Admit	Surveillance footage	Π
MI	People v. Hill, No. 326550, 2016 WL 3365256 (Mich. Ct. App. June 16, 2016) (per curiam), *perm. app. denied*, 887 N.W.2d 621 (Mich. 2016)	Admit	Cell site location information	Π
MI	People v. Jackson, No. 313455, 2014 WL 3973378 (Mich. Ct. App. Aug. 14, 2014) (per curiam), *rev'd in part on other grounds*, 870 N.W.2d 884 (Mich. 2015)	Admit	DNA	Π
MI	People v. James, No. 301526, 2012 WL 75355 (Mich. Ct. App. Jan. 10, 2012) (per curiam)	Admit	Causation	Π

MI	People v. Johnson, No. 324567, 2016 WL 2342284 (Mich. Ct. App. May 3, 2016) (per curiam)	Admit	Cell site location information	Π
MI	People v. Kircher, No. 275215, 2008 WL 3540254 (Mich. Ct. App. Aug. 14, 2008) (per curiam)	Admit	Raw sewage hazards	Π
MI	People v. Kowalski, 821 N.W.2d 14 (Mich. 2012)	Exclude	False confessions	Δ
MI	*Id.*	Remand	Clinical psychology	Δ
MI	People v. Lawson, No. 302128, 2012 WL 2402033 (Mich. Ct. App. June 26, 2012) (per curiam)	Admit	Identification based on ear characteristics	Π
MI	People v. Lane, 862 N.W.2d 446 (Mich. Ct. App. 2014) (per curiam)	Admit	Cadaver dog evidence	Π
MI	People v. Lay, No. 330880, 2017 WL 3276845 (Mich. Ct. App. Aug. 1, 2017) (per curiam)	Admit	Forensic cell phone analysis	Π
MI	People v. McDaniel, No. 290689, 2010 WL 3813347 (Mich. Ct. App. Sept. 30, 2010) (per curiam)	Admit	Motorcycle-make identification	Π
MI	People v. Payne, No. 248708, 2005 WL 433538 (Mich. Ct. App. Feb. 24, 2005) (per curiam)	Exclude	Firearms	Δ
MI	People v. Perrien, Nos. 312743, 317405, 2015 WL 7283216 (Mich. Ct. App. Nov. 17, 2015) (per curiam)	Admit	Cell site location information	Π
MI	People v. Piontek, No. 268048, 2007 WL 1227705 (Mich. Ct. App. Apr. 26, 2007) (per curiam)	Exclude	Child sexual abuse	Δ
MI	People v. Pritchett, No. 329901, 2017 WL 1422830 (Mich. Ct. App. Apr. 20, 2017) (per curiam), *perm. app. denied*, 903 N.W.2d 581 (Mich. 2017)	Admit	Ballistics	Π
MI	People v. Pruitt, No. 313065, 2014 WL 1320253 (Mich. Ct. App. Apr. 1, 2014) (per curiam)	Admit	Fire causation	Π
MI	People v. Sandoval-Ceron, No. 286985, 2010 WL 3021861 (Mich. Ct. App. Aug. 3, 2010) (per curiam)	Exclude	Battered woman syndrome	Δ
MI	People v. Schneider, No. 273421, 2007 WL 1202322 (Mich. Ct. App. Apr. 24, 2007) (per curiam)	Exclude	Profile of a child molester	Δ

MI	People v. Spencer, No. 271844, 2007 WL 4125378 (Mich. Ct. App. Nov. 20, 2007) (per curiam)	Admit	Fire causation	Π
MI	People v. Spitler, No. 331962, 2017 WL 2664729 (Mich. Ct. App. June 20, 2017) (per curiam), *remanded on other grounds*, No. 156281, 2018 WL 561367 (Mich. 2018)	Exclude	Linguistic analysis	Π
MI	People v. Steele, 769 N.W.2d 256 (Mich. Ct. App. 2009) (per curiam)	Exclude	Sex offender identification	Δ
MI	People v. Stiehl, No. 283641, 2009 WL 2951284 (Mich. Ct. App. Sept. 15, 2009) (per curiam)	Admit	Toxicology	Π
MI	People v. Stroud, Nos. 322812, 322879 2016 WL 901333 (Mich. Ct. App. Mar. 8, 2016) (per curiam), *perm. app. denied*, 885 N.W.2d 286 (Mich. 2016)	Exclude	Eyewitness identification	Δ
MI	People v. Stumpmier, No. 330145, 2017 WL 1488966 (Mich. Ct. App. Apr. 25, 2017) (per curiam), *rev'd on other grounds*, 903 N.W.2d 195 (Mich. 2017)	Admit	Pediatric age assignment	Π
MI	People v. Sweeney, No. 330662, 2017 WL 2562562 (Mich. Ct. App. June 13, 2017) (per curiam)	Admit	Child abuse	Π
MI	People v. Sutton, No. 275447, 2008 WL 2627607 (Mich. Ct. App. July 3, 2008) (per curiam)	Admit	Height comparison using photos	Π
MI	People v. Thames, No. 306313, 2013 WL 5663112 (Mich. Ct. App. Oct. 17, 2013) (per curiam)	Exclude	False confessions, psychology	Δ
MI	People v. Thomas, No. 326645, 2016 WL 3421403 (Mich. Ct. App. June 21, 2016) (per curiam)	Admit	Cell site location information	Π
MI	People v. Traxler, No. 314951, 2014 WL 2934293 (Mich. Ct. App. June 26, 2014) (per curiam)	Admit	Posttraumatic stress disorder	Π
MI	People v. Unger, 749 N.W.2d 272 (Mich. Ct. App. 2008)	Admit	Medical examination	Π
MI	People v. West, No. 317109, 2014 WL 7157390 (Mich. Ct. App. Dec. 16, 2014) (per curiam)	Admit	Cell site location information	Π
MI	People v. Wood, 862 N.W.2d 7 (Mich. Ct. App. 2014), *vacated in part on other grounds*, 871 N.W.2d 154 (Mich. 2015)	Admit	DNA	Π

MI	People v. Wright, No. 261380, 2006 WL 2271264 (Mich. Ct. App. Aug. 8, 2006) (per curiam)	Admit	Blood detection chemicals	Π
MI	People v. Wyngarden, No. 321736, 2015 WL 4746277 (Mich. Ct. App. Aug. 11, 2015) (per curiam)	Admit	Interrogation techniques, false confessions	Δ
MS	Anderson v. State, 62 So. 3d 927 (Miss. 2011)	Admit	Forensic interview	Π
MS	Bateman v. State, 125 So. 3d 616 (Miss. 2013)	Admit	Forensic interview	Π
MS	Brown v. State, 33 So. 3d 1134 (Miss. Ct. App. 2009)	Admit	Forensic pathology	Π
MS	Carter v. State, 996 So. 2d 112 (Miss. Ct. App. 2008)	Admit	Forensic interview	Π
MS	Corrothers v. State, 148 So. 3d 278 (Miss. 2014)	Exclude	Eyewitness identification	Δ
MS	Daniels v. State, No. 2016-KA-00501-COA, 2017 WL 3485858 (Miss. Ct. App. Aug. 15, 2017)	Admit	Forensic interview	Π
MS	Edmonds v. State, 955 So. 2d 787 (Miss. 2007)	Exclude	False confessions	Δ
MS	*Id.*	Exclude	Forensic pathology	Π
MS	Evans v. State, 25 So. 3d 1061 (Miss. Ct. App. 2008)	Admit	Blood alcohol content	Δ
MS	Flaggs v. State, 999 So. 2d 393 (Miss. Ct. App. 2008)	Admit	Blood spatter	Π
MS	Flowers v. State, 158 So. 3d 1009 (Miss. 2014), *rev'd on other grounds*, 136 S. Ct. 2157 (2016)	Exclude	Criminal investigation procedures, eyewitness identification	Δ
MS	Fulgham v. State, 46 So. 3d 315 (Miss. 2010)	Admit	Social characterization	Δ
MS	Gillett v. State, 56 So. 3d 469 (Miss. 2010)	Admit	DNA	Π

MS	Grant v. State, 8 So. 3d 213 (Miss. Ct. App. 2008)	Exclude	Evidence gathering	Δ
MS	Gray v. State, 202 So. 3d 243 (Miss. Ct. App. 2015)	Admit	Victim survival after fatal injuries	Π
MS	Howard v. State, 853 So. 2d 781 (Miss. 2003)	Admit	Bite mark	Π
MS	Hull v. State, 174 So. 3d 887 (Miss. Ct. App. 2015)	Admit	Forensic pathology	Π
MS	Jane v. State, 222 So. 3d 1088 (Miss. Ct. App. 2017)	Admit	Automobile accident reconstruction	Π
MS	Lattimer v. State, 952 So. 2d 206 (Miss. Ct. App. 2006)	Admit	Forensic interview	Π
MS	Lima v. State, 7 So. 3d 903 (Miss. 2009)	Admit	Forensic pathology	Π
MS	Lowe v. State, 178 So. 3d 760 (Miss. Ct. App. 2012), *rev'd*, 127 So. 3d 178 (Miss. 2013)	Admit	Computer forensics	Π
MS	Madden v. State, 97 So. 3d 1217 (Miss. Ct. App. 2011)	Admit	Child sexual abuse	Π
MS	McClain v. State, 929 So. 2d 946 (Miss. Ct. App. 2005)	Admit	Toolmark, footprint	Π
MS	Moffett v. State, 49 So. 3d 1073 (Miss. 2010)	Admit	Causation	Π
MS	Mooneyham v. State, 915 So. 2d 1102 (Miss. Ct. App. 2005)	Admit	Forensic interview	Π
MS	Newell v. State, 176 So. 3d 78 (Miss. Ct. App. 2014)	Exclude	Forensic pathology	Π
MS	Parvin v. State, 113 So. 3d 1243 (Miss. 2013)	Exclude	Ballistics	Π
MS	Pickett v. State, 143 So. 3d 596 (Miss. Ct. App. 2013)	Admit	Forensic interview	Π

MS	Powell v. State, NO. 2016-KA-00518-COA, 2017 WL 3712862 (Miss. Ct. App. Aug. 29, 2017)	Admit	Forensic interview	Π
MS	Powers v. State, 945 So. 2d 386 (Miss. 2006) (en banc)	Exclude*	Crime scene analysis	Δ
MS	Ross v. State, 22 So. 3d 400 (Miss. Ct. App. 2009)	Admit	Pathology	Δ
MS	State v. Scott, No. 2014-KA-00123-SCT, 2017 WL 2377563 (Miss. June 1, 2017)	Admit	Psychiatry	Δ
MS	Smith v. State, 942 So. 2d 308 (Miss. Ct. App. 2006)	Admit	Blood alcohol content	Π
MS	Taylor v. State, 954 So. 2d 944 (Miss. 2007)	Admit	Burn patterns	Π
MS	Teston v. State, 44 So. 3d 977 (Miss. Ct. App. 2008)	Admit	Toxicology, pharmacology	Π
MS	Warren v. State, 187 So. 3d 616 (Miss. 2016)	Admit	Drugs	Π
MS	Williams v. State, No. 2016-KA-00634-COA, 2017 WL 3601170 (Miss. Ct. App. Aug. 22, 2017)	Exclude	DNA	Δ
MS	Willie v. State, 204 So. 3d 1268 (Miss. 2016)	Admit	Ballistics	Π
NH	State v. Langill, 945 A.2d 1 (N.H. 2008)	Exclude	Fingerprints	Π
NH	State v. Staples, No. 2006-0681, 2008 WL 11258731 (N.H. Jan. 30, 2008)	Admit	Accounting	Π
NC	State v. Abrams, 789 S.E.2d 863 (N.C. Ct. App. 2016)	Admit	Drugs	Π
NC	State v. Babich, 797 S.E.2d 359 (N.C. Ct. App. 2017)	Exclude	Blood alcohol content	Π
NC	State v. Daughtridge, 789 S.E.2d 667 (N.C. Ct. App. 2016)	Exclude	Causation	Π

NC	State v. Frye, No. COA16-362, 2016 WL 6440555 (N.C. Ct. App. Nov. 1, 2016)	Admit	Drugs	Π
NC	State v. Greene, No. COA16-1309, 2017 WL 4127730 (N.C. Ct. App. Sept. 19, 2017)	Admit	Horizontal gaze nystagmus	Π
NC	State v. Hunt, 790 S.E.2d 874 (N.C. Ct. App. 2016)	Admit	Drugs	Π
NC	State v. McDonald, 716 S.E.2d 250 (N.C. Ct. App. 2011)	Admit	Drugs	Π
NC	State v. McGrady, 753 S.E.2d 361 (N.C. Ct. App. 2014)	Exclude	Use of force	Δ
NC	State v. McGrady, 787 S.E.2d 1 (N.C. 2016)	Exclude	Reaction times	Δ
NC	State v. Perry, 750 S.E.2d 521 (N.C. Ct. App. 2013)	Admit	Child abuse	Π
NC	State v. Quick, No. COA13-289, 2014 WL 46996 (N.C. Ct. App. Jan. 7, 2014)	Admit	Drugs	Π
NC	State v. Shore, 803 S.E.2d 606 (N.C. Ct. App. 2017)	Admit	Child abuse	Π
NC	State v. Turbyfill, 776 S.E.2d 249 (N.C. Ct. App. 2015)	Admit	Blood alcohol content, horizontal gaze nystagmus	Π
NC	State v. Younts, 803 S.E.2d 641 (N.C. Ct. App. 2017)	Admit	Horizontal gaze nystagmus	Π
OH	State v. Armstrong, Nos. 2001-T-0120, 2002-T-0071, 2004 WL 2376467 (Ohio Ct. App. Oct. 22, 2004)	Admit	Ballistics, toolmarks	Π
OH	State v. Bell, No. 06-MA-189, 2008 WL 3009858 (Ohio Ct. App. July 25, 2008)	Admit	DNA	Π
OH	State v. Blamer, No. 00CA07, 2001 WL 109130 (Ohio Ct. App. Feb. 6, 2001)	Admit	Bite marks	Π
OH	State v. Calise, No. 26027, 2012 WL 4897840 (Ohio Ct. App. Oct. 17, 2012)	Exclude	Brain injury causation	Δ

OH	State v. Graham, No. 3052-M, 2001 WL 22482 (Ohio Ct. App. Jan. 10, 2001)	Admit	Hair comparison	Π
OH	*Id.*	Exclude	Hair attribution to particular defendant	Π
OH	State v. Henderson, No. 13 CR 135, 2017 WL 462596 (Ohio Ct. App. Feb. 3, 2017)	Admit	Medical examination	Π
OH	State v. Langlois, 2 N.E.3d 936 (Ohio Ct. App. 2013)	Admit	Ballistics	Π
OH	State v. Marshall, No. 06CA23, 2007 WL 4180806 (Ohio Ct. App. Nov. 16, 2007)	Admit	Fire characteristics	Π
OH	State v. McDade, Nos. OT-06-001, OT-06-004, 2007 WL 549498 (Ohio Ct. App. Feb. 23, 2007)	Admit	Drugs	Π
OH	State v. Mills, No. 2007 AP 07 0039, 2009 WL 1041441 (Ohio Ct. App. Apr. 15, 2009)	Admit	Forensic pathology	Π
OH	State v. Mobarak, No. 14AP-517, 2017 WL 4334156 (Ohio Ct. App. Sept. 29, 2017)	Admit	Forensic pharmacology	Π
OH	State v. Nemeth, 694 N.E.2d 1332 (Ohio 1998)	Admit	Battered child syndrome	Δ
OH	State v. Onunwor, No. 93937, 2010 WL 4684717 (Ohio Ct. App. Nov. 18, 2010)	Admit	Firearms	Π
OH	State v. Plott, 80 N.E.3d 1108 (Ohio Ct. App. 2017)	Admit	Forensic pathology	Π
OH	State v. Ream, No. 1-12-39, 2013 WL 5447606 (Ohio Ct. App. Sept. 30, 2013)	Exclude	Psychiatry	Δ
OH	State v. Shalash, 41 N.E.3d 1263 (Ohio Ct. App. 2015)	Admit	Drug analogues	Π
OH	State v. Sharma, 875 N.E.2d 1002 (Ohio Ct. Com. Pl. 2007)	Admit	Polygraph	Δ
OH	State v. Thompson, No. 89391, 2008 WL 248767 (Ohio Ct. App. Jan. 31, 2008)	Admit	Fire causation	Π

OH	State v. Wangler, No. 1-11-18, 2012 WL 5207546 (Ohio Ct. App. Oct. 22, 2012)	Admit	Chemical analysis of soot	Π
OH	*Id.*	Exclude	Chemical analysis of soot	Δ
OH	State v. Wegmann, No. 1-06-98, 2008 WL 434981 (Ohio Ct. App. Feb. 19, 2008)	Exclude	Bullet wound	Δ
OH	State v. Whites Landing Fisheries, LLC, No. E-16-040, 2017 WL 3981167 (Ohio Ct. App. Sept. 8, 2017)	Exclude	Fish shrinkage	Δ
OH	State v. Williams, 703 N.E.2d 1284 (Ohio Ct. Com. Pl. 1998)	Admit	Blood alcohol content	Π
OK	Bosse v. State, 400 P.3d 834 (Crim. App. Okla. 2017), *aff'd*, 406 P.3d 26 (Crim. App. Okla. 2017)	Admit	Fire reconstruction	Π
OK	Cripps v. State, 387 P.3d 906 (Crim. App. Okla. 2016)	Admit	Automobile accident reconstruction	Π
OK	Day v. State, 303 P.3d 291 (Crim. App. Okla. 2013)	Admit	Shaken baby syndrome	Π
SD	State v. Johnson, 860 N.W.2d 235 (S.D. 2015)	Admit	Child sexual abuse	Π
SD	State v. Yuel, 840 N.W.2d 680 (S.D. 2013)	Admit	Horizontal gaze nystagmus	Π
UT	State v. Clopten, 362 P.3d 1216 (Utah 2015)	Admit	Eyewitness identification	Π
UT	State v. Clopten, 223 P.3d 1103 (Utah 2009)	Admit	Eyewitness identification	Δ
UT	State v. Griffin, 384 P.3d 186 (Utah 2016)	Admit	DNA	Π
UT	State v. Guard, 371 P.3d 1 (Utah 2015)	Exclude	Eyewitness identification	Δ
UT	State v. Jones, 345 P.3d 1195 (Utah 2015)	Admit	DNA	Π

UT	State v. Lievanos, 298 P.3d 662 (Utah Ct. App. 2013)	Admit	DNA	Π
UT	State v. Maestas, 299 P.3d 892 (Utah 2012)	Admit	DNA, fingerprints	Π
UT	State v. Perea, 322 P.3d 624 (Utah 2013)	Admit	False confessions	Δ
UT	State v. Roberts, 345 P.3d 1226 (Utah 2015)	Admit	Computer forensics	Π
UT	State v. Sheehan, 273 P.3d 417 (Utah Ct. App. 2012)	Admit	Palm print	Π
UT	*Id.*	Remand	Palm print	Δ
UT	State v. Shepherd, 357 P.3d 598 (Utah Ct. App. 2015)	Admit	Boat operation	Π
UT	State v. Turner, 283 P.3d 527 (Utah Ct. App. 2012)	Admit	Breathalyzer	Π
UT	State v. Woodard, 330 P.3d 1283 (Utah Ct. App. 2014)	Admit	Fingerprints	Π
VT	State v. Abair, No. 2011-089, 2012 WL 1293562 (Vt. Mar. 15, 2012)	Admit	Blood alcohol content	Π
VT	State v. Brochu, 949 A.2d 1035 (Vt. 2008)	Admit	Hair comparison, DNA	Π
VT	State v. Forty, 989 A.2d 509 (Vt. 2009)	Exclude	Voice identification	Δ
VT	State v. Pratt, 128 A.3d 883 (Vt. 2015)	Admit	Forensic cell phone analysis	Π
VT	State v. Scott, 88 A.3d 1173 (Vt. 2013)	Admit	Automobile accident reconstruction	Π
VT	State v. Sullivan, 167 A.3d 876 (Vt. 2017)	Admit	Blood alcohol content, causation	Π

VT	State v. Tester, 968 A.2d 895 (Vt. 2009)	Admit	DNA	Π
WV	State v. Leep, 569 S.E.2d 133 (W. Va. 2002)	Admit	Sexual abuse and STD testing	Π
WV	State v. Wakefield, 781 S.E.2d 222 (W. Va. 2015)	Admit	Drugs	Π
WI	State v. Alvarez, No. 2014AP753-CR, 2015 WL 158899 (Wis. Ct. App. Jan. 14, 2015) (per curiam)	Admit	Marijuana distribution	Π
WI	State v. Chitwood, 879 N.W.2d 786 (Wis. Ct. App. 2016)	Admit	Drug recognition evaluation	Π
WI	State v. Chough, No. 2016AP406-CR, 2017 WL 389856 (Wis. Ct. App. Jan. 25, 2017)	Admit	Blood alcohol content	Π
WI	State v. Evans, No. 2015AP2315-CR, 2016 WL 5922863 (Wis. Ct. App. Oct. 12, 2016)	Admit	Drug quantities	Π
WI	State v. Garba, No. 2015AP1243-CR, 2016 WL 5794346 (Wis. Ct. App. Oct. 5, 2016)	Exclude	Blood alcohol content	Δ
WI	State v. Giese, 854 N.W.2d 687 (Wis. Ct. App. 2014)	Admit	Blood alcohol content	Π
WI	State v. Johnson, No. 2013AP65-CR, 2013 WL 12185148 (Wis. Ct. App. Dec. 11, 2013)	Admit	Sexual assault	Π
WI	State v. Smith, 874 N.W.2d 610 (Wis. Ct. App. 2015)	Admit	Child sexual assault	Π
WI	State v. Spizzirri, No. 2015AP84-CR, 2015 WL 9309202 (Wis. Ct. App. Dec. 23, 2015) (per curiam)	Admit	Blood alcohol content	Π
WI	State v. VanMeter, No. 2014AP1852-CR, 2015 WL 7432604 (Wis. Ct. App. Nov. 24, 2015)	Admit	Horizontal gaze nystagmus	Π
WI	State v. Zamora, No. 2016AP1923-CR, 2017 WL 4317783 (Wis. Ct. App. Sept. 27, 2017)	Admit	Sexual assault	Π

* The court held that the expert testimony should have been excluded but that the defendant's attorney's failure to object did not constitute ineffective assistance of counsel.

Appendix II: State Rule 702 Adoption and Usage in Criminal Cases

State	Year Adopted	Cases Discussing Reliability
Alabama[167]	2012	1
Arizona	2012	17
Delaware	2001	4
Florida	2013	1
Georgia	2013	0
Indiana[168]	1994	18
Kansas	2014	1
Kentucky	2007	3
Louisiana	2014	5
Massachusetts[169]	n/a	6
Maryland	1993	1
Michigan	2004	59
Mississippi	2003	37
Missouri	2017	0
New Hampshire	2016	2
North Carolina	2011	14
Ohio[170]	1994	22

167. The Alabama rule has the same reliability language but a slightly different structure (as well as additional provisions regarding juvenile cases, medical testimony, and use of DNA evidence). ALA. R. EVID. 702. Regarding expert evidence generally, the rule states:

> (b) In addition to the requirements in section (a), expert testimony based on a scientific theory, principle, methodology, or procedure is admissible only if:
>
> (1) The testimony is based on sufficient facts or data;
>
> (2) The testimony is the product of reliable principles and methods; and
>
> (3) The witness has applied the principles and methods reliably to the facts of the case.

Id.

168. IND. R. EVID. 702(b) (requiring that the expert testimony "rests upon reliable scientific principles"). The Rule included a reliability prong upon its adoption in 1994. A 2014 revision edited the structure, but the text of the reliability prong remained the same.

169. Massachusetts does not have official rules of evidence, but the Supreme Judicial Court recommends the *Massachusetts Guide to Evidence*. Press Release, Mass.gov, 2017 Edition of the Massachusetts Guide to Evidence Now Available (Feb. 24, 2017), https://www.mass.gov/news/2017-edition-of-the-massachusetts-guide-to-evidence-now-available [https://perma.cc/7JZG-G8YY]; *see also* Commonwealth v. Lanigan, 641 N.E.2d 1342, 1349 (Mass. 1994) (adopting the *Daubert* rationale).

170. Ohio Rule of Evidence 702 varies significantly from the federal rule, providing:

> (C) The witness' testimony is based on reliable scientific, technical, or other specialized information. To the extent that the testimony reports the result of a

Oklahoma[171]	2013	3
South Dakota	2011	2
Utah[172]	2007	13
Vermont	2004	7
West Virginia	2014	2
Wisconsin	2011	11

procedure, test, or experiment, the testimony is reliable only if all of the following apply:

(1) The theory upon which the procedure, test, or experiment is based is objectively verifiable or is validly derived from widely accepted knowledge, facts, or principles;

(2) The design of the procedure, test, or experiment reliably implements the theory;

(3) The particular procedure, test, or experiment was conducted in a way that will yield an accurate result.

OHIO R. EVID. 702.

171. The Oklahoma rule provides, using the same language as the federal rule, "(1) The testimony is based upon sufficient facts or data; (2) The testimony is the product of reliable principles and methods; and (3) The witness has applied the principles and methods reliably to the facts of the case." OKLA. STAT. ANN. tit. 12, § 2702 (West 2017).

172. Utah Rule of Evidence 702 provides

(b) Scientific, technical, or other specialized knowledge may serve as the basis for expert testimony only if there is a threshold showing that the principles or methods that are underlying in the testimony

(1) are reliable,

(2) are based upon sufficient facts or data, and

(3) have been reliably applied to the facts.

UTAH R. EVID. 702.