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State v. Matthews: Maryland Fails to Measure Up to its New Expert Testimony Standard

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NOTE

STATE V. MATTHEWS: MARYLAND FAILS TO MEASURE UP TO ITS NEW EXPERT TESTIMONY STANDARD

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In *State v. Matthews*,[1] the then-Maryland Court of Appeals[2] considered the admissibility of expert testimony in Kirk Matthews's trial for a double murder.[3] The forensic scientist presented a conclusion on the height of an individual captured on security camera footage, but did not include multiple variables in her measurement because she could not quantify them.[4] The Court of Appeals had to determine the admissibility of the expert testimony under the new standard adopted in *Rochkind v. Stevenson*,[5] which adopted the federal *Daubert v. Merrill Dow Pharmaceuticals, Inc.*[6] standard.[7]

The court found that the testimony was admissible.[8] The expert witness's inability to calculate the uncertainty of some variables did not make

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1. 479 Md. 278, 277 A.3d 991 (2022).

2. On December 14, 2022, Maryland Governor Larry Hogan announced that the majority of votes cast in the 2022 General Election were in favor of a constitutional amendment changing the names of the Court of Appeals of Maryland and the Court of Special Appeals of Maryland to the Supreme Court of Maryland and the Appellate Court of Maryland, respectively. *See* MD. EXEC. DEP'T, GOVERNOR'S PROCLAMATION DECLARING THE RESULT OF THE ELECTION OF NOVEMBER 8, 2022, FOR CONSTITUTIONAL AMENDMENTS (2022), https://mdcourts.gov/sites/default/files/import/reference/pdfs/proclamation20221213.pdf; *see also* MD. CONST. art. IV, § 14.

3. *Matthews*, 479 Md. at 286, 277 A.3d at 996.

4. *Id.* at 288–89, 277 A.3d at 997.

5. 471 Md. 1, 236 A.3d 630 (2020).

6. 509 U.S. 579 (1993).

7. *Matthews*, 479 Md. at 284, 277 A.3d at 995.

8. *Id.* at 286, 277 A.3d at 996.

the testimony inadmissible.[9] There was no "analytical gap" between the expert witness's opinion and the facts and data.[10] The expert witness provided sufficient information to aid the trier of fact, and any issues with accuracy could be handled at trial.[11] Therefore, the trial court did not abuse its discretion in admitting the testimony.[12]

The *Matthews* decision indicates that Maryland courts are unlikely to properly analyze scientific testimony in future cases. The court failed to recognize an analytical gap between the precise conclusion and unknown variables that should have barred its admission.[13] Additionally, the court did not analyze other factors affecting the testimony's reliability,[14] nor did it properly frame the scientific method that it was analyzing.[15] As a result, Maryland courts will likely make the same mistakes as other jurisdictions that have adopted the federal expert testimony standard.[16] The proper way to analyze scientific expert testimony has been a consistent problem for courts, and the reasoning of the court in *Matthews* indicates that Maryland courts will be unlikely to measure up to the task of properly analyzing scientific testimony.[17]

I. THE CASE

Linda McKenzie and Leslie Smith died from multiple shotgun wounds on June 1, 2017.[18] Police officers obtained security camera footage from a home near where the shootings occurred.[19] The video captured an individual wearing a head covering and carrying a shotgun, but the video did not show the individual's facial features or race.[20] The Anne Arundel County Police Department ("AAPD") submitted the video evidence to the Forensic Audio, Video and Image Analysis Unit of the FBI's Digital Evidence Laboratory to determine the individual's height.[21]

9. *Id.* at 314, 277 A.3d at 1012.

10. *Id.* at 318, 277 A.3d at 1015. The analytical gap is a gap between the expert's data and the opinion proffered, which can bar the opinion's admissibility. Gen. Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997).

11. *Matthews*, 479 Md. at 321, 277 A.3d at 1016.

12. *Id.* at 325, 277 A.3d at 1019.

13. *See infra* Section IV.A.1.

14. *See infra* Section IV.A.2.

15. *See infra* Section IV.A.3.

16. *See infra* Section IV.B.

17. *See infra* Section IV.C.

18. State v. Matthews, 479 Md. 278, 286, 277 A.3d 991, 996 (2022).

19. *Id.* at 287–88, 277 A.3d at 997 (describing the footage found).

20. *Id.* at 288, 277 A.3d at 997.

21. *Id.*

Forensic scientist Kimberly Meline ("Meline") received the video and selected one image to use for photogrammetric analysis.[22] The reverse projection photogrammetry Meline performed required duplicating the imaging conditions from the original scene to make a measurement.[23] On November 28, 2017, Meline went to the house where the video was taken.[24] Meline used the same security camera and placed a height chart where the subject was standing.[25] Meline overlaid this chart with the image to measure the subject's height.[26]

Meline concluded that the distance from the ground to the individual's headwear was approximately 5'8", plus or minus 0.67."[27] The measurement's reported uncertainty came from adding together the error from the image's resolution[28] and from the height chart's positional accuracy.[29] Meline acknowledged that the degree of uncertainty "could be significantly greater" due to the distance between the subject and camera, the image's resolution, the uneven landscape, and the subject's body position.[30]

In September 2017, Kirk Matthews ("Matthews") was indicted for the double murder.[31] Matthews filed a pretrial motion to exclude Meline's photogrammetric analysis from evidence.[32] In September 2018, the trial court held an evidentiary hearing on Matthews's motion.[33] At the hearing, Meline was accepted as an expert in "photogrammetry and reverse projection photogrammetry" and presented her conclusion.[34] Meline admitted that the incalculable variables prevented her from quantifying the overall margin of error.[35] Matthews called his own expert in photogrammetry who testified that

22. *Id.* Meline chose the image that was "most conducive for photogrammetric analysis." *Id.* at 290, 277 A.3d at 998.

23. *Id.* at 290, 277 A.3d at 998. Meline defined photogrammetry generally as "trying to make measurements in photos." *Id.* Reverse projection photogrammetry differs from analytical photogrammetry, which relies on software to make measurements without actually going to where an image was captured. *Id.*

24. *Id.* at 288, 277 A.3d at 997.

25. *Id.* at 291, 277 A.3d at 999.

26. *Id.* Meline also compared the subject's height to her own to double-check the measurement against her known height. *Id.* at 292, 277 A.3d at 999.

27. *Id.* at 288, 277 A.3d at 997.

28. The image resolution was based on the height change for each pixel, which was 0.53 inches. *Id.* at 291, 277 A.3d at 999.

29. *Id.* The positional accuracy measured how much the height would change based on a standard three-inch error in the height chart's placement, which was 0.133 inches. *Id.*

30. *Id.* at 288–89, 277 A.3d at 997. Meline later testified that she did not "have a scientific way of quantifying" the effect of these variables on her measurements. *Id.* at 292, 277 A.3d at 1000.

31. *Id.* at 289, 277 A.3d at 997.

32. *Id.*

33. *Id.* at 290, 277 A.3d at 998.

34. *Id.* at 290–91, 277 A.3d at 998–99.

35. *Id.* at 295, 277 A.3d at 1001.

the incalculable variables made the image unsuitable for analysis.[36] These incalculable variables included the changing terrain,[37] the suspect wearing headwear,[38] and the uncertainty of the suspect's foot position.[39] The trial court denied Matthews's motion and permitted Meline to testify at trial.[40]

Matthews's trial was conducted in October of 2018.[41] The prosecution called several eyewitnesses to the stand,[42] as well as crime scene technicians who measured Matthews's height at 5'9".[43] Meline presented her conclusion and was cross examined on its uncertainty.[44] The defense's case included an eyewitness who saw an individual with a shotgun who was a different race and height than Matthews.[45] No witness testified to seeing the shootings.[46] The jury found Matthews guilty of two counts of second-degree murder and other related charges.[47]

Matthews appealed his case to the Maryland Court of Special Appeals.[48] Matthews argued that the trial court abused its discretion in admitting Meline's testimony.[49] While Matthews's case was pending appeal, the

36. *Id.* at 294, 277 A.3d at 1001.

37. *Id.* at 335–37, 277 A.3d at 1025–26 (Watts, J., dissenting). The defense's private investigator testified that the terrain changed every time he visited and was "very different" between when the crime occurred and when testing was done. *Id.* at 336, 277 A.3d at 1025. Additionally, the land was characterized as swampy, sandy, and uneven. *Id.* at 337, 277 A.3d at 1026.

38. *Id.* at 337, 277 A.3d at 1026. Because the subject's additional height attributable to the headwear was an incalculable variable, the expert's final conclusion included the headwear in the suspect's height. *Id.*

39. *Id.* The expert testified that the left heel was difficult to see, so the best practice is to assess the terrain where the suspect was standing. *Id.* However, as noted, the terrain would have changed between the image's capture and later assessment. *Id.*; *see supra* note 37.

40. *Matthews*, 479 Md. at 297, 277 A.3d at 1002 (majority opinion). The trial court denied motions under both Maryland Rules 5-403 and 5-702. *Id.* The trial court found that Meline was qualified as an expert, her testimony was appropriate for the case, and there was a sufficient factual basis for Meline's testimony. *Id.* This Note will focus only on the Maryland Rule 5-702 issue.

41. *Id.*

42. *See id.* at 298–300, 277 A.3d at 1003–04 (describing how these eyewitnesses knew Matthews for a long time, but some may have been intoxicated).

43. *Id.* at 300–01, 277 A.3d at 1004–05; *see id.* at 302 n.16, 277 A.3d at 1005 n.16 (discussing discrepancies in Matthews's reported height).

44. *Id.* at 301, 277 A.3d at 1004–05. The court here described Meline's opinion as providing the "subject's height," which differs from the reported opinion of the foot to the top of the headwear. *Id.* at 301, 288, 277 A.3d at 1004–05, 997. When she testified, Meline described that her conclusion was to "a reasonable degree of scientific certainty." *Id.* at 292, 277 A.3d at 999.

45. *Id.* at 302–03, 277 A.3d at 1005–06 (describing that witness's testimony and the contrast between the testimony and Matthews's physical description).

46. *Id.* at 287, 277 A.3d at 996.

47. *Id.* at 303, 277 A.3d at 1006.

48. Matthews v. State, 249 Md. App. 509, 524, 246 A.3d 644, 652 (2021), *rev'd* 479 Md. 278, 277 A.3d 991 (2022).

49. *Id.* Matthews presented two other issues not relevant here. They regarded testimony on an allegedly inconsistent prior statement and whether Matthews should have been permitted to question a witness about prior criminal charges. *Id.* On these two issues, the Court of Special Appeals found

Maryland Court of Appeals decided *Rochkind v. Stevenson*.[50] The Court of Special Appeals then applied the new *Rochkind* standard, requiring courts to examine a method's overall reliability, to Meline's testimony.[51] The court found that Meline's testimony had an analytical gap because Meline could not calculate the actual uncertainty of her measurement, which meant the height calculation was not reliable.[52] The Court of Special Appeals held that the trial court should have excluded Meline's testimony.[53] The court found that error was not harmless, and thus Matthews's convictions were reversed.[54] The State of Maryland appealed the ruling on the issue of whether the Court of Special Appeals erred in holding that there was an analytical gap.[55]

The Court of Appeals granted the State's petition for a writ of certiorari to determine whether the Court of Special Appeals erred in its ruling.[56]

II. LEGAL BACKGROUND

For seventy years, the dominant standard for admitting novel scientific evidence was the "general acceptance" standard created by *Frye v. United States*.[57] In 1993, the U.S. Supreme Court held that the Federal Rules of Evidence superseded that standard in *Daubert v. Merrell Dow Pharmaceuticals, Inc*.[58] Since the *Daubert* decision, a supermajority of jurisdictions abandoned the *Frye v. United States* standard of determining a method's general acceptance in favor of *Daubert*'s approach of assessing a method's reliability under the Federal Rules of Evidence.[59] Maryland adopted the general acceptance standard in *Reed v. State*.[60] However, that

no abuse of discretion. *See id.* at 531, 246 A.3d at 656 (finding the prior inconsistent statements issue was not advanced in the trial court); *id.* at 537, 246 A.3d at 660 (finding no abuse in restricting cross examination).

50. *Id.* at 541–42, 246 A.3d at 662–63 (citing Rochkind v. Stevenson, 471 Md. 1, 39, 236 A.3d 630, 652 (2020)).

51. *Id.* at 542, 246 A.3d at 663; *see infra* notes 138–166 and accompanying text (discussing the holding of *Rochkind*).

52. *Matthews*, 249 Md. App. at 544, 246 A.3d at 664.

53. *Id.* The Court of Special Appeals also noted issues under Maryland Rule 5-403 related to whether there was a danger of unfair prejudice from Meline's testimony because the video was "unilluminating and the remaining testimony so equivocal." *Id.*

54. *Id.*

55. State v. Matthews, 479 Md. 278, 305, 277 A.3d 991, 1007 (2022).

56. *Id.* (citing State v. Matthews, 474 Md. 719, 255 A.3d 1090 (2021)).

57. 293 F. 1013 (D.C. Cir 1923); *see* Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 586 (1993).

58. *Daubert*, 509 U.S. at 587.

59. Savage v. State, 455 Md. 138, 178 n.3, 166 A.3d 183, 206 n.3 (2017) (Adkins, J., concurring) (listing thirty-eight states that have "explicitly adopted *Daubert*" or held that the *Daubert* factors are persuasive).

60. 283 Md. 374, 375, 391 A.2d 364, 364–65 (1978).

standard expanded over time and became more similar to *Daubert*'s analysis.[61] The Maryland Court of Appeals adopted the *Daubert* standard for the admission of expert testimony in *Rochkind v. Stevenson*.[62] *State v. Matthews* was the Court of Appeals's first application of that new standard.[63]

Section II.A discusses the federal case law on the admission of expert testimony.[64] Section II.B examines the scientific community's response to courts' use of the *Daubert* standard.[65] Then, Section II.C examines the growth of Maryland's standard over time.[66] Section II.D discusses the *Rochkind* decision that *State v. Matthews* applied.[67]

A. The Federal Rules of Evidence Changed the Federal Standard for the Admission of Expert Evidence

The initial predominant standard for the admission of expert testimony came from *Frye v. United States*, a 1923 case in the Court of Appeals of the District of Columbia.[68] In *Frye*, the defendant appealed the trial court's denial of expert witness testimony regarding a lie detector test.[69] The court held that for a scientific principle or discovery to be admissible, it "must be sufficiently established to have gained general acceptance" in its particular field.[70] The lie detector test did not have the required recognition to meet this standard and was therefore inadmissible.[71] Over time, many state and federal courts adopted *Frye*'s general acceptance test to determine the admissibility of novel scientific evidence.[72]

In 1975, Federal Rule of Evidence 702 was initially written to govern testimony by expert witnesses.[73] The original rule said that a witness who qualified as an expert may testify if their specialized knowledge would assist

61. *See* Rochkind v. Stevenson, 471 Md. 1, 16–21, 236 A.3d 630, 639–42 (2020) (discussing a history of the "drift" from the original *Frye* standard).

62. *Id.* at 26, 236 A.3d at 644–45.

63. State v. Matthews, 479 Md. 278, 284, 277 A.3d 991, 995 (2022). *Rochkind* applied to any cases pending on direct appeal when the opinion was filed if the relevant question of whether a trial court erred in admitting or excluding expert testimony was preserved. *Rochkind*, 471 Md. at 38–39, 236 A.3d at 652.

64. *See infra* Section II.A.

65. *See infra* Section II.B.

66. *See infra* Section II.C.

67. *See infra* Section II.D.

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

69. *Id.* at 1013.

70. *Id.* at 1014.

71. *Id.*

72. Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 585 (1993) (citing PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, SCIENTIFIC EVIDENCE § 1–5, at 10–14 (1986 & Supp. 1991)).

73. FED. R. EVID. 702 (1975) (amended 2000).

the trier of fact in understanding the evidence or determining a fact in issue.[74] Additionally, under the Federal Rules of Evidence, evidence must be relevant to be admissible.[75] Courts and scholars were divided over whether the Rules incorporated *Frye*'s standard of general acceptance.[76] The Federal Rules of Evidence did not establish general acceptance as a prerequisite to admissibility.[77]

The U.S. Supreme Court took up the issue of whether *Frye* was overruled by the Federal Rules of Evidence in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*[78] The *Daubert* Court held the Federal Rules of Evidence superseded *Frye*.[79] The Rules were permissive, and not mentioning general acceptance made the *Frye* standard incompatible with the Rules.[80] The Court held that scientific testimony or evidence must be "not only relevant, but reliable."[81] Evidentiary reliability for scientific testimony came from scientific validity.[82]

The Court provided additional factors for judges to consider when determining whether the reasoning or methodology of testimony is scientifically valid.[83] The factors to help judges determine reliability (the "*Daubert* factors") are:

1. "[W]hether a theory or technique . . . can be (and has been) tested";
2. "[W]hether the theory or technique has been subjected to peer review and publication";

74. *Id.*

75. FED. R. EVID. 402. Relevance requires proving that a fact has any tendency to make a material fact more or less probable. FED. R. EVID. 401. Additionally, evidence must pass a balancing test to show its relevance is not substantially outweighed by a danger of unfair prejudice, confusing the issues, misleading the jury, or other prejudicial factors. FED. R. EVID. 403.

76. *See Daubert*, 509 U.S. at 587 n.5 (collecting cases and treatises with differing conclusions over whether the Federal Rules of Evidence superseded *Frye*).

77. *Id.* at 588. The relevance requirement was in tension with the general acceptance standard. *Id.* The general acceptance standard was seen by the *Daubert* Court as "rigid" and at odds with the Federal Rules approach of relaxing traditional barriers to opinion testimony. *Id.* (quoting Beech Aircraft Corp. v. Rainey, 488 U.S. 153, 169 (1988)); *see also id.* at 586–89 (explaining this tension in greater detail based on the inconsistency of the common-law *Frye* rule with the Federal Rules of Evidence).

78. *Id.* at 587. The facts of the case concerned the admission of epidemiological data related to the drug Bendectin and birth defects. *Id.* at 583–84.

79. *Id.* at 589.

80. *Id.*

81. *Id.*; *see also id.* at 590–92 (discussing how the Rule's requirement of "scientific knowledge" establishes another standard of evidentiary reliability, and the "helpfulness" standard creates a precondition of relevance to the inquiry).

82. *Id.* at 590 n.9.

83. *Id.* at 592–93. *But see id.* at 598–600 (Rehnquist, C.J., concurring in part and dissenting in part) (agreeing that *Frye* was overruled, but criticizing the Court's dicta in creating factors to analyze).

3. "[Whether a particular scientific technique has a] known or potential rate of error";
4. "[T]he existence and maintenance of standards [and controls]"; and
5. Whether a theory or technique is generally accepted.[84]

These factors were neither exhaustive nor applicable in every case.[85] Lastly, the Court explained that the appropriate method to attack "shaky but admissible evidence" would be through cross-examination, contrary evidence, and "careful instruction on the burden of proof."[86]

The U.S. Supreme Court clarified and expanded *Daubert*'s holding in *General Electric Co. v. Joiner*[87] and *Kumho Tire Co. v. Carmichael*.[88] In *Joiner*, the Court incorporated the concept of the "analytical gap" to the analysis of expert testimony.[89] When the gap between the data and the expert's opinion is too wide, the testimony is inadmissible.[90] A court may exclude testimony when the connection between the conclusion and the data is only based on "the *ipse dixit* of the expert," or the expert's own words.[91] The Court also found that abuse of discretion is the proper standard of review for a district court's evidentiary ruling on scientific testimony.[92] Then, in *Kumho*, the Court clarified that *Daubert*'s holding is not limited to only scientific knowledge, but also applies to technical and specialized knowledge described in Rule 702.[93]

Rule 702 was rewritten in 2000 to clearly incorporate *Daubert*, then restyled in 2011.[94] Under the updated standard, expert witnesses may only testify when they have specialized knowledge, sufficient facts and data, reliable principles and methods, and reliable applications of those methods to the facts of the case.[95] After *Daubert*, a supermajority of jurisdictions moved

84. *Id.* at 593–94 (majority opinion).
85. Kumho Tire Co. v. Carmichael, 526 U.S. 137, 153 (1999).
86. *Daubert*, 509 U.S. at 596.
87. 522 U.S. 136 (1997).
88. 526 U.S. 137 (1999).
89. *Joiner*, 522 U.S. at 146.
90. *Id.*
91. *Id.*
92. *Id.*
93. *Kumho*, 526 U.S. at 141 (citing FED. R. EVID. 702). The Court said that there is no clear line between "scientific" and "technical" knowledge, so all forms of specialized knowledge will fall under *Daubert*'s requirements. *Id.* at 148. The Court said even "pure scientific theory" may depend on observations and engineered machinery. *Id.*
94. FED. R. EVID. 702 advisory committee's note to 2000 amendment.
95. FED. R. EVID. 702.

to the *Daubert* approach from *Frye*.[96] Only a minority of jurisdictions maintained the *Frye* standard or modified it.[97]

B. The Scientific Community Criticized Courts' Use of Daubert *and Advocated for Change*

After *Daubert*'s adoption, scientific organizations put out reports calling for reform in forensic science.[98] The National Academy of Sciences ("NAS") released the first major report in 2009 after Congress authorized a study on forensic science.[99] The NAS report detailed many issues found in widely accepted forensic techniques.[100] This report concluded that other than nuclear DNA analysis, no forensic method showed it could connect evidence to a specific individual or source with a high degree of certainty.[101] The report found that, despite the *Daubert* standard, forensic evidence was often introduced in trial "without any meaningful scientific validation."[102]

A second major report was issued by the President's Council of Advisors on Science and Technology ("PCAST") in 2016.[103] The report recommended that the judiciary examine forensic methods more carefully and ensure statements do not imply greater certainty than the empirical evidence supports.[104] To meet the *Daubert* standard of validity, meaning a forensic method is reliable in principle, the PCAST report said a method must be both foundationally valid and valid as applied.[105] Foundational validity requires that a method is repeatable, reproducible, and accurate.[106] Validity

96. Rochkind v. Stevenson, 471 Md. 1, 15 n.7, 236 A.3d 630, 638 n.7 (2020) (citing Savage v. State, 455 Md. 138, 178 n.3, 166 A.3d 183, 206 n.3 (2017) (Adkins, J., concurring)) (discussing how by 2019, the *Daubert* standard had either been explicitly adopted or its factors had been deemed persuasive in thirty-nine jurisdictions).

97. *Savage*, 455 Md. at 179 n.4, 166 A.3d at 207 n.4 (listing eight states that applied a traditional or modified *Frye* test in 2017).

98. COMM. ON IDENTIFYING THE NEEDS OF THE FORENSIC SCI. CMTY., NAT'L RSCH. COUNCIL, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 1–2 (2009) [hereinafter NAS Report], https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf.

99. *Id.* at 1. A diverse group of forensic scientists, professors, judges, and lawyers wrote the report. *See id.* at v–ix (listing the committee members).

100. *Id.* at 42 ("The fact is that many forensic tests . . . have never been exposed to stringent scientific scrutiny. Most of these techniques were developed in crime laboratories . . . and researching their limitations and foundations was never a top priority.").

101. *Id.* at 7.

102. *Id.* at 107–08.

103. PRESIDENT'S COUNCIL OF ADVISORS ON SCI. & TECH., EXEC. OFF. OF THE PRESIDENT, FORENSIC SCIENCE IN CRIMINAL COURTS: ENSURING SCIENTIFIC VALIDITY OF FEATURE-COMPARISON METHODS 1 (2016) [hereinafter PCAST Report], https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf.

104. *Id.* at 19.

105. *Id.* at 4–6, 47–48.

106. *Id.*

as applied refers to a valid application in practice, meaning the forensic examiner is capable of reliability applying a method and shows they actually did reliably apply it.[107] Both of these reports examined national trends in forensic science, which occurred alongside the changes in Maryland's standard for expert testimony.

C. Maryland Incorporated the Frye *Standard, Which Then Expanded Beyond its Intended Application*

In 1978, Maryland adopted the *Frye* standard in *Reed v. State*,[108] but the standard's expansion over the next four decades made the standard move closer to the *Daubert* standard.[109] In *Reed*, the Maryland Court of Appeals had to determine the admissibility of voice identification technology.[110] The court incorporated the *Frye* standard (the "*Frye-Reed*" standard) and held that a scientific opinion would be admissible if it was "generally accepted as reliable within the expert's particular scientific field."[111] The court held that voiceprint evidence was inadmissible because that method had not gained general acceptance.[112] After establishing the *Frye-Reed* standard, Maryland courts applied it to novel scientific evidence.[113]

A year after *Daubert* was decided, the Court of Appeals adopted Maryland Rule 5-702, changing the requirements for expert testimony.[114] This rule requires a trial court to determine whether expert testimony will assist a trier of fact to understand the evidence or determine a fact in issue.[115] To meet this standard, the witness must (1) be qualified through their knowledge, skill, experience, training, or education, (2) show that their testimony is appropriate for the subject, and (3) show that they have a sufficient factual basis for their testimony.[116] The sufficient factual basis requirement needs both an adequate supply of data, and a reliable methodology.[117] However, the Rules Committee noted that the required

107. *Id.*

108. 283 Md. 374, 391 A.2d 364 (1978).

109. Rochkind v. Stevenson, 471 Md. 1, 16–21, 236 A.3d 630, 639–42 (2020).

110. *Reed*, 283 Md. at 375, 391 A.2d at 364–65.

111. *Id.* at 381, 391 A.2d at 368. The *Reed* court believed this standard would likely slow the admission of new methods until they have enough status within their field. *Id.* at 385, 391 A.2d at 370 (citing United States v. Addison, 498 F.2d 741, 743 (D.C. Cir. 1974)).

112. *Reed*, 283 Md. at 385, 399 A.2d at 377.

113. *See* Rochkind v. Stevenson, 471 Md. 1, 13, 236 A.3d 630, 637 (2020) (listing cases from the 1980s and 1990s involving novel scientific evidence, including the admission of polygraphs tests, field sobriety tests, and polarized light microscopy in asbestos cases).

114. *Id.* at 21, 236 A.3d at 642 (citing MD. R. 5-702).

115. MD. R. 5-702.

116. *Id.*

117. Roy v. Dackman, 445 Md. 23, 42–43, 124 A.3d 169, 180 (2015) (quoting CSX Transp., Inc. v. Miller, 159 Md. App. 123, 189, 858 A.2d 1025, 1063 (2004)).

scientific foundation to admit "novel scientific techniques or principles" was to be developed through precedent.[118] As a result, while the *Frye-Reed* standard would act as a threshold inquiry for some scientific testimony, that same testimony must also pass Maryland Rule 5-702.[119]

Over time, courts expanded the *Frye-Reed* test and applied it beyond the initial purpose of admitting novel scientific evidence.[120] First, courts applied *Frye-Reed* to scientific conclusions, rather than scientific methods.[121] The Court of Appeals held that courts needed to conduct a *Frye-Reed* analysis when offering a novel medical conclusion, even if the underlying principles were generally accepted.[122] Maryland courts incorporated the analytical gap standard from *Joiner*, allowing courts to examine analyses and conclusions.[123] Trial judges needed to consider whether an analysis was flawed and created an analytical gap.[124] The Court of Appeals held that generally accepted methodology "must be coupled with generally accepted analysis."[125] The *Frye-Reed* standard expanded beyond its analysis of methodology alone to also encompass the conclusions of the experts.[126]

Second, courts applied the *Frye-Reed* standard beyond its intended application to admit novel techniques.[127] Maryland courts began applying the *Frye-Reed* standard to all scientific principles.[128] As an example, in *Clemons v. State*,[129] the Court of Appeals applied *Frye-Reed* to comparative bullet lead analysis, a method that was widely relied upon for forty years.[130] Courts also took judicial notice of the scientific method's general acceptance when the validity and reliability is "so broadly and generally accepted" in the scientific

118. *Rochkind*, 471 Md. 1, 21–22, 236 A.3d 630, 642 (2020) (citing MD. R. 5-702 advisory committee note to 1994 amendment).

119. Savage v. State, 455 Md. 138, 183, 166 A.3d 183, 209–10 (2017) (Adkins, J., concurring).

120. *Rochkind*, 471 Md. at 15–21, 236 A.3d at 639–42.

121. *Id.* at 16, 236 A.3d at 639 (citing Wilson v. State, 370 Md. 191, 210–11, 803 A.2d 1034, 1045 (2002)) (holding that a reliable statistical method was insufficient when there was not general acceptance on the conclusion).

122. *Id.* at 16–17, 236 A.3d at 639 (citing Montgomery Mut. Ins. Co. v. Chesson (*Chesson I*), 399 Md. 314, 329–30, 923 A.2d 939, 947–48 (2007)).

123. Blackwell v. Wyeth, 408 Md. 575, 608, 971 A.2d 235, 255 (2009).

124. Chesson v. Montgomery Mut. Ins. Co. (*Chesson II*), 434 Md. 346, 356–57, 75 A.3d 932, 937–38 (2013).

125. *Blackwell*, 408 Md. at 608–09, 971 A.2d at 255 (finding an analytical gap in a case about childhood vaccinations and autism because the novel theory was not generally accepted).

126. *Rochkind*, 471 Md. at 16, 236 A.3d at 639.

127. *Id.* at 19, 236 A.3d at 641.

128. Savage v. State, 455 Md. 138, 180, 166 A.3d 183, 208 (2017) (Adkins, J., concurring).

129. 392 Md. 339, 896 A.2d 1059 (2006).

130. *See id.* at 365–68, 896 A.2d at 1074–75 (explaining the method's origin in the 1960s). The court found that the process was inadmissible because its fundamental assumptions were not generally accepted. *Id.* at 372, 896 A.2d at 1079.

community.[131] This judicial notice replicated the *Frye-Reed* test, even though non-novel methods did not require general acceptance under the original *Frye-Reed* standard.[132]

Judges on the Court of Appeals began to advocate for altering Maryland's *Frye-Reed* jurisprudence based on the standard's expansion.[133] In *Savage v. State*,[134] the Court of Appeals held that there was an analytical gap in a neurologist's opinion.[135] In a concurring opinion, Judge Adkins advocated for the adoption of the *Daubert* standard in Maryland because the expanded *Frye-Reed* standard encompassed the Rule 5-702 analysis.[136] The court adopted these recommendations in 2020.[137]

D. In 2020, the Court of Appeals Adopted the Daubert *Standard for the Admission of Expert Testimony*

In *Rochkind v. Stevenson*,[138] the Court of Appeals adopted *Daubert* and overruled *Reed* to create a single standard for the admission of expert testimony.[139] The case concerned the admission of an expert's conclusion that lead poisoning had caused the plaintiff's injuries.[140] The court determined that the circuit court abused its discretion by not holding a Rule 5-702 hearing on the expert's testimony to determine if the opinion's causation was reliable and admissible.[141] The court found that *Daubert* should be adopted due to the jurisprudential drift in the *Frye-Reed* standard.[142] Stare decisis was not

131. *Rochkind*, 471 Md. at 20, 236 A.3d at 641 (quoting Wilson v. State, 370 Md. 191, 201, 803 A.2d 1034, 1039 (2002)).

132. *Id.* at 20–21, 236 A.3d at 642.

133. *Id.* at 26, 236 A.3d at 644–45.

134. 455 Md. 138, 166 A.3d 183 (2017).

135. *Id.* at 171, 166 A.3d at 202.

136. *Id.* at 184, 166 A.3d at 210 (Adkins, J., concurring). Judge Adkins had previously written multiple opinions regarding the standard of expert testimony in Maryland. *See, e.g.*, Rochkind v. Stevenson, 454 Md. 277, 295, 164 A.3d 254, 264 (2017) (determining that an expert's testimony did not have sufficient factual foundation and that the trial court abused its discretion); Sugarman v. Liles, 460 Md. 396, 446, 190 A.3d 344, 373 (2018) (permitting an expert to testify to causation of an individual's attention problems based on the lack of an analytical gap). As the court said in *Rochkind*, Adkins' concurrence in *Savage* "blazed the trail" for the adoption of the *Daubert* standard in Maryland. *Rochkind*, 471 Md. at 30, 236 A.3d at 647.

137. *Rochkind*, 471 Md. at 26, 236 A.3d at 644–45.

138. 471 Md. 1, 236 A.3d 630 (2020).

139. *Id.* at 26, 236 A.3d at 644–45. The Court detailed the legal history of the *Frye-Reed* standard and how it expanded over time, as described in the previous Section. *Id.* at 15–21, 236 A.3d at 639–42.

140. *Id.* at 6, 236 A.3d at 633–34; *see id.* at 5–10, 236 A.3d at 633–36 (discussing the procedural history of the case and the expert's testimony at issue).

141. *Id.* at 26–27, 236 A.3d at 645.

142. *Id.* at 26, 236 A.3d at 644–45 (citing Savage v. State, 455 Md. 138, 186–87, 166 A.3d 183, 211–12 (2017) (Adkins, J., concurring)).

controlling for the *Frye-Reed* standard because the forty years of changes to the standard were "significant changes in the law and facts."[143] The benefit of adopting *Daubert* was to shift from only examining community acceptance towards examining a method's overall reliability.[144]

The court explained that the purpose of *Daubert* was for judges to determine only the threshold reliability of a method, not its ultimate validity.[145] To make this determination, the court described ten factors (the "*Rochkind-Daubert* factors") for a court to consider in admitting expert testimony.[146] The first five come from *Daubert*, as described above.[147] The other five are from the Advisory Committee Notes for the Federal Rules of Evidence:

> 6. Whether [the proposed testimony has grown] naturally and directly out of [the expert's independent] research, or whether [it was developed for the] purposes of testifying;
> 7. Whether the expert has unjustifiably extrapolated from an accepted premise to an unfounded conclusion;
> 8. Whether the expert has adequately accounted for obvious alternative explanations;
> 9. Whether the expert is being as careful as [they] would be in [their] regular professional work; and
> 10. Whether the field of expertise . . . is known to reach reliable results.[148]

Just like in *Daubert*, all of these factors are relevant, but none are dispositive.[149]

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143. *Id.* at 28–29, 236 A.3d at 646 (quoting *Savage*, 455 Md. at 186, 166 A.3d at 212 (Adkins, J., concurring)); *see supra* notes and accompanying text 120–132 (discussing the drift from the *Frye-Reed* standard); *see also Rochkind*, 471 Md. at 15–21, 236 A.3d at 639–42 (providing a history of that drift).

144. *Rochkind*, 471 Md. at 30–31, 236 A.3d at 647–48. The court cited multiple cases from outside Maryland criticizing the *Frye* approach to support its holding that the standard was "conceptually flawed" and "both unduly restrictive and unduly permissive." *Id.* at 32, 236 A.3d at 648 (first quoting State v. Porter, 698 A.2d 739, 750 (Conn. 1997); and then quoting State v. Coon, 974 P.2d 386, 394 (Alaska 1999)).

145. *Id.* at 33, 236 A.3d at 649. The court dismissed a criticism that this would lead to inconsistent results by recognizing that "inconsistency is inevitable" and preferable to properly admit good science. *Id.* at 34, 236 A.3d at 649–50 (quoting Motorola Inc. v. Murray, 147 A.3d 751, 756 (D.C. 2016)).

146. *Id.* at 35–36, 236 A.3d at 650.

147. *Id.*; *see also supra* text accompanying note 84 (listing five *Daubert* factors).

148. *Rochkind*, 471 Md. at 35–36, 236 A.3d at 650 (citing FED. R. EVID. 702 advisory committee's note). These additional factors come from the Advisory Committee collecting relevant factors from U.S. Supreme Court and federal Court of Appeals cases. *See* FED. R. EVID. 702 advisory committee's note.

149. *Rochkind*, 471 Md. at 37, 236 A.3d at 651.

The Court of Appeals changed the standard of review from *Frye-Reed*'s de novo standard to the abuse of discretion standard.[150] Courts no longer need to determine whether the case involved a new or novel technique that required a *Frye-Reed* analysis instead of a Rule 5-702 analysis.[151] The focus of the reliability analysis should be "solely on [the] principles and methodology" and not the conclusions.[152] The Court of Appeals reasserted *Joiner*'s analytical gap inquiry, explaining that trial courts should analyze the relationship between "the methodology applied and conclusion reached."[153] Finally, the court reasserted *Daubert*'s assertion that shaky but admissible evidence should be attacked through the adversarial process.[154] This ensures that the trial court maintains its proper gatekeeping function.[155]

Dissenting from the *Rochkind* majority opinion, Judge Shirley Watts, joined by Judge Michele Hotten and Senior Judge Clayton Greene, disagreed with the adoption of the *Daubert* standard.[156] First, Judge Watts said that the adoption of the standard was improper in this specific case.[157] The issue of what analytical standard to use was not properly argued before the Court of Appeals based on the lower court's decision.[158] Judge Watts also found that there were no new cases or further developments in the law in recent years that justified an exception to stare decisis.[159]

Additionally, Judge Watts argued that the majority did not adequately account for the potential harms that the *Daubert* standard could bring to Maryland.[160] Judge Watts criticized the majority's reliance on only using one identified study in coming to its conclusion.[161] She pointed to other articles that found that *Daubert* had a disproportionately negative impact on Black

150. *Id.* at 37, 236 A.3d at 651.

151. *Id.*

152. *Id.* at 36, 236 A.3d at 651 (quoting Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 595 (1993)).

153. *Id.* at 36, 236 A.3d at 651 (citing Gen. Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997)).

154. *Id.* at 38, 236 A.3d at 652 (quoting *Daubert*, 509 U.S. at 596).

155. *Id.*

156. *Id.* at 39, 236 A.3d at 652 (Watts, J., dissenting).

157. *Id.* at 51–53, 236 A.3d at 659–61. Counsel for Rochkind agreed that a *Frye-Reed* hearing was not appropriate, and a Rule 5-702 hearing was needed. *Id.* at 51, 236 A.3d at 659–60; *see also id.* at 53 n.3, 236 A.3d at 660 n.3 (criticizing the majority's position because they ignored a previous concession made by the party, and that the Court of Appeals should have instead dismissed the case as improvidently granted rather than answering the *Daubert* question).

158. *See id.* at 53, 236 A.3d at 661.

159. *Id.* at 50, 236 A.3d at 659.

160. *Id.* at 54, 236 A.3d at 661. Judge Watts refers to amicus curiae briefs filed before the case that describe disproportionate impacts on some plaintiff groups. *Id.*

161. *Id.* at 54–55, 236 A.3d at 661–62 (citing *id.* at 29 n.15, 236 A.3d at 646 n.15 (majority opinion)).

plaintiffs,[162] placed heightened causation requirements on gender, race, and class lines,[163] and raised the cost and risk for plaintiffs in asserting claims.[164] Judge Watts argued that the Rules Committee should have taken time to study this issue to ensure that there is equal access to the court system.[165] Judge Watts concluded by finding that the expert's testimony in the case was admissible under Maryland Rule 5-702 because there was no analytical gap in the testimony.[166]

III. THE COURT'S REASONING

Matthews was the first case in which the Court of Appeals applied the new *Rochkind* standard and its incorporation of *Daubert*.[167] In a 6-1 decision, the Court of Appeals reversed the Court of Special Appeals's decision and held that the trial court did not abuse its discretion in permitting Meline to testify.[168] Relying on *Rochkind v. Stevenson*, the court applied an abuse of discretion standard to the admissibility of expert testimony.[169]

Matthews had argued that Meline's inability to provide an overall margin of error for the height estimate made it unreliable.[170] The court countered that the *Rochkind* reliability factors are "neither exhaustive nor mandatory."[171] Therefore, the applicability of one factor did not remove the trial court's discretion of the opinion's admission, and the testimony was not per se inadmissible.[172]

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162. *Id.* at 56 n.4, 236 A.3d at 662 n.4 (Watts, J., dissenting) (citing Andrew W. Jurs & Scott Devito, *A Tale of Two* Dauberts*: Discriminatory Effects of Scientific Reliability Screening*, 79 OHIO ST. L.J. 1107, 1109–10 (2018)).

163. *Id.* at 57 n.4, 236 A.3d at 663 n.4 (citing Lucinda M. Finley, *Guarding the Gate to the Courthouse: How Trial Judges Are Using Their Evidentiary Screening Role to Remake Tort Causation Rules*, 49 DEPAUL L. REV. 335, 373–74 (1999)).

164. *Id.* (discussing several additional articles finding an impact of the *Daubert* standard on plaintiffs).

165. *Id.* at 58–59, 236 A.3d at 664.

166. *Id.* at 59–67, 236 A.3d at 664–69.

167. State v. Matthews, 479 Md. 278, 284, 277 A.3d 991, 995 (2022). *Rochkind* applied to any cases pending on direct appeal when the opinion was filed if the relevant question of whether a trial court erred in admitting or excluding expert testimony was preserved. *Rochkind*, 471 Md. at 38–39, 236 A.3d at 652. *Matthews* was not the only case about the *Rochkind* standard that the Court of Appeals heard in 2021, as another case called *Ross v. Ross* would have dealt with expert testimony in the context of a child custody case. Ross v. Ross, No. 1473, 2020 Md. App. LEXIS 1200, at *12 (Md. Ct. Spec. App. Dec. 18, 2020). However, that case was dismissed as improvidently granted. Ross v. Ross, 474 Md. 124, 125, 252 A.3d 966, 967 (2021).

168. *Matthews*, 479 Md. at 286, 277 A.3d at 996.

169. *Id.* at 305, 277 A.3d at 1007 (citing *Rochkind*, 471 Md. at 10–11, 236 A.3d at 636).

170. *Id.* at 314, 277 A.3d at 1012.

171. *Id.* (citing Kumho Tire Co. v. Carmichael, 526 U.S. 137, 153 (1999)).

172. *Id.* at 314–15, 277 A.3d at 1012–13.

The court next found that Matthews's arguments focused on the effect of variables on the conclusions, rather than the methodology.[173] When an expert "applied a reliable methodology to an adequate supply of data," a trial court should not exclude the testimony because that court is concerned over the accuracy of the conclusions.[174] The court found that neither party disputed Meline's photogrammetry method.[175] Since Meline used a methodology the parties agreed was reliable, the trial court was not required to exclude that method.[176] The next step was to determine whether Meline's uncertainty in her measurement of the suspect's height was the result of an analytical gap or whether the uncertainty prevented the testimony from being helpful to the trier of fact.[177]

The court found there was no analytical gap in Meline's testimony.[178] The court defined "analytical gap" as the result of an expert witness's failure to connect their opinion to the "empirical foundation on which the opinion was derived."[179] The height estimate combined "generally accepted methodology" with "generally accepted analysis."[180] The unknown degree of uncertainty did not reflect an analytical gap without "a demonstrable flaw in Meline's logic."[181]

With no analytical gap found, the court moved to consider whether the uncertainty would prevent the jury from understanding the testimony.[182] The court concluded that Meline's expert testimony would assist the trier of fact under Maryland Rule 5-702.[183] The court found that Meline provided sufficient details in how she conducted her analysis.[184] For example, Meline adequately responded to questions at the motions hearing regarding the

173. *Id.* at 315, 277 A.3d at 1013.

174. *Id.* at 316, 277 A.3d at 1013–14 (citing Manpower, Inc. v. Ins. Co. of Pa., 732 F.3d 796, 806 (7th Cir. 2013)). The court distinguished techniques that always produce an "unacceptably high margin of error" from less problematic techniques that may not have a specific margin of error in a specific case. *Id.* at 315, 277 A.3d at 1013.

175. *Id.* at 315, 277 A.3d at 1013. The court cited cases from other jurisdictions to support photogrammetry as an accepted technique. *Id.*; *see also* notes 280–289 and accompanying text (discussing these same cases and their inapplicability to *Matthews*).

176. *Matthews*, 479 Md. at 317, 277 A.3d at 1014.

177. *Id.*

178. *Id.*

179. *Id.* (quoting Savage v. State, 455 Md. 138, 163, 166 A.3d 183, 198 (2017)).

180. *Id.* at 318, 277 A.3d at 1015 (quoting Rochkind v. Stevenson, 471 Md. 1, 17, 236 A.3d 630, 640 (2020)).

181. *Id.*

182. *Id.* at 318–19, 277 A.3d at 1015.

183. *Id.* at 319, 277 A.3d at 1015 (quoting MD. R. 5-702).

184. *Id.* The Court noted that Meline ensured that the camera was in the same position as the original video, placed a height chart at the individual's center of gravity in the image, appropriately used software to overlay the two images, and accurately calculated the known uncertainty. *Id.*

uncertainty of variables.[185] The court explained that the trial court could have reasonably concluded that, despite the uncertainty, Meline's conclusion regarding the individual's height would assist the jury in determining the identity of the individual in the video.[186] Further, cross-examination at trial would challenge the testimony's accuracy.[187] The court said that the adversarial system should test testimony resting on "good grounds."[188] Trial courts have broad discretion on whether to exclude expert testimony, and the court found the admissibility of Meline's testimony did not fall outside of that discretion.[189]

As the Court of Appeals found that there was no abuse of discretion in admitting the expert testimony, the judgment of the Court of Special Appeals was reversed, and Matthews's convictions were ordered to be reinstated.[190] In dissent, Judge Watts argued that the trial court abused its discretion because there was an analytical gap between the facts and data and the expert's conclusion.[191] The dissent first described how *Rochkind* represented a larger shift in the admissibility of expert testimony than the majority described.[192] *Rochkind* changed the standard of review to an abuse of discretion standard, meaning that a trial court's decision will now rarely be reversed.[193] Judge Watts argued that Maryland Rule 5-702 established that

185. *Id.* at 319–20, 277 A.3d at 1015–16. This included the defense's expert agreeing that the questioned image was "correctly selected." *Id.* at 320, 277 A.3d at 1016. Meline responded to questions regarding the suspect's headwear, their foot placement, and the change in terrain, leading to a finding that she sufficiently addressed these variables. *Id.*

186. *Id.*

187. *Id.* at 321, 277 A.3d at 1016. The Court compared its reasoning to the reasoning used in *Gecker v. Menard, Inc. Id.* at 321–22, 277 A.3d at 1016–17 (citing Gecker v. Menard, Inc., No. 16 CV 50153, 2019 U.S. Dist. LEXIS 135590, at *4 (N.D. Ill. Aug. 12, 2019)). In *Gecker*, photogrammetric analysis was applied to the force of motion of a shopping cart. *Gecker*, 2019 U.S. Dist. LEXIS 135590, at *7–*8. The district court in that case found that while the expert could not provide specific error rates for their testimony, that was "not fatal to [its] admissibility." *Id.* at *17–*18. The court said that went to "credibility but not threshold admissibility." *Id.* at *18.

188. *Matthews*, 479 Md. at 322–23, 277 A.3d at 1017 (quoting Ruiz-Troche v. Pepsi Cola of P.R. Bottling Co., 161 F.3d 77, 85 (1st Cir. 1998)).

189. *Id.* at 323, 277 A.3d at 1018. The court concluded its opinion by finding that Maryland Rule 5-403 was also not violated. *Id.* The court found Meline's testimony was probative to identifying the shooter and corroborated witness statements. *Id.* at 324, 277 A.3d at 1018. The court reasserted that flaws in Meline's conclusion could be properly attacked through cross-examination or contrary experts. *Id.* at 324–25, 277 A.3d at 1018. Judge Watts's dissent noted that Meline being unable to scientifically quantify the missing information meant that the evidence's probative value was substantially outweighed by its prejudicial effect, and Meline's testimony should not have been admitted. *Id.* at 338 n.1, 277 A.3d at 1027 n.1 (Watts, J., dissenting). This Note focuses on the Rule 5-702 issue and application of *Rochkind* and will not analyze the court's conclusion under the Rule 5-403 standard.

190. *Id.* at 325, 277 A.3d at 1019 (majority opinion).

191. *Id.* at 325–26, 277 A.3d at 1019 (Watts, J., dissenting).

192. *Id.* at 326, 277 A.3d at 1019–20.

193. *Id.* at 327, 277 A.3d at 1020.

analytical gaps make expert testimony inadmissible independent from *Rochkind* and the *Daubert* factors.[194] The main admissibility issue in this case was not based on the *Daubert* factors but on the presence of an analytical gap.[195] Thus, the question in this case was not whether there was a known error rate, but whether sufficient information led to a reliable opinion.[196]

Judge Watts argued there was an analytical gap because the expert testified that she did not "have a scientific way of quantifying" how missing variables would affect her measurements.[197] As a result, the margin of error could be much greater than Meline's estimation, and she could not assure her test's reliability.[198] The unknown variables, including the changing terrain, suspect's headwear, and the uncertainty of the individual's foot position, meant that it was not possible to provide a height estimate.[199] Because there was unknown information and the expert "had no way of calculating" its impact on her final measurements, Meline's testimony had an analytical gap.[200] Therefore, the trial court abused its discretion in admitting expert testimony that the expert herself recognized was missing crucial information.[201]

IV. ANALYSIS

In *State v. Matthews*, the Maryland Court of Appeals applied the *Rochkind* standard for the first time and concluded that the expert's testimony was admissible to establish the height of an individual based on security camera footage.[202] However, the court misapplied the new standard. With this ruling, Maryland courts are at risk of repeating the same analytical mistakes in applying the *Daubert* analysis as other jurisdictions that have adopted the standard.

Section IV.A examines how the Court of Appeals inadequately analyzed the expert testimony in this case.[203] Section IV.B discusses how the Court of Appeals's analysis reflects the same problems other states faced when adopting the federal *Daubert* standard, indicating that Maryland is unlikely to avoid those mistakes.[204] Lastly, Section IV.C analyzes how *Matthews*

194. *Id.* at 329, 277 A.3d at 1021.
195. *Id.*
196. *Id.* at 330, 277 A.3d at 1021–22.
197. *Id.* at 335, 277 A.3d at 1024.
198. *Id.*
199. *Id.* at 335–38, 277 A.3d at 1025–26; *see supra* notes 37–39 (discussing these variables).
200. *Matthews*, 479 Md. at 338, 277 A.3d at 1027 (Watts, J., dissenting).
201. *Id.*
202. *Id.* at 325, 277 A.3d at 1019 (majority opinion).
203. *See infra* Section IV.A.
204. *See infra* Section IV.B.

reflects tensions between the scientific community and the legal system that are likely to persist in the aftermath of this decision.[205]

A. The Court of Appeals Failed to Act as a Gatekeeper by Inadequately Analyzing Meline's Expert Testimony

In *Daubert*, the U.S. Supreme Court said that trial courts have a "gatekeeping role" to ensure that expert testimony is both relevant and reliable.[206] However, the Court of Appeals failed to properly gatekeep Meline's unreliable testimony, as the *Matthews* majority failed to identify problems with her testimony. First, the court failed to identify an analytical gap in the testimony.[207] Next, the court only analyzed one *Rochkind-Daubert* factor, despite multiple factors applying to the testimony.[208] Finally, the court relied on inapplicable precedent in concluding that the overall method is reliable.[209]

1. The Court of Appeals Did Not Properly Analyze an Analytical Gap Between the Narrow Error Range and the Numerous Unquantifiable Variables

The Court of Appeals misapplied the *Rochkind-Daubert* standard by not finding an analytical gap in Meline's testimony.[210] As Judge Watts argued in her dissent, there was an analytical gap in Meline's testimony because of the gap between the specificity of the error rate and the unknown variables that she could not quantify.[211]

An analytical gap exists when the expert witness fails to connect their opinion to its empirical foundation.[212] The *Rochkind-Daubert* standard did not alter how courts analyze analytical gaps.[213] The analysis for an analytical gap comes from Maryland Rule 5-702(3)'s requirement, derived from *Joiner*, that expert testimony must be supported by a sufficient factual basis, which requires both an adequate supply of data and reliable methodology.[214] Even under the higher abuse of discretion standard, evidence may be excluded if a

205. *See infra* Section IV.C.

206. Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 597 (1993); *see Matthews*, 479 Md. at 312, 277 A.3d at 1011 ("*Rochkind* did 'not upend [the] trial court's gatekeeping function.'" (quoting Rochkind v. Stevenson, 471 Md. 1, 38, 236 A.3d 630, 652 (2020))).

207. *See infra* Section IV.A.1.

208. *See infra* Section IV.A.2.

209. *See infra* Section IV.A.3.

210. *Matthews*, 479 Md. at 318, 277 A.3d at 1014–15.

211. *Id.* at 329, 277 A.3d at 1021 (Watts, J., dissenting).

212. *Id.* at 317, 277 A.3d at 1014 (majority opinion).

213. *Id.* at 329, 277 A.3d at 1021 (Watts, J., dissenting).

214. *Id.* at 332, 277 A.3d at 1023.

court concludes that there is "simply too great an analytical gap" between the opinion and underlying facts.[215]

The *Matthews* decision said that a court should not exclude testimony that used reliable methodology because the "particular conclusions may be inaccurate."[216] However, this framing means an expert could have a "reliable methodology" and "adequate supply of data," but if the expert then misapplies that method and creates an inaccurate conclusion, the court should not exclude the evidence.[217] The U.S. Supreme Court and Maryland Court of Appeals have noted that "conclusions and methodology are not entirely distinct," so a trial court must consider the relationship between the methodology applied and conclusion reached.[218] If the methodology is misapplied to the facts and data, then the court's focus is still on the methodology used, not the conclusions. While the majority found that there was no analytical gap without "a demonstrable flaw in Meline's logic,"[219] the proper question in determining whether an analytical gap exists is whether the expert had sufficient information to render a reliable opinion.[220]

Meline failed to show she had sufficient information to render her opinion.[221] Meline testified that there were several variables that she could not scientifically quantify, including the distance between the camera and subject, the images' resolution, the unevenness of the landscape, and the subject's body position.[222] The State argued that there was not an analytical gap because the expert disclosed her inability to reduce every variable to a number.[223] However, Meline "testif[ying] honestly" about the variables she could not calculate still shows an analytical gap.[224] Meline recognized that she had "no way of calculating" how the missing information affected the outcome.[225] The defense's expert said that the unknown information meant it was not possible to provide a height estimate.[226]

215. *Id.* at 333, 277 A.3d at 1024 (citing Gen. Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997)).

216. *Id.* at 316, 277 A.3d at 1013 (majority opinion).

217. *Id.*

218. Rochkind v. Stevenson, 471 Md. 1, 36, 236 A.3d 630, 651 (Md. 2020) (quoting Gen. Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997)); *see also* Chesson v. Montgomery Mut. Ins. Co. (*Chesson II*), 434 Md. 346, 357, 75 A.3d 932, 938 (2013) (holding that a trial judge must consider whether scientific analysis "is flawed and posits an 'analytical gap.'").

219. *Matthews*, 479 Md. at 318, 277 A.3d at 1015.

220. *Id.* at 330, 277 A.3d at 1021–22 (Watts, J., dissenting).

221. *Id.*, 277 A.3d at 1021.

222. *Id.* at 331, 277 A.3d at 1022.

223. Brief of Petitioner at 44, *Matthews*, 479 Md. 278, 277 A.3d 991 (2022) (No. 15), 2021 WL 4952114.

224. *Matthews*, 479 Md. at 335, 277 A.3d at 1024 (Watts, J., dissenting).

225. *Id.* at 339, 277 A.3d at 1027.

226. *Id.* at 337, 277 A.3d at 1026.

The uncertainty in Meline's conclusion is problematic because of its specificity: "5'8" plus or minus two-thirds of an inch."[227] But when other variables "might lead to a higher degree of uncertainty," the two-thirds of an inch error rate misleads the jury because the true uncertainty is likely greater.[228] The PCAST report specifically recommended that these suggestions of greater certainty should not be made without empirical support.[229] The error rate is important to a litigator because there is a wide difference between stating something is *a* match instead of *the* match.[230] Here, the weight of a conclusion would change based on the size of the error range, because the conclusion is only "seemingly precise."[231] This would be a "demonstrable flaw" in logic because logic cannot ignore multiple unquantifiable variables that prevent finding a specific conclusion.[232] The Court of Special Appeals concluded correctly that the missing input variables "prevented a reliably accurate height calculation."[233]

Meline did not bridge the gap between her conclusion and the underlying facts. *Matthews* had an analytical gap between the opinion's specific error rate and the unknown information that was not numerically factored into the conclusion, which should have barred its admission.[234] The lower court abused its discretion in admitting this evidence because the expert failed to adequately account for the missing information.[235]

2. The Court of Appeals Focused on a Single Rochkind-Daubert *Factor, Ignoring Other Factors that Applied to Meline's Testimony*

The next failure was the court's narrow focus on the *Rochkind-Daubert* factors, as the court limited its analysis to only the error rate factor.[236] The *Daubert* factors are only guidelines, which allows courts to heavily emphasize one criteria over others because the factors do not give a fixed order or priority.[237] This flexibility can lead to inconsistent conclusions based

227. *Id.* at 285, 277 A.3d at 995 (majority opinion).

228. *Id.*

229. PCAST Report, *supra* note 103, at 19.

230. Michael J. Saks, *Merlin and Solomon: Lessons from the Law's Formative Encounters with Forensic Identification Science*, 49 HASTINGS L.J. 1069, 1092 (1998).

231. Matthews v. State, 249 Md. App. 509, 544, 246 A.3d 644, 664 (2021), *rev'd* State v. Matthews, 479 Md. 278, 277 A.3d 991 (2022).

232. *Matthews*, 479 Md. at 318, 277 A.3d at 1015.

233. *Matthews*, 249 Md. App. at 544, 246 A.3d at 664.

234. *Matthews*, 479 Md. at 339, 277 A.3d at 1027 (Watts, J., dissenting).

235. *Id.*

236. *Id.* at 314, 277 A.3d at 1012 (majority opinion).

237. BRUCE D. SALES & DANIEL W. SHUMAN, EXPERTS IN COURT: RECONCILING LAW, SCIENCE, AND PROFESSIONAL KNOWLEDGE 60 (2005).

on which factors a court weighs most heavily.[238] The overall purpose of these factors was for courts to determine that a conclusion is reliable, or scientifically valid.[239] However, courts instead treat these factors like a superficial checklist rather than engaging in a thoughtful inquiry.[240] The *Matthews* court did the same by only analyzing the error rate, rather than examining the factors in totality.[241] The court thus used error rate as a proxy for scientific validity, rather than looking to the method in its totality under the *Rochkind-Daubert* factors.[242]

While the Court of Appeals is limited to answering the questions before it, the question on appeal was whether the lower court erred by holding that the expert had an analytical gap by acknowledging the limitations of the methodology.[243] Part of analyzing a potential analytical gap analysis involves determining whether there was a reliable methodology, and one way to show that the methodology was reliable is through a thorough application of the *Rochkind-Daubert* factors.[244]

One of the *Rochkind-Daubert* factors assesses whether experts are testifying on matters developed expressly for the purposes of testifying.[245] The court should consider whether the method originated out of the expert's research in the field, or for the purpose of use in litigation.[246] Many types of forensic evidence "are but handmaidens of the legal system," and are only useful when related to law enforcement.[247] No other scientific field has as close an affiliation with litigators as forensic scientists have with criminal prosecutors.[248]

238. *Id.*

239. Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 592–93 (1993).

240. David H. Kaye, *How* Daubert *and its Progeny Have Failed Criminalistics Evidence and a Few Things the Judiciary Could Do About It*, 86 FORDHAM L. REV. 1639, 1643 (2018).

241. *Matthews*, 479 Md. at 314, 277 A.3d at 1012. The court said it did this because it was the only factor that Matthews relied on. *Id.*

242. *See id.* at 321, 277 A.3d at 1016 (finding that the validity would be attacked related to uncertainty, but never discussing validity related to, as an example, the maintenance of standards or peer review of the method).

243. *Id.* at 305, 277 A.3d at 1005.

244. *Id.* at 309, 277 A.3d at 1009.

245. *Id.* at 310, 277 A.3d at 1010 (quoting Rochkind v. Stevenson, 471 Md. 1, 35, 236 A.3d 630, 650 (2020)).

246. *Id.* (quoting *Rochkind*, 471 Md. at 35, 236 A.3d at 650).

247. NAS Report, *supra* note 98, at 52 (giving firearms analysis and latent fingerprint identification as examples); *see also* Maneka Sinha, *Radically Reimagining Forensic Evidence*, 73 ALA. L. REV. 879, 892 (2022) ("Forensic methods enable surveillance, prosecution, conviction, and punishment—the core inputs and outputs of the criminal legal system.").

248. Saks, *supra* note 230, at 1092; *see also* Jim Hilbert, *The Disappointing History of Science in the Courtroom:* Frye, Daubert, *and the Ongoing Crisis of "Junk Science" in Criminal Trials*, 71 OKLA. L. REV. 759, 805–07 (2019) (defining how a major problem for forensic testimony is the connection between law enforcement and crime labs and discussing two major crime lab scandals that undermined the validity of those labs); M. CHRIS FABRICANT, JUNK SCIENCE AND THE

The origin of the method is relevant here because of Meline's employment with the FBI's Digital Evidence Laboratory.[249] Forensic scientists at the FBI have continued to use certain techniques despite knowing that they are scientifically problematic.[250] Meline's job was to work with law enforcement to conduct photogrammetric analysis.[251] The law enforcement origins of Meline's testimony thus make it more suspect than a method originating from a scientist's research.[252] Specifically, Meline's employment with the FBI should make the court more wary of forensic methods used by the laboratories without independent verification.[253] However, the court did not analyze whether photogrammetry was used for purposes other than testifying.[254] While this factor would not have been dispositive, the court should have weighed the factor against admissibility given the lack of evidence that photogrammetry was used for anything other than its use in criminal investigations and subsequent testimony.[255]

A second applicable *Rochkind-Daubert* factor is whether the expert unjustifiably extrapolated from an accepted premise to an unfounded

AMERICAN CRIMINAL JUSTICE SYSTEM 20 (2022) (describing how dental experts changed their conclusions after meeting with detectives to fit the prosecution's suspect).

249. *Matthews*, 479 Md. at 288, 277 A.3d at 997.

250. *See* FABRICANT, *supra* note 248, at 215 (describing how one FBI agent wrote an internal memo documenting the problems that led to the abandonment of comparative bullet lead analysis, yet that same agent used the same technique in a trial years later, resulting in a wrongful conviction); *see also* Hilbert, *supra* note 248, at 808–09 (describing how, in 2015, the FBI announced that 90% of trials involving hair analysis contained errors, despite internal FBI papers from 2002 finding that the analysis was unreliable).

251. *Matthews*, 479 Md. at 288, 277 A.3d at 997.

252. *See* Sinha, *supra* note 247, at 897 (describing how law enforcement-based forensic practitioners are distinct from scientists because they focus on applying forensic methods, rather than conducting research or theorizing about the method).

253. *See* Paul C. Giannelli, *Wrongful Convictions and Forensic Science: The Need to Regulate Crime Labs*, 86 N.C. L. REV. 163, 195–208 (2007) (detailing failures by the FBI laboratory in the areas of explosives, DNA, bullet analysis, and fingerprints to conduct proper testing or perform sufficient research to give methods their needed scientific foundation); *see also* PCAST Report, *supra* note 103, at 134–35 (recommending to the FBI laboratory the creation of objective scientific methods, adoption of proficiency testing, and disclosure of quality control issues).

254. *See Matthews*, 479 Md. at 315, 277 A.3d at 1013 (discussing the method, but not connecting it back to Meline's FBI employment).

255. *Id.* at 311–12, 277 A.3d at 1011. Additionally, Meline's employment at the FBI implicates the final *Rochkind-Daubert* factor of whether the expert's field "is known to reach reliable results." *Matthews*, 479 Md. at 311, 277 A.3d at 1010 (quoting Rochkind v. Stevenson, 471 Md. 1, 35–36, 236 A.3d 630, 650 (2020)). As discussed above, the FBI and forensic science in general has major issues with reaching reliable results. *See supra* notes 248, 250, 253. While likely not determinative, this factor should be weighed when determining reliability that the testimony is from law enforcement organizations that created their own science. *See* Sinha, *supra* note 247, at 927–37 (explaining how law enforcement and forensic disciplines can manipulate the *Daubert* standards to create a false perception of reliability).

conclusion.[256] This factor would implicate the extrapolation of the error rate to a conclusion not including the multiple incalculable variables.[257] An error rate for a particular method is the proportion of cases where the method will lead to a false conclusion.[258] The confidence interval represents a range that the scientist can say, with a specific percentage of certainty, contains the true value.[259] Therefore, the final error rate should reflect this uncertainty so that someone interpreting the data can determine the reliability of the method.[260] Error rates of a technique are based on experimental conditions in which analysts' judgments are compared to a true state of affairs.[261]

However, the Court of Appeals never mentioned a confidence interval while discussing the error rate, nor the origins of Meline's methods for calculating the error.[262] Meline's report included the qualification that the incalculable variables meant that the uncertainty "could be significantly greater."[263] The unjustifiable extrapolation comes from the absence of information regarding the magnitude of the change in error rate, as the certainty of a conclusion changes if it moves from two-thirds of an inch of error to hypothetically two or three inches.[264] Without empirical measurements of a method's accuracy, similarities between features have no

256. *Matthews*, 479 Md. at 310, 277 A.3d at 1010 (quoting *Rochkind*, 471 Md. at 35, 236 A.3d at 650).

257. *Id.*

258. NAS Report, *supra* note 98, at 120. This includes false negatives, where a sample was from a particular class, but the analysis determined it was not in the class, and false positives, where a sample was not from a particular class, but the analysis determined it was within the class. *Id.*; *see also* PCAST Report, *supra* note 103, at 151–52 (defining these same terms).

259. Mark G. Haug, *Minimizing Uncertainty in Scientific Evidence*, *in* SCIENTIFIC EVIDENCE REVIEW: CURRENT ISSUES AT THE CROSSROADS OF SCIENCE, TECHNOLOGY AND THE LAW, MONOGRAPH NO. 7, at 96–97 (Cynthia H. Cwik & Helen E. Witt eds., 2006); *see also* NAS Report, *supra* note 98, at 116–17 (discussing measurement error and how a confidence interval is intended to have a "high probability" of containing the true value). As an example, say a method produces a result with a 95% confidence interval of 5 ± 2. This means the method can say with 95% certainty that the true value of what is being measured is between 3 and 7, and there is a 5% chance that the true value is outside of that range. *See* PCAST Report, *supra* note 103, at 151–53 (defining statistical terms including confidence intervals, sensitivity, and false positives).

260. NAS Report, *supra* note 98, at 186.

261. Kaye, *supra* note 240, at 1647.

262. *See Matthews*, 479 Md. at 321–22, 277 A.3d at 1016–17 (nowhere in the opinion are the concepts of a confidence interval or related ideas mentioned in relation to an error rate); *see also supra* notes 28–29 (discussing Meline's description of uncertainty based on resolution and positional accuracy).

263. *Id.* at 289, 277 A.3d at 997.

264. The true value would likely not be included in the original error rate if the error is actually significantly greater, and measurement techniques are inherently limited in accuracy based on their error. *See* NAS Report, *supra* note 98, at 116–17 (discussing measurement error and error rates). For example, Meline's conclusion presents a height range of 5'6.33" to 5'8.67". *Matthews*, 479 Md. at 324, 277 A.3d at 1018. But if the true error rate were to be, say, three inches, the height range is now 5'5" to 5'11", a range that now includes more potential individuals as a match.

probative value.[265] Applied here, without knowledge of the magnitude of the error in Meline's conclusion, the probative value of the comparison between the subject's height and Matthew's height is diminished.[266] However, since the Court of Appeals did not analyze this *Rochkind-Daubert* factor, it is unclear how heavily it weighs against Meline's testimony.

These were two factors that the court did not examine despite their applicability to the testimony. This may have resulted from the narrow scope of the parties' arguments on appeal, which focused only on the analytical gap and error rate.[267] However, the court's job as gatekeeper is to uphold its own standards regarding the analysis of expert testimony.[268] The dissent argued that the ten adopted factors are ones that, at a minimum, must be considered to admit expert testimony.[269] The Court of Appeals did not consider all of the *Rochkind-Daubert* factors that were relevant in this case and weighed against the admission of Meline's testimony.[270] Instead, the Court of Appeals minimized the importance of the error rate, a factor that could have been sufficient on its own to establish an analytical gap,[271] and instead found that this lone factor was insufficient to require exclusion under the *Rochkind-Daubert* standard.[272] By ignoring and minimizing these relevant factors, the Court of Appeals incorrectly found that Meline's testimony was admissible.

3. The Court of Appeals Relied on Inapplicable Precedent and Overgeneralized Photogrammetry as a Method

The third major problem in the court's analysis of Meline's testimony is the court's general acceptance of photogrammetry as a method.[273]

265. PCAST Report, *supra* note 103, at 53.

266. *See Matthews*, 479 Md. at 324, 277 A.3d at 1018 (quoting Matthews's argument that the calculable error rate has no practical significance in this case based on the unknown true margin of error).

267. *See* Brief of Petitioner, *supra* note 223, at 34–37 (discussing the history of *Daubert* but only listing the factors, not conducting any analysis or discussion of the factors as they relate to Meline's testimony); Respondent's Brief at 9, *Matthews*, 479 Md. 278, 277 A.3d 991 (No. 15), 2021 WL 4952133 (discussing *Rochkind* and stating the error rate and unjustifiable extrapolation factors). As the question on appeal was related to the issue of the analytical gap, both briefs focused their analysis on that issue, rather than the broader factors. *See* Brief of Petitioner, *supra* note 223, at 40–46 (arguing why the analytical gap did not apply); Respondent's Brief, *supra*, at 15–19 (arguing that the Court of Special Appeals was correct in its analysis of the analytical gap).

268. *Matthews*, 479 Md. at 312, 277 A.3d at 1011.

269. *Id.* at 327, 277 A.3d at 1020 (Watts, J., dissenting).

270. *See supra* notes 245–264 and accompanying text (discussing the applicability of the method's origins and unjustifiable extrapolations factors).

271. *See supra* Section IV.A (discussing how the error rate relates to the analytical gap).

272. *Matthews*, 479 Md. at 314–15, 277 A.3d at 1013 (majority opinion).

273. *See id.* at 315–17, 277 A.3d at 1013–14 (discussing the general acceptance of photogrammetry and rejecting Matthews's argument related to the reliability of the conclusions derived from that reliable method).

Matthews did not specifically contend that photogrammetry was an unreliable technique.[274] The Court of Appeals supported its reliance on the technique by stating that photogrammetry had been an accepted technique "for many years" and was "deemed reliable by many courts."[275]

Photogrammetry, which broadly means measuring using photographs, is a large field with a variety of applications, and these different applications have different reliabilities.[276] Other forensic fields, even including DNA analysis, may vary in reliability based on the particular method used.[277] Even Meline distinguished her own method of reverse projection photogrammetry from analytical photogrammetry, referring to the latter as less accurate.[278]

The *Matthews* court cited three cases to support its proposition that photogrammetry is reliable.[279] However, the precedent utilized methods distinct from reverse projection photogrammetry and did not adequately analyze the reliability of the methods Meline used in this case.[280] The first case, *Chapman v. Bernard's, Inc.*,[281] concerned deriving measurements from multiple photographs of a product, which is distinct from the lone image utilized in this case.[282] The court accepted the photogrammetric method because the experts testified that the methods were used or accepted in the field.[283] While this analysis would likely satisfy *Frye v. United States*, it is insufficient for a complete *Daubert* analysis, as it only addresses the single

274. *Id.* at 315, 277 A.3d at 1013.

275. *Id.*

276. *See* THOMAS LUHMANN ET AL., CLOSE-RANGE PHOTOGRAMMETRY AND 3D IMAGING 6–7 (3d ed. 2020) (categorizing types of photogrammetry based on camera position, number of images, availability or results, or by application area); *see also* Eugene Liscio et al., *A Comparison of Reverse Projection and PhotoModeler for Suspect Height Analysis*, 320 FORENSIC SCI. INT'L, Mar. 2021, at 1, 11 (comparing reverse projection photogrammetry to another method and finding reverse projection had a greater range of error).

277. *See* PCAST Report, *supra* note 103, at 69, 82 (finding that single-source DNA analyses are scientifically valid, while complex DNA mixtures with multiple sources are not similarly valid). Scientific methods may vary in reliability, and disciplines can be misapplied through scientific error, misleading testimony, or misconduct. Vanessa Meterko, *Strengths and Limitations of Forensic Science: What DNA Exonerations Have Taught Us and Where to Go from Here*, 119 W. VA. L. REV. 639, 641 (2016) (describing how serology may be misapplied due to masking even as a scientifically valid and reliable way to narrow down the source of blood, and other methods are even more prone to misapplication).

278. *Matthews*, 479 Md. at 290, 277 A.3d at 998; *see supra* note 23 (discussing this distinction between the methods).

279. *Matthews*, 479 Md. at 315, 277 A.3d at 1013.

280. *Id.*

281. 167 F. Supp. 2d 406 (D. Mass. 2001).

282. *Id.* at 421.

283. *See id.* (finding that applying math to photographs for measurements appeared reasonable based on the expert witness's own affidavit of general acceptance). The court permitted the expert witness to testify despite finding that the report was "conclusory at best," as that could be challenged on cross-examination. *Id.*

Daubert factor of general acceptance.[284] Next, the court in *Commonwealth v. Caruso*[285] did not conduct an admissibility analysis, as the issue only concerned whether the photogrammetric evidence was newly discovered for an appeal.[286] Finally, the court in *Gecker v. Menard, Inc*.[287] admitted photogrammetry evidence used to estimate the force of a moving cart and admitted it based on the "long, recognized history" of photogrammetry's reliability.[288] These three cases do not support the conclusion that photogrammetry is reliable under the *Rochkind-Daubert* standard for the specific application of measuring the height of an individual from security camera footage.[289]

Relying on precedent, rather than conducting independent analyses, allows courts to launder flawed evidence into future cases.[290] However, courts frequently rely on precedent to admit unreliable techniques solely because those techniques have been admitted previously.[291] Courts cannot prevent junk science from being admitted if they continue to "rely[] on past cases without questioning even the most archaic justifications."[292]

The court did not analyze whether photogrammetry was foundationally valid or valid as applied.[293] Instead, the court said that there was "no dispute that Meline's methodology was reliable."[294] Studies have analyzed the reliability of reverse projection photogrammetry, but the court did not factor these into its analysis.[295] Additionally, the Court of Appeals dismissed Matthews's challenge of the error rate as attacking the application of a

284. *See* text accompanying notes 84, 148 (listing all ten *Rochkind-Daubert* factors).

285. 4 N.E.3d 1283 (Mass. App. Ct. 2014).

286. *Id.* at 1288–89 (relying on an FBI affidavit stating that the method had been used for over a century).

287. No. 16 CV 50153, 2019 U.S. Dist. LEXIS 135590 (N.D. Ill. Aug. 12, 2019).

288. *Id.* at *12.

289. State v. Matthews, 479 Md. 278, 285, 277 A.3d 991, 995 (2022).

290. Sinha, *supra* note 247, at 913; *see also* United States v. Tibbs, No. 2016-CF1-19431, 2019 D.C. Super. LEXIS 9, at *18 (D.C. Super. Sept. 5, 2019) (finding a pattern of case law in which prior precedent was used with "limited analysis" that while creating the appearance of authority, ultimately stood "on a fairly flimsy foundation").

291. Sinha, *supra* note 247, at 913; *see also* Brandon L. Garrett & M. Chris Fabricant, *The Myth of the Reliability Test*, 86 FORDHAM L. REV. 1559, 1573 (2018) (locating forty state court decisions where expert evidence was ruled admissible because prior rulings approved of that evidence).

292. Hilbert, *supra* note 248, at 804; *see also* Katie Kronick, *Forensic Science and the Judicial Conformity Problem*, 51 SETON HALL L. REV. 589, 615 (2021) (analyzing the conformity problem that makes a judge more likely to conform to past decisions and rely on prior admissibility rulings).

293. *See Matthews*, 479 Md. at 315–16, 277 A.3d at 1013–14 (discussing how Meline's methodology was reliable without referencing the underlying validity requirement).

294. *Id.* at 313, 277 A.3d at 1012.

295. See Liscio et al., *supra* note 276, at 1 for an example of such a study.

method, rather than the method itself.[296] However, a trial court applying the *Rochkind-Daubert* standard "must consider the relationship between the methodology applied and conclusion reached."[297] Instead of considering that relationship, the court relied on inapplicable precedent to support the method generally rather than conducting its own independent analysis.[298]

By failing to identify a clear analytical gap, omitting analysis of *Daubert* factors that applied to the expert's testimony, and using precedent to avoid a general assessment of the method's reliability, the court did not properly perform the gatekeeping function towards expert testimony required by *Rochkind*.

B. Matthews *Represents the Court of Appeals Falling into the Same Traps as Other States That Adopted the* Daubert *Standard*

The *Matthews* court overemphasized the utility of the adversarial system and underemphasized its job as gatekeeper.[299] Maryland courts interpreting the *Rochkind-Daubert* standard will fall into the same traps that other jurisdictions have when adopting the federal *Daubert* standard, resulting in an overdependence on the adversarial process and a criminal legal system more tilted towards the prosecution.

The majority's opinion reasserted the idea from *Daubert* that admissible evidence should be attacked though "vigorous cross-examination," contrary evidence, and careful jury instructions.[300] The court said that Meline's testimony should be tested by the adversary process through "competing expert testimony and active cross-examination."[301] However, relying on the adversarial process rather than sufficient judicial scrutiny has led to multiple issues with expert testimony.

The adversarial process is not an adequate avenue to protect defendants from the harm of improper expert testimony.[302] One main issue is that jurors are often not sensitive to the quality of underlying science in expert

296. *Matthews*, 479 Md. at 316–17, 277 A.3d at 1014; *see also* Gecker *ex rel.* Collins v. Menard, Inc., No. 16 CV 50153, 2019 U.S. Dist. LEXIS 135590, at *17–*18 (N.D. Ill. Aug. 12, 2019) (describing how error rate in photogrammetry is fact-specific, and therefore this went to the testimony's credibility but not its admissibility).

297. *Matthews*, 479 Md. at 311, 277 A.3d at 1011 (quoting Rochkind v. Stevenson, 471 Md. 1, 36, 236 A.3d 630, 650 (2020)).

298. *Id.* at 314, 236 A.3d at 1012.

299. *Id.* at 322–23, 277 A.3d at 1017.

300. *Id.* at 312, 277 A.3d at 1011 (quoting Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 596 (1993)).

301. *Id.* at 323, 277 A.3d at 1017.

302. BRIAN H. BORNSTEIN & EDIE GREENE, THE JURY UNDER FIRE: MYTH, CONTROVERSY, AND REFORM 134 (2017) (citing studies that would vary characteristics of the expert's methodology only to find no effect on the jury's verdicts).

testimony.[303] A jury's verdict is affected more by opposing experts or the expert admitting they were wrong than by judicial instructions and cross-examination alone.[304] Additionally, jurors' perceptions of the credibility of evidence greatly influence their perceptions of the evidence's strength.[305] Existing studies on jurors' understanding of forensic evidence suggest that error in interpretation comes from misleading testimony or instructions.[306] By valuing credentials over the methodology, the jury may accept unreliable methods because they are conveyed by a credible authority.

Another issue with the court's dependence on the adversarial system is that attorneys must challenge expert testimony.[307] As a result, trials involving similar forensic methods may have different evidentiary rulings based on the arguments made and information presented to the court.[308] These different rulings may be exacerbated by wealth, as indigent defendants may lack the funds to mount a successful *Daubert* challenge.[309] Indigent defendants may be unable to acquire expert witnesses to challenge the prosecution.[310] Even when a defendant can acquire expert witnesses and challenge the prosecution, courts will rely on prior cases in favor of the method or the forensic testimony.[311] Even in *Matthews*, where Matthews had hired experts and challenged the expert's testimony, Matthews still lost his challenge to the

303. *Id.*; *see also* Mark A. Godsey & Marie Alou, *She Blinded Me with Science: Wrongful Convictions and the "Reverse CSI-Effect"*, 17 TEX. WESLEYAN L. REV. 481, 483–84 (2011) (describing a "Reverse CSI Effect" where jurors "give too much weight" to evidence produced by the prosecution, which can result in wrongful convictions).

304. Heidi Eldridge, *Juror Comprehension of Forensic Expert Testimony: A Literature Review and Gap Analysis*, 1 FSI SYNERGY 24, 31 (2019) (collecting studies on mitigating factors for juries receiving expert testimony).

305. *Id.* Jurors give considerable weight to scientific evidence when presented by experts with impressive credentials. Reed v. State, 283 Md. 374, 386, 391 A.2d 364, 370 (1978) (citing People v. Kelly, 549 P.2d 1240, 1245 (Cal. 1976)); *see also* United States v. Addison, 498 F.2d 741, 744 (D.C. Cir. 1974) (scientific evidence tends to sway jurors because this evidence has "mystic infallibility" for jurors).

306. NAS Report, *supra* note 98, at 236 (citing Valerie P. Hans et al., *Science in the Jury Box: Jurors' Comprehension of Mitochondrial DNA Evidence*, 35 L. & HUM. BEHAV. 60 (2011)).

307. SALES & SHUMAN, *supra* note 237, at 46.

308. *See id.* at 45 (describing the difference between primary, secondary, and tertiary authorities of sources, where reliance on different levels of authority can lead to inconsistent outcomes).

309. Peter J. Neufeld, *The (Near) Irrelevance of* Daubert *to Criminal Justice and Some Suggestions for Reform*, 95 AM. J. PUB. HEALTH S107, S110 (2005). Junk science "is subjective speculation masquerading as science, typically tilted in the government's favor against an indigent person of color." FABRICANT, *supra* note 248, at 26.

310. Brandon L. Garrett & Peter J. Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions*, 95 VA. L. REV. 1, 89–90 (2009). In an analysis of 137 trial transcripts of people wrongfully convicted, only 19 trials had defense experts testify. *Id.* at 89.

311. Neufeld, *supra* note 309, at S110; *see also infra* notes 321–333 and accompanying text (discussing the pro-prosecution bias in analyzing expert testimony).

prosecution's expert.[312] If a defense attorney does not have the requisite knowledge and funds, *Matthews* and its abuse of discretion standard will make it harder for a defendant to succeed in challenging improper expert testimony.[313] The abuse of discretion standard places a higher burden on parties to challenge improper expert testimony, compared to an appellate court reviewing the trial court's analysis de novo.[314] This higher standard will just make it more challenging to exclude improper forensic testimony for indigent defendants lacking the resources needed to bring a successful claim.[315]

Furthermore, *Daubert*'s shift in scientific evidence standards had disparate impacts on civil and criminal cases.[316] *Daubert* shifted how judges and lawyers approach scientific evidence.[317] However, *Daubert* may not have resulted in higher overall exclusion rates of expert testimony.[318] Following *Daubert*, in the criminal context, judges may be more influenced by the credentials of an expert witness than the reliability of the methodology used.[319] In fact, studies have shown that *Daubert* has had little to no influence on the admissibility of science in criminal cases.[320]

Despite the unclear overall shift, *Matthews* continues the general post-*Daubert* trend towards admitting prosecution expert witnesses.[321] In civil cases, expert testimony faces routine and extensive challenges, while expert

312. State v. Matthews, 479 Md. 278, 323, 277 A.3d 991, 1017 (2022) (describing how Matthews's counsel "ably cross-examined Meline" and "highlighted the uncertainty in Meline's opinion").

313. Neufeld, *supra* note 309, at S110.

314. *See* Garrett & Fabricant, *supra* note 291, at 1579 (describing deference to trial court rulings as a "contributing factor" to appeals courts not engaging with reliability rules).

315. Neufeld, *supra* note 309, at S110.

316. Julie A. Seaman, *A Tale Of Two* Dauberts, 47 GA. L. REV. 889, 890–91 (2013); Déirdre Dwyer, *(Why) Are Civil and Criminal Expert Evidence Different?*, 43 TULSA L. REV. 381, 383 (2007) (finding that experts for civil plaintiffs are subject to greater scrutiny than civil defendants, while experts for criminal prosecutors are subject to the least scrutiny).

317. Hilbert, *supra* note 248, at 793 n.192.

318. *See id.* at 790–92 nn.182–86 (citing numerous studies examining the aftermath of *Daubert* that differ on the decision's impact on expert testimony).

319. Jennifer L. Groscup et al., *The Effects of* Daubert *on The Admissibility of Expert Testimony in State and Federal Criminal Cases*, 8 PSYCH., PUB. POL'Y, & L. 339, 357 (2002). The study found that the importance of research as a source of expertise disproportionately decreased after *Daubert*. *Id.*

320. Hilbert, *supra* note 248, at 796; *see* also Erin Murphy, *Neuroscience and the Civil/Criminal* Daubert *Divide*, 85 FORDHAM L. REV. 619, 621 (2016) (finding that the *Daubert* decision "conspicuously omitted" referencing forensic science).

321. *See* D. Michael Risinger, *Navigating Expert Reliability: Are Criminal Standards of Certainty Being Left on The Dock?*, 64 ALB. L. REV. 99, 108 (2000) (finding that in federal Court of Appeals cases that "government proffered expertise" was only excluded once, while "defense-proffered expertise" was excluded in 83% of cases).

testimony is rarely challenged in criminal cases.[322] Even when criminal defendants challenge expert testimony, they are unlikely to succeed.[323] Courts have been shown to conduct more in-depth analysis in the context of excluding criminal defense experts.[324] However, these differences may not have resulted from *Daubert* alone.[325] Regardless, criminal defendants prevail much less often in excluding expert testimony than any other group.[326] Based on data from other jurisdictions, the adoption of *Daubert* was more favorable to some groups, like prosecutors, than others.[327]

Additionally, the *Daubert* standard has been shown to have disparate impacts on communities of color, limiting their access to the court system when adopted across the country.[328] Examining this issue in the civil context, a study found that the adoption of *Daubert* decreased Black litigants' access to federal court while increasing access for white litigants.[329] *Daubert*'s impact may contribute to the racial divide in criminal convictions. Black defendants are already incarcerated at nearly five times the rate of white defendants in America.[330] The criminal legal system is pro-prosecution in analyzing expert evidence, so prosecutors may more easily provide faulty scientific evidence.[331] In nearly half of the Innocence Project's wrongful

322. Erica Beecher-Monas, *Reality Bites: The Illusion of Science in Bite-Mark Evidence*, 30 CARDOZO L. REV. 1369, 1371 (2009); *see also* Risinger, *supra* note 321, at 109 (finding that only approximately 10% of district court opinions citing *Daubert* arose in the criminal context, and about three-fourths of those cases were government challenges to defense experts).

323. *See* Risinger, *supra* note 321, at 111 (finding that in state criminal cases defendants succeeded in a quarter of cases and in federal criminal cases defendants succeeded in only ten percent of cases); Dwyer, *supra* note 316, at 392 (arguing that courts do not overrule forms of expert evidence that have been adopted for many years because it may "adversely affect" other prosecutions and open up the floodgates for appeals); Margaret A. Berger, *What Has a Decade of* Daubert *Wrought?*, 95 AM. J. PUB. HEALTH S59, S63–64 (2005) (finding that while federal courts are strict against plaintiffs' experts, those courts "are not applying *Daubert* stringently in the criminal context").

324. *See* Garrett & Fabricant, *supra* note 291, at 1581 (concluding that courts avoid reliability analysis in criminal cases and when it is used "it tends to exclude defense witnesses").

325. *See* Groscup et al., *supra* note 319, at 345 (summarizing trends before and after *Daubert* and finding the decision did not impact the admission rates of expert testimony).

326. Risinger, *supra* note 321, at 112.

327. *See supra* notes 321–326 and accompanying text (describing how *Daubert* excludes witnesses more often when they come from criminal defendants).

328. Jurs & Devito, *supra* note 162, at 1109.

329. *Id.* at 1128.

330. ASHLEY NELLIS, SENT'G PROJECT, THE COLOR OF JUSTICE: RACIAL AND ETHNIC DISPARITY IN STATE PRISONS 6 (2021), https://www.sentencingproject.org/app/uploads/2022/08/The-Color-of-Justice-Racial-and-Ethnic-Disparity-in-State-Prisons.pdf.

331. *See* Susan D. Rozelle, Daubert, *Schmaubert: Criminal Defendants and the Short End of the Science Stick*, 43 TULSA L. REV. 597, 606 (2007) (comparing typically pro-prosecution scientific evidence, like fingerprint and tool mark evidence that are not scientifically supported, that judges routinely admit to typically pro-defense scientific evidence, like eyewitness identification

conviction cases, improper forensic evidence contributed to the incorrect verdict.[332] Without rigorous analysis of prosecution experts by the courts, defendants effectively have the burden to both defeat improper prosecution expert testimony and to simultaneously present their own experts to defend their freedom.[333]

Until there is some program regulating forensic evidence and expert testimony, like a scientific body examining methodology nationwide, individual judges have the burden to follow the reliability standards set out in the federal and state rules of evidence.[334] Relying on the adversarial system is not enough to overcome the problem of improper expert testimony.[335] It will take active effort from the judiciary to show that expert testimony is proper, and *Matthews* shows that Maryland is unlikely to make that effort.

C. Matthews *Reflects Longstanding Tensions Between the Scientific Community and Legal Processes*

State v. Matthews reflects the challenge of interpreting scientific evidence in a legal context and shows the long-recognized issues in interpreting scientific evidence. Meline's testimony is far from the least scientifically rigorous that the court could have analyzed,[336] yet the court still failed to sufficiently challenge the method to ensure that it complied with the *Rochkind-Daubert* standard.[337]

The scientific and legal communities have generally different goals. While scientists focus on "the validity of research," courts and judges must focus on the "perceived legitimacy of the [judicial] process."[338] Additionally,

limitations, that judges routinely deny); *see also supra* note 323 (describing how *Daubert* is more advantageous to prosecution witnesses).

332. *See Forensic Science: Problems and Solutions*, INNOCENCE PROJECT, https://innocenceproject.org/forensic-science-problems-and-solutions/ (last visited Apr. 13, 2023) (finding that forensic science contributed to 45% of their 360 DNA exonerations); *see also* Garrett & Neufeld, *supra* note 310, at 9 (examining trial transcripts in 137 cases where the defendant was exonerated, finding invalid forensic science was used in 60% of those cases).

333. Garrett & Neufeld, *supra* note 310, at 10–11 ("[T]he legal system is ill-equipped to correct the problems of the forensic science community." (quoting NAS Report, *supra* note 98, at 53)).

334. Garrett & Fabricant, *supra* note 291, at 1580–81; *see also* NAS Report, *supra* note 98, at 77–81 (describing how the forensic science community is fragmented and lacks a centralized body that could lead research and training efforts).

335. *See supra* notes 302–313 and accompanying text (describing insufficiencies in the adversarial process).

336. *See* NAS Report, *supra* note 98, at 149, 154, 160, 176 (describing impression evidence, toolmark and firearms identification, hair analysis, and bite mark evidence as limited in drawing conclusive analyses); PCAST Report, *supra* note 103, at 7–14 (describing issues with foundational validity of multiple feature-comparison methods).

337. *See* State v. Matthews, 479 Md. 278, 290–97, 277 A.3d 991, 998–1003 (2022) (describing Meline's testimony).

338. SALES & SHUMAN, *supra* note 237, at 7.

courts must reach definitive conclusions to resolve each case, while the scientific community does not need to reach a definitive conclusion on scientific issues.[339] While science is an iterative process that reexamines underlying evidence, the court system is interested in finality, rather than correcting mistakes or addressing injustice by reexamining evidence.[340] These divergent goals reflect the previously discussed problems in relying on legal precedent instead of current scientific trends.[341]

Judges are not required to rely on specific types of information when looking at the admissibility of expert testimony.[342] Judges' lack of scientific expertise can lead to inconsistent admissibility decisions, shown by studies reflecting judges' poor understanding of scientific terms.[343] Some judges defer to the government's theory of validity; for these judges, the *Daubert* criteria simply "become a mantra [for the judge] to recite, but without any seeming conscious understanding."[344] *Matthews* follows this path, as the majority opinion defers to the accepted validity of reverse image photogrammetry.[345] The court is deferring to the expert's statements without the sufficient, required analysis.[346]

339. *Id.* (quoting United States v. Hines, 55 F. Supp. 2d 62, 65 (D. Mass. 1999)).

340. FABRICANT, *supra* note 248, at 153.

341. *See supra* notes 290–292 and accompanying text (discussing issues with relying on precedent to admit scientific techniques).

342. SALES & SHUMAN, *supra* note 237, at 45 ("[U]nfortunately, it is the sources that are less reliable that are typically easiest for judges to understand and apply.").

343. *Id.* at 61 (citing Shirley A. Dobbin et al., *Applying* Daubert*: How Well Do Judges Understand Science and Scientific Method?*, 85 JUDICATURE 244, 246–47 (2002)) (citing a study that found that only six percent of a judge's responses to questions on falsifiability as an admissibility guideline demonstrated clear understanding of falsifiability as a scientific term); *see also* Sophia I. Gatowski et al., *Asking the Gatekeepers: A National Survey of Judges on Judging Scientific Evidence in a Post-*Daubert *World*, 25 L. & HUM. BEHAV. 433, 442 (2001) (surveying four hundred state court judges and finding that 96% "reported that they had *not* received instruction about general scientific methods and principles").

344. David L. Faigman, *Admissibility Regimes: The "Opinion Rule" and Other Oddities and Exceptions to Scientific Evidence, the Scientific Revolution, and Common Sense*, 36 SW. U. L. REV. 699, 718 (2008). Faigman discusses two cases in which the court "simply recited" the testimony of the government experts without critically examining the underlying theory. *Id.* at 719; *see also* David E. Bernstein & Eric G. Lasker, *Defending* Daubert*: It's Time to Amend Federal Rule of Evidence 702*, 57 WM. & MARY L. REV. 1, 19 (2015) (finding that federal courts often ignored Rule 702, or cited it and then ignored it in the rest of the opinion); Groscup et al., *supra* note 319, at 367 (finding in criminal appellate opinions that the *Daubert* criteria of falsifiability, peer review, and error rate were "rarely given more than a cursory mention").

345. State v. Matthews, 479 Md. 278, 315, 277 A.3d 991, 1013 (2022).

346. *See* Faigman, *supra* note 344, at 719 (detailing a case where the court deferred, without independent analysis, to an expert's assertion that a method was accepted and peer reviewed and another case where the court accepted an expert's assertion that their technique had a near zero error rate (first citing United States v. Allen, 390 F.3d 944, 949–50 (7th Cir. 2004); and then citing United States v. Hicks, 389 F.3d 514, 526 (5th Cir. 2004))).

The NAS and PCAST reports expressed the scientific community's desire for increased judicial analysis.[347] While the NAS report did not discuss photogrammetry, the report's findings on comparison evidence remain applicable to the evidence here based on the lack of specific testing or ability to demonstrate connections to specific individuals.[348] This analysis needs to occur for every method, because even fingerprint evidence, which was historically perceived as finding absolute matches, was publicly undermined in 2004 by errors found in the Madrid train bombing investigation.[349] Further studies of fingerprint analysis found that when the same expert analyzed the same pair of prints twice, two-thirds of the experts studied made inconsistent decisions between the two tests.[350] Despite calls from the scientific community, courts continue to fail to analyze the *Daubert* factors in-depth in specific cases.[351] The PCAST and NAS reports have not been cited in many legal rulings.[352] While judges acknowledged the NAS report, the report was not seen as particularly relevant to the admissibility of the described techniques.[353] However, if judges analyzed experimental techniques to the level that the PCAST report advocated for, examining foundational validity and validity as applied, expert evidence could be held inadmissible.[354]

347. *See supra* notes 98–102 and accompanying text (discussing findings of the NAS Report).

348. NAS Report, *supra* note 98, at 7–8.

349. *See* Hilbert, *supra* note 248, at 809–10 (discussing how FBI examiners were "100 percent" certain that the fingerprint was a match, which led to the false accusation of Brandon Mayfield (quoting OFF. OF THE INSPECTOR GEN. OVERSIGHT & REV. DIV., A REVIEW OF THE FBI'S HANDLING OF THE BRANDON MAYFIELD CASE 64 (2006))).

350. Itiel Dror & David Charlton, *Why Experts Make Errors*, 56 J. FORENSIC IDENTIFICATION 600, 612 (2006).

351. Jane Campbell Moriarty, *Deceptively Simple: Framing, Intuition, and Judicial Gatekeeping of Forensic Feature-Comparison Methods Evidence*, 86 FORDHAM L. REV. 1687, 1696 (2018); *see also* Garrett & Fabricant, *supra* note 291, at 1564 (conducting an analysis of 229 state court cases quoting equivalents of Federal Rule 702 and finding very few rulings discussed "'reliability' in any meaningful way").

352. Garrett & Fabricant, *supra* note 291, at 1580.

353. Kaye, *supra* note 240, at 1640.

354. PCAST Report, *supra* note 103, at 19. For an example of a court performing this analysis, see United States v. Tibbs, No. 2016 CF1 19431, 2019 D.C. Super. LEXIS, at *9 (D.C. Super. Sept. 5, 2019). In *Tibbs*, the court analyzed each *Daubert* factor for an expert's conclusion on firearms analysis. *Id.* at *80–*81. The court found that the method can be and has been tested, *id.* at *25, and that the method has been subjected to peer review. *Id.* at *35–*36 (noting that the majority of studies came from a journal with a flawed review process). However, studies examining the error rate had limited reliability so the court could not conclude that there was a known or potential error rate. *Id.* at *64. There was no standard controlling the method and the reliability of subjective judgement strongly weighed against admissibility. *Id.* at *72. Lastly, the government failed to show wider acceptance of the method. *Id.* at *74. Based on its analysis, the court limited the expert's conclusions to the comparisons he made and restricted stronger conclusions. *Id.* at *77–*78.

The same unreliable techniques often reappear when courts improperly apply *Daubert*,[355] and the *Matthews* decision used them all.[356] Professor Jane Moriarty wrote that when expert evidence is challenged, courts cite prior case law or look to other courts, claim *Daubert* factors "are meant to be helpful and not definitive," or claim that reliability should be handled on cross-examination.[357] Turning to *Matthews*, the court cited prior case law from other jurisdictions to reassert the reliability of photogrammetry, which were not binding precedent.[358] The court also quoted the U.S. Supreme Court to reassert that the *Daubert* factors were "meant to be helpful, not determinative."[359] Furthermore, the court said that the concerns in this case "should be tested by the adversary process."[360] The appearance of these assertions in *Matthews* increases the likelihood that future Court of Appeals decisions will replicate this flawed reasoning and insufficient analysis for expert testimony.[361]

The Court of Appeals fell into another trap by repeating that Meline's conclusion was given "within a reasonable degree of scientific certainty."[362] The National Commission on Forensic Science said that the standard of to a "reasonable scientific certainty" is not routinely used by professionals outside of a courtroom context and the phrase's use cloaks judicial opinions with "the rigor, acceptance and reproducibility of scientific study."[363] The use of this phrase by the witness and adoption by the court in describing the testimony serves the purpose of masking concerns over the incalculability of the overall margin of error.[364] Rather than adopting the "reasonable degree of scientific certainty" framing, the Court of Appeals should have focused on analyzing the reliability of the method.[365]

355. *See* Moriarty, *supra* note 351, at 1696 (providing a list of typical actions by courts that do not analyze *Daubert* factors in depth).

356. *See infra* notes 358–360 and accompanying text (describing these same actions in the *Matthews* decision).

357. Moriarty, *supra* note 351, at 1696.

358. *See supra* notes 281–289 and accompanying text (discussing the precedent the court relied upon and its inapplicability here).

359. State v. Matthews, 479 Md. 278, 314, 277 A.3d 991, 1012 (2022) (quoting Kumho Tire Co. v. Carmichael, 526 U.S. 137, 151 (1999)).

360. *Id.* at 323, 277 A.3d at 1017 (quoting Ruiz-Troche v. Pepsi Cola of P.R. Bottling Co., 161 F.3d 77, 85 (1st Cir. 1998)); *see also supra* notes 302–313 and accompanying text (criticizing the ability of the adversarial system to address issues with reliability).

361. *See* Moriarty, *supra* note 351, at 1706–707 (discussing cognitive biases and heuristics and how they make courts confirm existing beliefs related to prior forensic methods).

362. *Matthews*, 479 Md. at 292, 277 A.3d at 999.

363. NAT'L COMM'N ON FORENSIC SCI., NAT'L INST. OF STANDARDS & TECH., VIEWS OF THE COMMISSION USE OF THE TERM "REASONABLE SCIENTIFIC CERTAINTY" 1, 2–3 (2016), www.justice.gov/ncfs/file/839726/download.

364. *Matthews*, 479 Md. at 295, 277 A.3d at 1001.

365. *Id.* at 292, 277 A.3d at 999.

The problems that Maryland faces in properly applying *Daubert* are not unique. The NAS report said that the serious problems with forensic science "can only be addressed by a national commitment to overhaul the current structure that supports the forensic science community in this country."[366] The history of DNA evidence's admissibility shows that, over time, "changes in lab standards, accreditation, and additional research" laid the debate over DNA's admissibility to rest.[367] If the criminal legal system could overcome the DNA debate, it could exclude "less certain and reliable forensic science disciplines" until sufficient testing is completed.[368] The Court of Appeals's admission of the insufficiently reliable photogrammetry method in *Matthews* does not indicate a desire to exclude methods from evidence until sufficient analysis of that method's reliability is complete.[369]

In the Court of Appeals's first case applying the new *Rochkind* standard, the court shows that Maryland will not heed calls from the scientific community to ensure the validity and reliability of expert testimony.[370] While Meline's testimony in this case is by no means the most egregious expert conclusion that has been permitted by a court,[371] the lack of interrogation from the Court of Appeals is troubling. The court reconvicted Kirk Matthews on the basis of improperly admitted expert testimony.[372] If an expert being unable to quantify numerous variables does not warrant exclusion, then what will?[373] While the court does not need to be an armed guard, in *Matthews*, the court failed to act even as a proper gatekeeper.[374]

CONCLUSION

In *State v. Matthews*, the Maryland Court of Appeals held that photogrammetry evidence was admissible under its new standard for the analysis of expert testimony.[375] However, the court failed to follow its guidelines for admitting expert testimony and inadequately analyzed the

366. NAS Report, *supra* note 98, at xx.

367. Adam B. Shniderman, *Prosecutors Respond to Calls for Forensic Science Reform: More Sharks in Dirty Water*, 126 YALE L.J.F. 348, 359–60 (2017); *see also* PCAST Report, *supra* note 103, at 3 (describing similar studies in other fields).

368. Shniderman, *supra* note 367, at 360.

369. *But see* Kronick, *supra* note 292, at 630–42 (discussing cases from other jurisdictions that conducted thorough analyses of eyewitness identification evidence and firearm and toolmark evidence before ruling on admissibility).

370. *See, e.g.*, PCAST Report, *supra* note 103, at 19 (recommending that the judiciary assess the scientific validity of expert testimony).

371. *See supra* note 337.

372. State v. Matthews, 479 Md. 278, 325, 277 A.3d 991, 1019 (2022).

373. *Id.* at 338, 277 A.3d at 1026.

374. *Id.* at 322, 277 A.3d at 1017 (quoting Ruiz-Troche v. Pepsi Cola of P.R. Bottling Co., 161 F.3d 77, 86 (1st Cir. 1998)).

375. *Id.* at 286, 277 A.3d at 996.

offered expert conclusion.[376] As a result, the court did not identify an analytical gap between the precision in the final conclusion and the unknown and unquantifiable variables.[377] The court did not analyze *Rochkind-Daubert* factors that undermined the conclusion's reliability.[378] Instead, the court relied on inapplicable precedent to support its reliance on photogrammetry, and did not analyze the underlying method's reliability.[379] The court replicated errors made by other courts after their adoption of *Daubert*, like depending on the adversarial process to overcome improper expert testimony.[380] The Court of Appeals did not listen to the scientific community's calls to ensure the reliability of expert testimony, which will make it more likely that these methods will be used in future cases despite their lack of proven reliability.[381] In future cases, the court should take steps to uphold its own standard for the admission of expert testimony and ensure that only reliable scientific evidence is admitted.

376. *See supra* Section IV.A.
377. *See supra* Section IV.A.1.
378. *See supra* Section IV.A.2.
379. *See supra* Section IV.A.3.
380. *See supra* Section IV.B.
381. *See supra* Section IV.C.