STATE OF NEW JERSEY Plaintiff-Appellant, v. FRENCH G. LEE Defendant-Respondent.	Supreme Court Docket No. 090662 CRIMINAL ACTION On Certification from a Final Order of the Superior Court, Appellate Division Docket No.: A-3125-22 Sat Below: Hon. Lisa A. Firko, J.A.D., Hon. Avis Bishop-Thompson, J.A.D., and Hon. Lorraine M. Augustini, J.A.D.

BRIEF OF AMICI CURIAE DR. ADELE QUIGLEY-MCBRIDE, DR. JEFF KUKUCKA, DR. JASON CHIN, AND DR. BRIAN BORNSTEIN, EXPERTS IN DECISION MAKING AND JUDGMENT IN LEGAL CONTEXTS

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TABLE OF CONTENTS

PAGES

TABLE OF AUTHORITIES

Page(s)

RULES

OTHER AUTHORITIES

PRELIMINARY STATEMENT

Dr. Adele Quigley-McBride, Dr. Jeff Kukucka, Dr. Jason Chin, and Dr. Brian Bornstein, experts in decision making and judgment in legal contexts, seek to participate as amici curiae to explain how ordinary people learn about forensic evidence and to identify common misconceptions about forensic evidence that ordinary people hold, including jurors. This brief explains how such misconceptions are formed, which misconceptions about forensic evidence are most prevalent, and how they can affect jurors' understanding and evaluation of forensic evidence presented in court. Dr. Quigley-McBride and colleagues explain that jurors are frequently exposed to information about forensic evidence through news coverage, entertainment media, and social media. The opinions they form from these sources can influence how they perceive, interpret, and evaluate the forensic evidence they are asked to consider during a trial. (Point I).

This brief discusses five incorrect preexisting beliefs about forensic evidence common in the general population. (Point II). Because jurors' existing opinions about forensic evidence will influence their understanding of new information about or related to forensic science, courts should consider strategies to identify and mitigate the effects of such misconceptions. Although a comprehensive review of research-based strategies to counteract

misconceptions is beyond the scope of this brief, the brief addresses the relative utility of voir dire, admissibility decisions, and jury instructions—the most commonly used judicial safeguards—for mitigating the effect of misconceptions. (Point III). A more detailed review of these issues can be found in the relevant academic literature and by parties and other amici.

STATEMENT OF FACTS AND PROCEDURAL HISTORY

Amici Dr. Adele Quigley-McBride, Dr. Jeff Kukucka, and Dr. Jason Chin adopt the statement of facts and procedural history in French G. Lee's Respondent's Brief.

ARGUMENT

I. Incidental and unintentional learning can lead jurors to develop misconceptions about forensic science.

When people think about "learning," they often think about deliberate, effortful learning that might happen by taking a class, reading a book, or otherwise seeking out information. Yet much of what people learn happens incidentally, simply by going about their daily lives and being exposed to readily available information. Information about forensic science, for example, is widely available through news coverage, entertainment media (such as television shows and movies), and social media posts. Frequent exposure to this kind of information can lead people to develop knowledge structures and beliefs about forensic science without any effort or intention on their part. Simon A.

Cole, A Surfeit of Science: The "CSI Effect" and the Media Appropriation of the Public Understanding of Science, 24 Pub. Underst. Sci. 130 (2015) [hereinafter Cole, A Surfeit of Science]; Bruno Takahashi & Edson C. Tandoc, Jr., Media Source, Credibility, and Perceptions of Science: Learning About How People Learn About Science, 25 Pub. Underst. Sci. 6 (2015). To illustrate the reach of entertainment media featuring forensic science, in 2007, 2008, and 2009, the television show CSI: Crime Scene Investigation won an International Audience Award, and it was the most watched show in the United States between 2002 and 2003. Press Release, CSI: Crime Scene Investigation is the Most Watched Show in the World!, Paramount (June 11, 2010), https://www.paramountpressexpress.com/paramount-global-content-distribution/releases/?view=25235; Gary Susman, "CSI" and "Millionaire" Are the Year's Top Shows, Entertainment Weekly (May 22, 2003), https://ew.com/article/2003/05/22/csi-and-millionaire-are-years-top-shows/.

Of course, the value of the knowledge gained through incidental learning—or, indeed, any type of learning—depends on the validity and accuracy of the information regularly encountered. When people are exposed to information that is incomplete, inaccurate, or unbalanced, the resulting knowledge and beliefs will reflect those flaws. News, entertainment, and social media often present a mix of accurate information about forensic evidence and

methods alongside misleading or incorrect depictions. These outlets are not inherently unreliable, and the issues arising from incidental learning through media are not unique to forensic science (for example, see public beliefs about climate change). See Dan M. Kahan et al., The Polarizing Impact of Science Literacy and Numeracy on Perceived Climate Change Risks, 2 Nature Climate Change 732 (2012). Importantly, however, media outlets have different primary goals—such as attracting attention, creating compelling narratives, or maximizing entertainment value—and do not adhere to the same safeguards for accuracy and completeness as academic research or formal education. See Gordon Pennycook & David G. Rand, The Psychology of Fake News, 25 Trends Cogn. Sci. 388 (2021). Because these media outlets aim for entertainment value, newsworthiness, or attention, they cannot be relied upon to help people form accurate knowledge and beliefs. Disseminating the truth about forensic evidence rarely makes for a dramatic story; in reality, forensic science is complex and limited in ways that do not fit easily into fast-paced or sensationalized portrayals. Cole, A Surfeit of Science, supra. Ordinary people are not well equipped to critique such information, and as a result, they are more likely to accept incorrect information about forensic science and form misconceptions. Deanna Kuhn, Children and Adults as Intuitive Scientists, 96 Psych. Rev. 674 (1989). In fact, mere exposure to the same incorrect information more than once

can increase how accurate it seems to lay individuals. See Gordon Pennycook, Tyrone D. Cannon & David G. Rand, Prior Exposure Increases Perceived Accuracy of Fake News, 147 J. Exp. Psych. Gen. 1865 (2018).

Psychologists accept that people's preexisting beliefs, knowledge, and expectations can bias any subsequent judgments or decisions about relevant information. This effect takes many names, including "confirmation bias," (Raymond S. Nickerson, Confirmation Bias: A Ubiquitous Phenomenon in Many Guises, 2 Rev. Gen. Psych. 175 (1998)), "top-down processing," (Shelly Chaiken & Durairaj Maheswaran, Heuristic Processing Can Bias Systematic Processing: Effects of Source Credibility, Argument Ambiguity, and Task Importance on Attitude Judgment, 66 J. Personality & Soc. Psych. 460 (1994)), "heuristics," and "System 2 processing," (DANIEL KAHNEMAN, THINKING, FAST AND SLOW (2011) [hereinafter Kahneman, Thinking, Fast and Slow]). In the context of forensic science, these effects are ubiquitous. Saul M. Kassin, Itiel E. Dror & Jeff Kukucka, The Forensic Confirmation Bias: Problems, Perspectives, and Proposed Solutions, 2 J. Appl. Rsch. Mem. & Cogn. 42 (2013). Thus, what an investigator, legal professional, or fact finder already believes they know about forensic evidence will frame how they interpret and evaluate new forensic information encountered in association with a case. Nancy Pennington & Reid

Hastie, Explaining the Evidence: Test of the Story Model for Juror Decision Making, 62 J. Personality & Soc. Psych. 189 (1992).

An example can be used to illustrate here. Imagine, for example, a juror believes that fingerprint evidence is infallible. If prosecutors later present that juror with incriminating fingerprint evidence, even very explicit statements about the limitations of that evidence or clear evidence that the expert in the case was unreliable might not be enough to sway that juror's judgment about that evidence. Because the juror believes fingerprint results cannot be inaccurate, they will tend to discount or disregard evidence that does not correspond with that view and weigh information that is consistent with their existing opinion more heavily. People will typically be unaware of this process as it occurs—or at least the reasons why they are so invested in upholding their existing viewpoint. As a result, any subsequent decisions made about the relevant evidence are more likely to align with their preexisting beliefs about fingerprint evidence than the new information encountered. Lauren Hudachek & Adele Quigley-McBride, Juror Perceptions of Opposing Expert Forensic Psychologists: Preexisting Attitudes, Confirmation Bias, and Belief Perseverance, 28 Psych., Pub. Pol'y & L. 213 (2022); Lisa L. Smith & Ray Bull, Identifying and Measuring Juror Pre-Trial Bias for Forensic Evidence:

Development and Validation of the Forensic Evidence Evaluation Bias Scale, 18 Psych., Crime & L. 797 (2012).

Given the important role that preexisting knowledge plays in juror decision making, the Court should understand what misconceptions about forensic evidence jurors are likely to bring with them into a trial. In addition, the Court should be informed about the empirical research addressing strategies that can mitigate the effects of those pre-existing beliefs.

II. Common misconceptions shape how ordinary people understand forensic evidence.

The following five misconceptions represent the baseline knowledge and understanding that most jurors and other laypersons without scientific training bring with them to court—their "preexisting beliefs" about forensic science. Because misconceptions will influence how people interpret and evaluate new information, courts should recognize that jurors are likely to rely on these beliefs when considering forensic results and related expert testimony at trial.

A. People believe that forensic analysis is objective and was created by scientists.

The general public are often poor evaluators of scientific information. In some respects, people have become more skeptical of scientific evidence in recent years. Kirsten Intemann, Science Communication and Public Trust in Science, 48 Interdisc. Sci. Rev. 350 (2023); Stephen Lewandowsky & Klaus

Oberauer, Motivated Rejection of Science, 25 Curr. Directions Psych. Sci. 217 (2016). Yet most evidence suggests that people without scientific training tend to recognize their lack of skills and knowledge compared to qualified experts, and are often impressed by science and advanced technology, tending to trust scientists when forming opinions about science-related topics. See Cary Funk et al., Trust and Mistrust in Americans' Views of Scientific Experts, Pew Rsch. Ctr. (2019); Robert J. MacCoun, The Epistemic Contract: Fostering an Appropriate Level of Public Trust in Experts, in MOTIVATING COOPERATION AND COMPLIANCE WITH AUTHORITY: THE ROLE OF INSTITUTIONAL TRUST 191 (Brian H. Bornstein & Alan J. Tomkins eds., 2015).

Most ordinary people lack the knowledge and skills needed to evaluate the quality of forensic methods and results. Information that is presented as "scientific" and delivered by someone labelled a "forensic expert" appears very compelling to lay individuals. Knowing that a particular individual was deemed an "expert" by the court or has an advanced degree results in a presumption that person will be accurate about topics within their expertise. Most people will rely, however, on their assessment of superficial factors (i.e., qualifications) rather than carefully evaluating the content of the forensic analyst's testimony and the quality of the information provided. Barbara A. Spellman & Adele Quigley-McBride, Reasoning about Forensic Science Evidence, in LEGAL

REASONING AND COGNITIVE SCIENCE: TOPICS AND PERSPECTIVES 439 (Marco Brigaglia & Corrado Roversi eds., 2023); Alicia McCarthy Wilcox & Niamh Nic Daeid, Jurors' Perceptions of Forensic Science Expert Witnesses: Experience, Qualifications, Testimony Style and Credibility, 291 Forensic Sci. Int'l 100 (2018). In many contexts, assuming that an expert will be able to provide useful, accurate information is an efficient way to make sound judgments. See Kahneman, Thinking, Fast and Slow, supra. However, in the case of forensic science experts in trials, the "science" and "expert" labels do not necessarily mean the information is objective, reliable, or accurate—generally speaking or in any particular case. That type of evaluation requires a more rigorous look at the examiner's proficiency, the information that was made available to the forensic scientist, and the methods and tools used in that particular case.

One of the main reasons that many forensic disciplines would not be considered "scientific" by scientists is the lack of sufficient safeguards and standardized, detailed, validated methods and protocols that minimize the role of subjective judgments. Established scientific disciplines are characterized by methods that reduce bias and increase the consistency of judgments between decisionmakers. Adele Quigley-McBride & T.L. Blackall, On the Continuum of Foundational Validity: Lessons from Eyewitness Science for Latent Fingerprint

Examination, 15 Behav. Sci. 1145 (2025). Except for DNA analysis, most forensic techniques were not developed by scientists and lack sufficient empirical evidence. Forensic "sciences" were usually developed in the context of law enforcement to support investigations and prosecutions, rather than because the evidence was independently theoretically interesting to scientists. Brandon L. Garrett, Autopsy of a Crime Lab: Exposing the Flaws in Forensics (2022) [hereinafter Garrett, Autopsy of a Crime Lab]; see also Nat'l Rsch. Council, Strengthening Forensic Science in the United States: A Path Forward (2009) [hereinafter National Research Council Report]; and President's Council of Advisors on Science and Technology, Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods (2016) [hereinafter PCAST Report]. Most forensic disciplines do not employ scientific safeguards and clearly defined objective criteria that characterize validated sciences and instead rely heavily on the forensic examiner's judgment and experience.[1] See PCAST Report, supra.

Latent print examination, in particular, has long been portrayed as scientific and objective, a reputation reinforced by entertainment media and, at

[1] Note that forensic examiners are not typically at fault—they are using the methods and skills they were trained to use, but the United States lacks widespread development of objective and standardized criteria in many forensic science disciplines.

times, by individuals working in law enforcement and the latent fingerprint community themselves—often unwittingly. In reality, latent print examination involves very few objective criteria and lacks the kind of standardized training programs or examination protocols that should be present among practicing latent fingerprint examiners across the United States. Even examiners working in the same laboratory might approach the task of analyzing the same latent and suspect fingerprint pairing in different ways due to ambiguous or vague laboratory procedures or subjective aspects of fingerprint examination that are inherent to the task. Quigley-McBride & Blackall, supra. For instance, one study showed that latent print examiners varied considerably in terms of the number of corresponding features they thought were sufficient before forming an opinion that two fingerprints originated from the same person. Bradford T. Ulery et al., Measuring What Latent Fingerprint Examiners Consider Sufficient Information for Individualization Determinations, 9 PLoS ONE e110179 (2014). Even when a minimum standard of twelve points was imposed, the number of features examiners identified and reported still varied. Id.

The perception of forensic disciplines as scientific is further reinforced by algorithmic and technological tools that forensic analysts use to speed up processing or perform tasks that a person cannot reasonably do (for example, the use of algorithms to search large databases for visually similar fingerprints).

Sophisticated technology can have the same persuasive effect on lay individuals as complex scientific evidence that is beyond the average person's understanding—it appears reliable and objective. Many people assume that the use of algorithms, databases, and technology necessarily improves accuracy and probative value. Emma Rempel & Tara Burke, The Impact of Technology on Jurors' Decisions, in THE IMPACT OF TECHNOLOGY ON THE CRIMINAL JUSTICE SYSTEM 350 (Emily Pica, David Ross & Joanna Pozzulo eds., 2024). Yet the use of some technologies can introduce new sources of error. For example, database searches make latent print examiners' tasks much more difficult by providing lists of very similar looking prints, any of which could be from a suspect. Moreover, the rankings generated by these systems can produce *automation bias*—examiners may be more likely to conclude a fingerprint high on the candidate list is from the same source as the suspect's fingerprint even when it is not. Itiel E. Dror & Jennifer L. Mnookin, The Use of Technology in Human Expert Domains: Challenges and Risks Arising from the Use of Automated Fingerprint Identification Systems in Forensic Science, 9 L., Probab. & Risk 47 (2010); see also Itiel E. Dror et al., The Impact of Human-Technology Cooperation and Distributed Cognition in Forensic Science: Biasing Effects of AFIS Contextual Information on Human Experts, 57 J. Forensic Sci. 343 (2012) [hereinafter Dror et al., The Impact of Human Technology]; Jonathan J. Koehler

& Shiquan Liu, Fingerprint Error Rate on Close Non-Matches, 66 J. Forensic Sci. 129 (2021).

Thus, both the public and forensic examiners themselves may harbor problematic misconceptions about foundational validity and objectivity associated with many forensic disciplines, including bloodstain pattern analysis, shoeprints, bitemarks, canine detection and latent fingerprint examination. This lack of objectivity and underlying foundational science leaves examiners vulnerable to inconsistencies or mistakes during the examination process. Furthermore, those tasked with judging fingerprint evidence, especially fingerprint evidence amplified by algorithmic or technological tools, can persist in believing these disciplines have a strong scientific basis and yield largely objective and error-free conclusions—even if told otherwise.

B. People believe that forensic results are very rarely inaccurate.

Most people believe that the error rate associated with forensic disciplines is negligible or extremely low. Some may even believe some well-known disciplines, such as DNA and fingerprint evidence, are infallible. This perception arises partly from the questionable information sources through which ordinary people learn about forensic techniques (see supra Point I and Point II.A) and partly because forensic analysts used to claim that mistakes were extremely rare or impossible. Simon A. Cole, More than Zero: Accounting for

Error in Latent Fingerprint Identification, 95 J. Crim. L. & Criminol. 985 (2005). In fact, most forensic disciplines do not have the foundational science necessary to establish an error rate at all. Garrett, Autopsy of a Crime Lab, supra; see also National Research Council Report, supra.

In established scientific disciplines, error rates are determined by a robust body of literature demonstrating both "repeatability" (the same examiner makes similar decisions across time and cases) and "reproducibility" (different examiners make similar decisions with the same data). In the context of forensic science, this could include "black box" studies,[2] blind proficiency tests,[3] or other controlled, empirical approaches to estimating the rate of incorrect identifications and exclusions in forensic examinations. See Quigley-McBride & Blackall, supra.

Although several forensic disciplines now have one or two black-box studies or blind-proficiency tests (e.g., fingerprints and firearms analysis), this limited evidence does not constitute a sufficient body of literature from which to draw conclusions about error rates in real-world casework. Furthermore, the rate of error in most of these studies is likely to be lower than would be seen in

[2] Black box studies look at the outcomes of analyses conducted by expert forensic examiners from the relevant field, but not the process through which they came to those decision outcomes.

[3] Blind proficiency tests are fake, realistic-looking cases for which ground truth is known, which are embedded in a laboratory's workflow.

real cases because the samples used in the studies are better quality than the evidence typically obtained from crime scenes. Sharon Kelley et al., How Do Latent Print Examiners Perceive Proficiency Testing? An Analysis of Examiner Perceptions, Performance, and Print Quality, 60 Sci. & Just. 120 (2020); see also Anthony J. Koertner & Henry J. Swofford, Comparison of Latent Print Proficiency Tests with Latent Prints Obtained in Routine Casework Using Automated and Objective Quality Metrics, 68 J. Forensic Identif. 379 (2018). Moreover, because study participants know they are taking part in an experiment, their decision strategies or criteria may differ from those used in real examinations, further distorting error-rate estimates. Christina Steindl et al., Understanding Psychological Reactance: New Developments and Findings, 223 Z. für Psych. 205 (2015); Nicholas Scurich et al., The Hawthorne Effect in Studies of Firearm and Toolmark Examiners, 70 J. Forensic Sci. 1329 (2025). Thus, the existing error rate studies are merely the beginning of a field of science that has been needed for some time.

Again, forensic fingerprint evidence is an excellent example of a discipline that is less accurate and reliable than it is perceived to be. As discussed above (supra Point II.A), most people are familiar with fingerprint examination and believe that it is accurate and reliable, including investigators, judges, and latent fingerprint examiners themselves. Brandon L. Garrett, The

Reliable Application of Fingerprint Evidence, 66 UCLA L. Rev. Discourse 64 (2018). In a relative sense, this is correct—fingerprint evidence has more underlying evidence, including black box studies (see, e.g., Koehler & Liu, supra, at 129-134) and blind proficiency tests, than most forensic disciplines (see, e.g., Kelley et al., supra, at 121; see also PCAST Report, supra). Nonetheless, with only a small number of existing studies and no standardized methodology across the discipline, there is no assurance that the error rates in these studies reflect the accuracy and reliability of a fingerprint examination performed for any particular case. Henry Swofford et al., Inconclusive Decisions and Error Rates in Forensic Science, 8 Forensic Sci. Int'l: Synergy 100472 (2024). This concern is compounded by the varied use of black-box algorithms and automated tools that are not well understood but can affect examination outcomes in ways that increase error. See supra, Point II.A; Dror & Mnookin, supra, at 63.

C. People believe that forensic science reliability does not vary much across types of evidence.

Forensic disciplines lie on a continuum from least to most reliable. For example, single-source DNA profile comparisons tend to be very accurate and have a body of literature that has established an error rate. Other disciplines such as bitemarks, voice analysis, or even other types of DNA analysis (such as mitochondrial DNA comparisons or DNA mixture analyses) are far less reliable

because they are more difficult, based on a less robust foundation of literature and empirical work, and require more subjective decisions on the part of the analyst. Fingerprint comparisons are more reliable than most other types of forensic evidence (e.g., bitemark, footwear, firearm marks, and hair comparison) but tend not to be as reliable as single-source DNA profile comparison. Garrett, Autopsy of a Crime Lab, supra; National Research Council Report, supra.

Each discipline also includes its own potentially dizzying array of limitations, unstandardized procedures, training approaches, and discretion that needs to be considered when judging reliability. So, the reliability of an analysis in any particular case will depend on the discipline, the particular jurisdiction or laboratory and what procedures are used there, and whether the analyst followed those procedures when performing the examination. See Quigley-McBride & Blackall, supra; see also Swofford et al., supra. Ordinary people can often tell when evidence is very reliable, but they struggle to sufficiently adjust when faced with evidence that is less reliable, such as bitemarks or hair analysis. Spellman & Quigley-McBride, supra, at 449. Thus, most people tend to believe forensic disciplines share roughly equivalent levels of repeatability and reproducibility. Moreover, even when they realize a discipline is less reliable, they often underestimate how large those differences are. Jason M. Chin & Carlos M. Ibaviosa, Beyond CSI: Calibrating Public Beliefs About the

Reliability of Forensic Science Through Openness and Transparency, 62 Sci. & Just. 272 (2022); see Garrett, Autopsy of a Crime Lab, supra.

Even within a particular type of evidence, reliability can vary substantially. As discussed above, (supra, Point II.B) fingerprint evidence has a stronger scientific basis than most other forensic techniques, with studies showing relatively low error rates. However, when the nature of the fingerprint task changes, so does its accuracy. For example, when examining close non-matches (fingerprints that share many similar features but are not from the same source), error rates are substantially higher. Compare Koehler & Liu, supra, at 131 (error rates between 15.9% and 18.1% in close non-match cases), with Bradford T. Ulery et al., Accuracy and Reliability of Forensic Latent Fingerprint Decisions, 108 Proc. Nat'l Acad. Sci. U.S.A., 7733 (2011) (error rate of less than 1% in other fingerprint cases). Moreover, the increased use of algorithms to search large fingerprint databases for potential suspects increases the chance that latent print examiners will face close non-matches in casework. Thomas Busey, Arch Silapiruti & John Vanderkolk, The Relation Between Sensitivity, Similar Non-Matches and Database Size in Fingerprint Database Searches, 13 L., Probab. & Risk 151 (2014); see also Kang Li et al., The Influence of Close Non-Match Fingerprints Similar in Delta Regions of Whorls on Fingerprint Identification, 66 J. Forensic Sci. 1482 (2021).

These concerns are compounded by other information available when conducting database searches that can bias examiners towards an identification decision, such as rankings from the algorithm or the candidate's demographic information and criminal history. Dror et al., The Impact of Human Technology, supra, at 350.

D. People believe that forensic evidence is commonly available in criminal cases.

Forensic evidence is certainly more commonplace now than it was in the past, particularly given the wider range of different forensic methods that can be called upon by investigators and legal professionals. It also appears more frequently in entertainment and news media than it did prior to the 2009 National Research Council Report. As a result, ordinary people often assume that the frequency with which they encounter forensic evidence in media reflects its prevalence in real cases—a phenomenon known as the *availability heuristic*. See Amos Tversky & Daniel Kahneman, Judgment Under Uncertainty: Heuristics and Biases: Biases in Judgments Reveal Some Heuristics of Thinking Under Uncertainty, 185 Sci. 1124 (1974).

In real cases, however, uncontaminated trace evidence that is high enough quality to submit for analysis is not often obtained from crime scenes and when it is, it may not yield useful or admissible results. Forensic testing also takes time (weeks or months, not the less than one hour turnaround time typically seen

on television) and is expensive, so it is typically reserved for the most serious cases. Spellman & Quigley-McBride, supra, at 449-50. Empirical data support this point: in one study, forensic evidence was collected in most cases of homicide and sexual assault, but it was far less common in aggravated assaults, robberies, and burglaries—5.1%, 7.4%, and 15.7% of cases in Denver, and 18.4%, 26.8%, and 29.3% in San Diego, respectively. Tom McEwen, The Role and Impact of Forensic Evidence in the Criminal Justice System, U.S. Dep't of Just. (2011).

Because the true availability of forensic evidence does not align with jurors' expectations, prosecutors worry that jurors would expect forensic evidence in every case before they would render a guilty verdict. See Chin & Ibaviosa, supra, at 273. Defense attorneys also worry they will be unable to succeed in cases where incriminating forensic evidence is available. See id. These perspectives represent two sides of the same coin—an intuitive recognition of the effect that preexisting beliefs can have on jurors in this context. Although research shows that that the impact of lay perceptions about forensic science and its availability on case outcomes are more complex that either the prosecutors or defense attorneys typically assume, what is consistently observed is a shift in judgments about cases with forensic evidence in light of peoples' pre-existing beliefs. Id.; see also Hudachek & Quigley-McBride, supra.

E. People believe that forensic evidence can tell you whether a specific person committed a crime.

In addition to assumptions about the accuracy and reliability of forensic methods and results, people also struggle to understand what can legitimately be inferred from forensic results. What can be "proven" by a piece of evidence and any associated analyses depends on several factors, such as the type of evidence, where it was found, and the alleged crime. Ultimately, though, all physical evidence is circumstantial. The discovery of traces indicating that someone was, at some time, physically present in a location where a crime occurred is not, alone, direct evidence that the contributor of that evidence committed a crime. Additional evidence or the placement of the evidence might be properly interpreted as increasing the likelihood of their involvement, though (e.g., DNA profile analysis from skin found under the victim's fingernails or paired with bloodstain pattern analysis).

Recovering traces of a particular person at a crime scene can also indicate that they were physically present in that location, though that is not definitive. Although it is more likely that someone who was present at the crime scene at some time is guilty than someone who was never present at the crime scene, that is merely inferred from the evidence, not proved by it. Spellman & Quigley-McBride, supra, at 450. Several factors can result in some inferences about *when and why* that evidence was left at a scene, including the quality of the evidence,

layers of traces, and the location where the evidence was found. Severely degraded evidence or other trace evidence found on top of a sample might suggest the passage of time, and DNA found under a deceased individual's fingernails might provide additional, circumstantial information. Although there are potentially many explanations for why that evidence was found there, one of those explanations is that the suspect in question was involved in the crime. When analyzed appropriately, each additional piece of the puzzle can increase the evidence in favor of the "suspect is the culprit" hypothesis—as well as other hypotheses that also must be adequately considered by examiners. See Duncan Taylor, Bas Kokshoorn & Alex Biedermann, Evaluation of Forensic Genetics Findings Given Activity Level Propositions: A Review, 36 Forensic Sci. Int'l: Genetics 34 (2018).

Ultimately, a piece of trace evidence, like a fingerprint, is almost always only a small piece of the puzzle. Typically, there would need to be other reasons to believe that the person who left the fingerprint was also the cause of a crime. Most forensic evidence, on its own, is fairly weak evidence that someone is guilty.

III. Jury selection, admissibility challenges, and judicial instructions are imperfect safeguards against the effect of misconceptions

There are several tools that are already used by courts to combat potential issues with jurors' pre-existing knowledge or views. Jurors can be questioned

during jury selection to determine if anything about their background or opinions might threaten the impartiality of the jury. For example, jurors serving in capital cases are asked in advance whether they are willing to consider the death penalty as a possible sentence because it is recognized that jurors will struggle to come to an impartial decision if they fundamentally disagree with one of the potential outcomes. This is generally effective at ensuring a jury is selected that can apply the law as written, but it also tends to result in juries that are more conviction prone than those including jurors unwilling to consider the death penalty. Craig Haney, Eileen L. Zurbriggen & Joanna L. Weill, The Continuing Unfairness of Death Qualification: Changing Death Penalty Attitudes and Capital Jury Selection, 28 Psych., Pub. Pol'y & L. 1 (2022). In a similar way, in cases likely to hinge on forensic evidence, voir dire could be used to assess jurors' misconceptions about forensic science. Jurors could be questioned in advance about their pre-existing beliefs relevant to forensic evidence so that those who are going to struggle to engage appropriately with the evidence can be excluded. See Hudachek & Quigley-McBride, supra. However, as seen for juries in capital cases, such screening could have the unintended consequence of altering the composition of the jury in unintended ways that affect its overall leanings. Voir dire screening about forensic evidence could also unintentionally prime jurors to pay closer attention to the forensic

evidence than they would otherwise or change how they perceive the evidence. Therefore, any voir dire about forensic evidence must be carefully phrased to avoid inadvertently affecting how jurors attend to or interpret evidence.

Pretrial hearings addressing the admissibility of forensic evidence are another safeguard. During these hearings, the judge can consider how a jury is likely to interpret the evidence and whether that aligns with the quality and reliability suggested by the underlying science and its application in the particular case—ideally aided by expert testimony on these issues. See FED. R. EVID. 702. This is a powerful safeguard because judges can prevent juries from hearing evidence that is unreliable or likely to be misinterpreted, or limit how such evidence is characterized in the presence of the jury. Given that pre-existing beliefs are difficult to change, and that jurors struggle to disregard evidence once they have heard it, a cautious approach to revealing forensic evidence to the jury is an effective way to address the effect of jurors' potential misconceptions. Nancy Steblay et al., The Impact on Juror Verdicts of Judicial Instruction to Disregard Inadmissible Evidence: A Meta-Analysis, 30 L. Hum. Behav. 469 (2006).

Finally, juries can be instructed on how to evaluate and interpret the evidence that they are presented during a trial. New Jersey courts have been at the forefront of efforts to improve the instructions given to jurors in cases

involving evidence that is complex or difficult to evaluate, such as eyewitness identification evidence. See Athan P. Papailiou, David V. Yokum & Christopher T. Robertson, The Novel New Jersey Eyewitness Instruction Induces Skepticism but No Sensitivity. 10 PLoS ONE e0142695 (2015). Unfortunately, jury instructions tend not to have the desired effect on jurors. Rather than improving jurors' ability to distinguish between high- and low-quality examples of evidence, they tend to lead to general skepticism towards all evidence relevant to the instructions. Amanda N. Bergold et al., Eyewitnesses in the Courtroom: A Jury-Level Experimental Examination of the Impact of the *Henderson* Instructions, 17 J. Exp. Criminol. 433 (2021); see also Papailiou, Yokum & Robertson, supra. That said, some research suggests that including reasons for the recommendations in judicial instructions improves juries' abilities to determine what is reliable and unreliable evidence. Brandon L. Garrett et al., Sensitizing Jurors to Eyewitness Confidence Using "Reason-Based" Judicial Instructions, 12 J. Appl. Rsch. Mem. & Cogn. 141 (2023).

Thus, the existing solutions to the effects of misconceptions are imperfect. Voir dire, admissibility challenges, and jury instructions each have strengths and limitations, and their effectiveness has not been studied extensively with respect to forensic evidence. The utility of these safeguards is particularly difficult to predict given the wide range of forensic disciplines to which they might apply.

What is clear, however, is the need for courts to acknowledge and address jurors' misconceptions in cases involving forensic evidence, rather than leaving juries to navigate challenges arising from their pre-existing beliefs and expectations alone during deliberations.

CONCLUSION

Dr. Quigley-McBride, Dr. Jeff Kukucka, Dr. Jason Chin, and Dr. Brian Bornstein seek to participate as amici curiae because most people have misconceptions about forensic science. Courts cannot ignore the existence of inaccurate preexisting beliefs held by jurors, nor their impact on fair trials. There exists no "quick cure" for these preexisting beliefs once they are formed, but their effect on trials can be mitigated with research-based approaches to voir dire, cautionary and limiting instructions, and imposing limits on how forensic results are communicated.

Respectfully submitted,

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