Commonwealth of Massachusetts
Supreme Judicial Court

SJC-12982

COMMONWEALTH OF MASSACHUSETTS,
Plaintiff-Appellee,
v.

LEE MANUEL RIOS,
Defendant-Appellant.

ON APPEAL FROM A JUDGMENT AND DENIAL OF A MOTION FOR NEW TRIAL BY THE HAMPDEN SUPERIOR COURT

BRIEF OF AMICI CURIAE THE NEW ENGLAND INNOCENCE PROJECT AND THE INNOCENCE PROJECT IN SUPPORT OF APPELLANT AND REVERSAL OF THE DENIAL OF A NEW TRIAL

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CORPORATE DISCLOSURE STATEMENT

Pursuant to Supreme Judicial Court Rule 1:21, the New England Innocence Project ("NEIP") represents that it is a 501(c)(3) organization under the laws of the Commonwealth of Massachusetts. NEIP does not have a parent corporation and no publicly held corporation owns 10% or more of its stock.

Pursuant to Supreme Judicial Court Rule 1:21, the Innocence Project ("IP") represents that it is a 501(c)(3) organization domiciled in the State of New York. The IP does not have a parent corporation and no publicly held corporation owns 10% or more of its stock.

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Edgeworth Analytics, *Independent Audit of the ShotSpotter Accuracy* (Mar. 28, 2022), https://www.edgeworthe conomics.com/assets/htmldocuments/Shotspotter-2022-Accuracy-Study.pdf 21

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Inst. of Electrical & Electronics Eng'rs (IEEE), *IEEE Standard for System, Software, and Hardware Verification and Validation* (IEEE Standard 1012-2016) (Sept. 2017) 18, 20

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Itiel Dror et al., *Cognitive bias in forensic pathology decisions*, 66 J. Forensic Sci. 1751 (2021).....38, 39

Itiel Dror & David Charlton, *Why Experts Make Errors*, 56 J. Forensic Identification 600 (2006).....24, 39

Jeanna Matthews et al., *Trustworthy Evidence for Trustworthy Technology: An Overview of Evidence for Assessing the Trustworthiness of Autonomous and Intelligent Systems*, Law Committee of the IEEE Global Initiative & IEEE-USA AI Policy Committee (Sept. 2022), https://ieeeusa.org/assets/public-policy/committees/aipc/IEEE_Trustworthy-Evidence-for-Trustworthy-Technology_Sept22.pdf.....20

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GLOSSARY

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STATEMENT OF INTEREST[1]

The **New England Innocence Project** ("NEIP") is a nonprofit organization dedicated to correcting and preventing wrongful convictions in the six New England states. In addition to providing pro bono legal representation to individuals with claims of innocence, NEIP advocates for judicial and policy reforms that will reduce the risk of wrongful convictions, including by assuming that the presumption of innocence applies robustly and equally to all people and at all stages of the criminal legal system, from the moment of their encounter with police through trial. That also includes ensuring that all evidence, regardless of its source or pedigree, is subjected to appropriately rigorous scrutiny and bears sufficient indicia of reliability before it is used against criminal defendants. In recognition of the grossly disproportionate number of members of communities of color who have been wrongfully convicted, NEIP's mission includes ensuring that explicit or implicit racial bias does not operate in ways that serve to undermine the presumption of innocence.

[1] Pursuant to Mass. R. App. P. 17(c)(5), Amici and their counsel declare that: (a) no party or party's counsel authored the brief in whole or in part; (b) no party or party's counsel contributed money that was intended to fund the preparation or submission of the brief; (c) no person or entity—other than Amici or their counsel—contributed money that was intended to fund the preparation or submission of the brief; and (d) neither Amici nor their counsel represent or have represented any of the parties to the present appeal in another proceeding involving similar issues, or were a party or represented a party in a proceeding or legal transaction that is at issue in the present appeal.

The **Innocence Project** ("IP") is a national nonprofit organization that works to free the innocent, prevent wrongful convictions, and create fair, compassionate, and equitable systems of justice for everyone. The IP's work is grounded in anti-racism and guided by science. In addition to representing individuals on post-conviction claims of innocence, the IP engages in strategic litigation and policy advocacy to effect reforms that will help prevent future wrongful convictions and promote the equitable administration of justice. This includes advocating to ensure that all forensic evidence and investigative tools undergo sufficient empirical validation and judicial scrutiny to establish their reliability before they are used in suspect development, investigation, or prosecution. Given the stark racial disparities documented in known wrongful convictions, and the contributions of faulty forensic evidence to a large proportion of those convictions, the IP seeks to ensure that investigative tools and technology do not exacerbate or mask conscious or unconscious bias that may contribute to wrongful convictions.

SUMMARY OF ARGUMENT

The ShotSpotter evidence in this case, a key factor behind the jury's verdict, is profoundly unreliable. ShotSpotter[2] employs opaque and untested computer algorithms as well as subjective and unvalidated methods for its human analysts. In doing so, it contravenes well-established principles of empirical validation in forensic science and software development: (1) technological and software tools must be empirically tested for correctness, (2) test conditions must mirror the conditions of deployment, and (3) testing should be performed by those with no personal or professional stake in the results. ShotSpotter's systems meet none of these conditions. Moreover, its human analysts employ subjective methods that lead different examiners to different conclusions based on the same acoustic data, and there is no empirical evidence to document which (if any) examiners are capable of consistently producing correct results. On top of this, data from several cities show that ShotSpotter rarely leads police to actionable evidence, suggesting that its error rates may be considerably higher than its developers claim.

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[2] The parent company for the ShotSpotter system changed its name to SoundThinking as of April 2023. SoundThinking, *Shotspotter Changes Corporate Name To Soundthinking And Launches Safetysmart Platform For Safer Neighborhoods*, Press Release (Apr. 10, 2023), https://www.soundthinking.com/press-releases/shotspotter-changes-corporate-name-to-soundthinking-and-launches-safetysmart-platform-for-safer-neighborhoods/. Amici refer to both the company and system itself as "ShotSpotter" throughout this brief, as that was the name used for both at the time of the proceedings at issue.

The specific circumstances of this case exemplify virtually all of the major risk factors that have led faulty forensic science to produce wrongful convictions in the past. Decades of exonerations have shown that flawed and misleading forensic science is a leading cause of wrongful convictions, in part because juries tend to place great weight on purportedly "objective" evidence—even when that evidence lacks scientific foundation. Subjective forensic methods, such as the analyst's revision of the location determination here, are particularly vulnerable to cognitive bias. Examiners who are exposed to extraneous case information often skew their results, relying consciously or unconsciously on the extraneous information rather than the data they are supposed to analyze. The ShotSpotter employee here was exposed to precisely such biasing, extraneous information. Along with the lack of transparency and the subjectivity of his methods, these are the precise circumstances most likely to produce erroneous results.

These unreliable and potentially erroneous results, far from being a minimal concern amid the rest of the trial evidence, likely influenced the jury's interpretation of much of the other testimony before them. This Court should therefore take account of how the unreliable ShotSpotter evidence almost certainly infected the jury's consideration of the rest of the testimony, and reverse.

ARGUMENT

I. ShotSpotter is not reliable.

Evidence generated by technology is generally not admissible unless the technology has been demonstrated to be reliable. *Commonwealth v. Davis*, 487 Mass. 448, 457 (2021); *see also Commonwealth v. Lanigan*, 419 Mass. 15, 25-26 (1994) (adopting federal *Daubert* test for reliability and admissibility of scientific or technical evidence). Establishing the reliability of a forensic tool or method requires independent, robust, empirical testing—which ShotSpotter has not undergone. The purpose of such empirical validation is to ensure that a forensic method produces consistent and accurate results. Absent such validation, many forensic disciplines have been found to produce incorrect results far more often than practitioners claimed or to lack scientific foundation entirely. Yet despite the impossibility of gauging reliability without independent empirical testing, ShotSpotter has shielded both its algorithms and its human employees' methods from such review, relying instead on methodologically flawed, non-independent studies and unsubstantiated marketing claims. Because practitioners' and developers' claims are no substitute for independent testing, this lack of transparency itself should have precluded a determination that ShotSpotter was reliable enough to be admitted.

On top of that, however, mounting empirical data about ShotSpotter's field performance from across the country establish that it overwhelmingly fails to lead

to actionable evidence and likely misidentifies or mislocates sounds far more often than its marketers claim. Audits in several cities have confirmed these results, consistently finding that the vast majority of ShotSpotter alerts and deployments yield no confirmatory evidence of gunfire.

A. ShotSpotter has not undergone the empirical testing necessary to establish the reliability of either its software or its human analysts' methods.

i. ShotSpotter's algorithms are opaque and untested.

Far from being objective, algorithm-based systems like ShotSpotter can and do make mistakes. Mistakes may arise from coding errors, biased training data or input data, mismatches between the systems' conditions of development and conditions of deployment, and misinterpretation of the algorithms' results by humans. *See, e.g.*, Andrea Roth, *Machine Testimony*, 126 Yale L. J. 1973, 1977-78 (2015) (noting risk of "human error at the programming, input, or operation stage" and "machine error due to degradation and environmental forces").

In the law enforcement and criminal legal contexts, these errors and biases have already caused serious—even deadly—miscarriages of justice and troubling racial disparities. *See*, *e.g.*, Matt Stroud, *Heat Listed*, The Verge (May 24, 2021), https://www.theverge.com/c/22444020/chicago-pd-predictive-policing-heat-list (last accessed Nov. 6, 2024) (documenting how Chicago Police Department's purported predictive algorithm to identify likely gun violence participants targeted

Robert McDaniel despite his lack of violent history, prompting police to surveil him; McDaniel was later shot because the surveillance led others to suspect him of being a police informant); Khari Johnson, *How Wrongful Arrests Based on AI Derailed 3 Men's Lives*, Wired (Mar. 7, 2022), https://www.wired.com/story/wrongful-arrests-ai-derailed-3-mens-lives/ (last accessed Nov. 6, 2024) (documenting wrongful arrests and in some cases lengthy detentions based on faulty facial recognition "matches," mostly of Black people); Julia Angwin et al., *Machine Bias*, Pro Publica (May 23, 2016), https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing (last accessed Nov. 11, 2024) (finding that pretrial risk assessment tool systematically overestimated Black defendants' likelihood of recidivism while underestimating white defendants').

Given the risks of error and bias, researchers, developers, and policymakers have developed frameworks for verification and validation of forensic tools, including those based on black-box software algorithms. These frameworks agree on several key principles.

First, validation testing must assess how often a tool or technique reaches the correct result; that is, it must measure accuracy against verifiable ground truth, not merely conformance with a method or process. *See* President's Council of Advisors on Sci. & Tech., *Forensic Science in the Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods* 5 (2016) (hereinafter "PCAST Report")

("Foundational validity requires that a method has been subjected to *empirical* testing . . . [that] provide[s] valid estimates of . . . how often the method reaches an incorrect conclusion."). The PCAST Report, a groundbreaking review of several forensic disciplines, found that many techniques, long admitted by courts based on practitioners' unverified claims about their accuracy, in fact lacked scientific foundation and often produced incorrect results. *Id.* at 87, 112, 117 (finding bitemark comparison and footwear analysis to be unsupported by *any* appropriate empirical studies, and firearm analysis insufficiently validated with only one properly designed study).

Second, empirical testing must properly represent the conditions under which the tool will be deployed. Nat'l Inst. of Standards & Tech., *Artificial Intelligence Risk Management Framework* 14 (2023) ("Accuracy measurements should always be paired with clearly defined and realistic test sets—that are representative of the conditions of expected use"); *PCAST Report*, *supra*, at 47 ("For a metrological method to scientifically valid and reliable, the procedures that comprise it must be shown, based on empirical studies, to be *repeatable*, *reproducible*, and *accurate*, at levels that have been measured and are appropriate to the intended application."). This Court has recognized that it is not enough for forensic technological evidence to be generally reliable before it can be admitted; rather, the proponent must demonstrate its reliability in the specific contexts and for the specific uses to which

it was put. *Davis*, 487 Mass. at 457-58 (holding that even where GPS monitor was known to be reliable for determining wearer's location, its data was inadmissible to prove wearer's speed or movements without showing of reliability for that purpose).

Third, this testing must be transparent and independent, conducted by parties with no professional, personal, or financial stake in the results. Inst. of Electrical & Electronics Eng'rs (IEEE), *IEEE Standard for System, Software, and Hardware Verification and Validation* (Standard 1012-2016) (Sept. 2017) (stating that verification and validation processes must "use personnel who are not involved in the development of the system or its elements," meaning people other than developers, vendors, and customers); *PCAST Report*, *supra*, at 14 ("To ensure . . . scientific judgments are unbiased and independent, such evaluations should be conducted by an agency which has no stake in the outcome.").

The Commonwealth's ShotSpotter evidence in this case met none of these conditions. First, there is no indication that the sensor array in Springfield was ever tested for accuracy. ShotSpotter employee Ronald Cayabyab claimed that ShotSpotter was guaranteed to capture "80 percent of all the detectable events . . . within 25 meters" of the actual sound source location. Tr. 1/24:94. But testimony in a California proceeding from another employee, Paul Greene, which was adduced to Mr. Rios' Motion for a New Trial in this case, revealed that this claim "originate[d]

with [ShotSpotter's] sales and marketing department" and was not based on any appropriate empirical testing. R.A.II:111-112 at 7/6:163-64.

Second, even if ShotSpotter conducted testing it did not disclose, there is no indication that any testing accounted for the conditions of deployment—even though the urban environments in which ShotSpotter operates are those most likely to introduce error. As scientific literature establishes, location estimates for gunshots vary greatly with environmental conditions like temperature and wind speed; they are especially error-prone in urban areas. *See, e.g.*, Juan R. Aguilar, *Gunshot Detection Systems in Civilian Law Enforcement*, 63 J. Audio Eng'g Soc'y 280, 286-87 (2015) ("[E]nvironmental issues affecting muzzle blast propagation in the outdoors imposes severe shortcomings on the accuracy of shooter location estimates."); P. Naz et al., *Acoustic Detection and Localization of Small Arms, Influence of Urban Conditions*, Proc. SPIE 6963, Unattended Ground, Sea, and Air Sensor Technologies and Applications 69630E, at 3 (2008) (finding that one algorithm's rate of correctly estimating source sound's direction—let alone exact location—fell to just 40% when sensors were obstructed by buildings and not in direct line of sight). Despite these known issues, ShotSpotter employee Ronald Cayabyab testified that ShotSpotter's sensors are not tested to account for "environmental factors such as echo[e]s" or buildings. Tr. 1/24:100-01.

Finally, ShotSpotter's refusal to turn over its algorithms and any internal validation data flies in the face of well-established standards for transparency and unbiased, independent verification and validation of software systems. *See* IEEE Standard 1012-2016, *supra*; Jeanna Matthews et al., *Trustworthy Evidence for Trustworthy Technology: An Overview of Evidence for Assessing the Trustworthiness of Autonomous and Intelligent Systems*, Law Committee of the IEEE Global Initiative & IEEE-USA AI Policy Committee, at 13 (Sept. 2022), https://ieeeusa.org/assets/public-policy/committees/aipc/IEEE_Trustworthy-Evidence-for-Trustworthy-Technology_Sept22.pdf (last accessed Nov. 13, 2024) (stating that automated software-based systems should not be considered trustworthy unless "obtained via a process that is transparent and open to audit by competent experts"). Independent code review has on multiple occasions uncovered software errors that developers missed. *See, e.g.*, *State v. Pickett*, 246 A.3d 279, 284 (N.J. 2021) (noting that independent review unearthed "significant source code errors" in breathalyzer and probabilistic genotyping software systems). Yet Cayabyab repeatedly asserted that ShotSpotter's code was "proprietary" and would not be disclosed, and the trial court improperly admitted his testimony despite ShotSpotter's failure to submit to independent review. Tr. 1/24:17, 24, 98.

The limited testing that ShotSpotter's promotional materials tend to cite is not independent and suffers from methodological flaws. For instance, one frequently-

touted, "independent" report by Edgeworth Analytics, which claimed ShotSpotter is "97% accurate," was in fact commissioned by ShotSpotter and relied solely on the reports of law enforcement customers to identify errors. Edgeworth Analytics, *Independent Audit of the ShotSpotter Accuracy*, at 2 (Mar. 28, 2022), https://www.edgeworthеconomics.com/assets/htmldocuments/Shotspotter-2022-Accuracy-Study.pdf (stating that "ShotSpotter commissioned Edgeworth Analytics" to audit data it collected in 2021). As a result, it did not measure accuracy against ground truth, and it failed to account for cases where law enforcement found no evidence of gunfire at the site of a ShotSpotter alert but, because they could not confirm a different sound source, did not report an error. *See id*.

Similarly, acoustic engineering experts have criticized the main early study of ShotSpotter's performance, which took place in Redwood City with the assistance of ShotSpotter's developers. *See* L.G. Mazerolle et al., *Field Evaluation of the ShotSpotter Gunshot Location System: Final Report on the Redwood City Field Trial*, Technical report, Doc. 180112, U.S. Dep't of Justice Award 96-MU-MU-0018-2000, at 12-13 (2000) (documenting input of employees of ShotSpotter's developer in study design). One subsequent assessment found that the Redwood City study "compromise[d] its experimental protocol by altering the stimuli during the trial to artificially boost the shot detection accuracy"; blended "manual interventions . . . with the automatic location results" to report a conclusion that

masked the low accuracy of the automatic location algorithm; and "overstate[d] the location accuracy by counting in as a success a manual location of a gunfire incident that was not detected by the system at all." John H.L. Hansen & Hynek Bořil, *Gunshot Detection Systems: Methods, Challenges, and Can they be Trusted?*, 151st Audio Eng'g Soc'y Convention, at 7 (Oct. 2021) (examining and critiquing L.G. Mazerolle et al., *supra*).

Taken together, these shortcomings make it clear that ShotSpotter has not been shown to be reliable; it therefore warrants thorough scrutiny by trial courts. It is thus particularly problematic that the ShotSpotter evidence in this case was admitted without robust discovery or a meaningful assessment of its reliability—and that, presented with new evidence and the chance to cure these defects upon the motion for a new trial, the trial court declined to do so.

ii. ShotSpotter's human analysts' post-processing methods are subjective and unvalidated.

Unvalidated algorithms pose even greater risks when coupled with subjective human decision-making; ShotSpotter's post-processing methods exemplify these risks. Forensic science is rife with cases of human analysts and examiners reaching erroneous conclusions or presenting misleading testimony. *See, e.g.*, PCAST Report, *supra*, at 27-30 (reviewing studies documenting erroneous forensic analyses and testimony in bullet lead examination, latent fingerprints, hair analysis, and bitemarks, and noting based on trial transcripts that "expert witnesses have often

overstated the probative value of their evidence, going far beyond what the relevant science can justify"); Brandon L. Garrett & Peter J. Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions*, 95 Va. L. R. 1, 14 (2009) (reviewing 137 exonerees' trial transcripts and finding that 60% "involved invalid forensic science testimony," even where underlying discipline was valid).

These errors need not, and often do not, reflect malice or deliberate deception. Rather, even well-intentioned examiners tasked with comparing fingerprints, conducting fire investigations, or analyzing weapons and casings—or attempting to decide whether a pulse in a sound recording is a gunshot or an echo, and trying to pinpoint the precise timing of that pulse—are susceptible to cognitive bias, undue reliance on extraneous information, and overconfidence in their results. *See, e.g.*, Itiel Dror, *Cognitive and Human Factors in Expert Decision Making: Six Fallacies and the Eight Sources of Bias*, 92 Anal. Chem. 7998, 7999-8002 (2020) (documenting sources of bias in forensic analysts' conclusions); *see also infra* pp. 36-40 (discussing how extraneous information can introduce cognitive bias into forensic examiners' determinations). The PCAST Report, which reviewed extensive empirical literature, found that virtually every forensic discipline it evaluated was susceptible to these problems. *PCAST Report*, *supra*, at 7-13 (summarizing findings on bitemark analysis, latent fingerprint analysis, firearms analysis, footwear analysis, and hair analysis).

Cognitive bias, or the *unconscious* effect of preconceived assumptions, extraneous information, or pressure to reach a certain result, is well documented in forensic science. *See* PCAST Report, *supra*, at 31, 113. This Court has already recognized the dangers it poses in the identification context, holding that officer testimony purporting to identify a defendant in poor-quality surveillance video constituted improper "priming" of jurors and "risked creating a cognitive bias before the jurors saw the footage for the first time." *Commonwealth v. Wardsworth*, 482 Mass. 454, 477 (2019). Such dangers are no less prevalent in the arena of forensic science. *See, e.g.*, Itiel Dror & David Charlton, *Why Experts Make Errors*, 56 J. Forensic Identification 600, 612-14 (2006) (discussing effects of cognitive bias on forensic analysis).

Cognitive bias can take several forms. For instance, practitioners fall victim to *confirmation bias* when they "interpret information, or look for new evidence, in a way that conforms to their pre-existing beliefs or assumptions." *PCAST Report*, *supra*, at 31. Practitioners may also engage in *circular reasoning*, working "backward . . . from the target/suspect to the evidence" rather than "from the evidence to the suspect (from data to theory)," looking for ways to make the evidence fit the prosecution's theory of the case, and discounting exculpatory evidence. Dror, *supra*, at 8000. Practitioners may view themselves not as neutral analysts but as sympathetic to, or even part of, the prosecution team, especially when that view is

prevalent in the organizations they work for or the training they receive. *Id.* at 8002; *see, e.g.*, Andrea Estes & Scott Allen, *Indicted drug analyst Annie Dookhan's e-mails reveal her close personal ties to prosecutors*, Boston.com (Dec. 20, 2012), https://www.boston.com/news/local-news/2012/12/20/indicted-drug-analyst-annie-dookhans-e-mails-reveal-her-close-personal-ties-to-prosecutors/ (documenting "close relationships" between prosecutors and state chemist Annie Dookhan, who was discovered to have altered drug evidence and test results in numerous cases in pursuit of securing convictions).

Real-world cases demonstrate the danger of these kinds of errors. For instance, the high-profile mistaken identification of Brandon Mayfield as a suspect in the 2004 Madrid train bombing was the result of an erroneous latent print identification. U.S. Dep't of Just., Off. of the Inspector Gen., Oversight and Review Division, *A Review of the FBI's Handling of the Brandon Mayfield Case* 3-4 (Mar. 2006), https://oig.justice.gov/sites/default/files/legacy/special/s0601/final.pdf. Multiple FBI examiners concluded that the latent print was Mayfield's with "100 percent certainty," a determination that was subsequently *also* reached by an independent examiner. *Id.* at 2-3. But two weeks later, Spanish authorities found the actual perpetrator, confirming that his fingerprints corresponded more closely to the latent prints; Mayfield was released. *Id.* at 3-4. Investigating what had led multiple examiners to make such a profound error, the Inspector General's report concluded

that "examiners' interpretation of some features in [the latent print] was adjusted or influenced by reasoning 'backward' from features visible in the known prints of Mayfield." *Id.* at 7. Examiners selectively relied on features in Mayfield's prints that corresponded to the latent print, while also going out of their way to come up with explanations for differences between the two prints that allowed them to discount those differences. *Id.* at 8-9. Ultimately, the report found, the verification procedures the FBI was using at the time likely contributed to confirmation bias rather than preventing or mitigating it. *Id.* at 204.

Humans and software, rather than compensating for one another's shortcomings, often in fact compound them. For instance, recent years have seen several wrongful arrests based on erroneous "matches" from facial recognition software. Johnson, *supra*; Kashmir Hill, *Eight Months Pregnant and Arrested After False Facial Recognition Match*, N.Y. Times (Aug. 6, 2023), https://www.nytimes.com/2023/08/06/business/facial-recognition-false-arrest.html (last accessed Nov. 15, 2024). In several of those cases, officers followed up the facial recognition searches with an eyewitness identification procedure such as a photo array. Johnson, *supra*; Hill, *supra*. But because the photo array included someone that an algorithm had already selected for their resemblance to the suspect, even though they were actually innocent, witnesses incorrectly selected the "lookalike" photo as the perpetrator—which in turn confirmed officers' assumptions

that they had found the right suspect. Johnson, *supra*; Hill, *supra*. This pattern eventually led the Detroit Police Department, responsible for no fewer than three wrongful arrests based on facial recognition, to prohibit using facial recognition search results in photo arrays unless independent evidence provides reason to suspect the person identified. Andrea May Sahouri & Minnah Arshad, *Detroit cops overhaul facial recognition policies after rotten arrest*, Detroit Free Press (June 28, 2024), https://www.freep.com/story/news/nation/2024/06/28/detroit-police-revises-face-recognition-technology/74251313007/ (last accessed Nov. 15, 2024).

Because of cognitive bias, a practitioner's training, experience, conformance to a given methodology, and confidence in their results are poor measures of whether those results are *correct*, or whether they are reliable enough to present to a jury. As the PCAST Report emphasized, properly designed empirical testing is the *only* way to ensure the reliability of a subjective method: "neither experience, nor judgment, nor good professional practices (such as certification programs and accreditation programs, standardized protocols, proficiency testing, and codes of ethics) can substitute for actual evidence of foundational validity and reliability." *PCAST Report*, *supra*, at 6. "Similarly, an expert's expression of *confidence* based on personal professional experience or expressions of *consensus* among practitioners about the accuracy of their field is no substitute for error rates estimated from relevant studies." *Id.* The PCAST Report concluded: "[E]stablishing foundational

validity based on empirical evidence is thus a *sine qua non.* Nothing can substitute for it." *Id.* The empirical evidence must establish that the method at issue is *repeatable* (i.e., the same examiner reaches the same result when presented with the same evidence or data, with a known probability of deviation), *reproducible* (i.e., different examiners reach the same result from the same evidence, with a known probability of deviation), and *accurate* (i.e., the method produces correct conclusions, with known rates of different kinds of errors). *Id.* at 47.

Yet ShotSpotter offered no empirical evidence, let alone from any appropriately designed studies, that Cayabyab or any of its human analysts could reliably distinguish gunshots from echoes or other sounds, or that they could reliably calculate location estimates when faced with noisy and often ambiguous recordings. Even today, it resists releasing any information about its employees' accuracy and proficiency rates. *See, e.g. People v. Jones*, 220 N.E.3d 475, 482-83 (Ill. App. Ct. 2023) (documenting ShotSpotter's refusal to comply with court order, following defense subpoena, for it to produce "records reflecting the qualifications, experience, and training of the [employee] who analyzed the acoustic pulse" in that case).

But the new evidence provided with the motion for a new trial makes clear that ShotSpotter analysts' post-processing methods exemplify the risk factors for bias and inaccuracy identified in the PCAST Report and scientific literature. Paul Greene's testimony from the California trial acknowledged that post-processing is

"subjective" and not reproducible: different analysts would in fact be likely to produce different results as to timing—and by extension location—from the same sensor data. *See* R.A.II:111-112 at 7/6:192-193. In that case, he testified that a difference of milliseconds in two analysts' timing determinations, likely obtained when one analyst deleted or shifted a timestamp, produced a difference in location of 43 meters, well outside ShotSpotter's advertised error range of 25 meters. R.A.II:111-112 at 7/6: 192-193, 210-211. In the absence of a robust empirical study, there is no way to know whether either analyst's determination was more likely to be correct, or whether either analyst applied a valid method to place the timestamps.

In fact, more recent empirical literature only offers further grounds for skepticism because it shows that humans often perform poorly at identifying, recognizing, and distinguishing sounds. One recent study tested human listeners' ability to determine whether a pair of voice recordings were from the same speaker or different speakers, comparing human subjects' performance to that of an automated forensic voice comparison system. Nabanita Basu et al., *Speaker identification in courtroom contexts – Part I: Individual listeners compared to forensic voice comparison based on automatic-speaker-recognition technology*, 341 Forensic Sci. Int'l 111499, 4-5 (2022). It found that *all* the human subjects performed worse than the automated system, and only a minority did better than

chance; more than half of the human subjects performed "worse than a system that that provided no useful information." *Id.* at 11.

There is no evidence that humans are any better at distinguishing gunshots from echoes than they are at distinguishing voices. Another post-processing analyst may easily have reached a different conclusion than Cayabyab—particularly if that other analyst relied solely on the sensor recordings and not on the extraneous information that police believed that the algorithm-identified location was wrong. *See* Dror, *supra,* at 8001 (documenting risks of exposing analysts to extraneous information). And courts cannot presume reliability; rather, the proponent of expert testimony bears the "burden of proof to demonstrate the reliability of the expert opinion . . . by a preponderance of the evidence." *Commonwealth v. Camblin,* 478 Mass. 469, 476 (2017). The Greene transcript, Dr. Maher's affidavit, and empirical literature make clear that the ShotSpotter testimony presented in this case did not meet that threshold, which should have been grounds for a new trial.

B. Data from several cities demonstrate that ShotSpotter frequently misses, misidentifies, or mislocates gunshots.

In the absence of robust empirical testing for ShotSpotter's computer algorithms and human employees' methods, ShotSpotter's performance in the field offers the next best proxy to gauge its reliability—or, as field data show, lack thereof. Several recent reviews or audits of ShotSpotter in recent years have consistently found that most alerts are dead ends, leading police to scenes where they find no

evidence of gunfire. While these studies were not available to trial counsel at the time of the trial in this case, they offer strong evidence that the Commonwealth's ShotSpotter evidence was not reliable, and that it warranted heavier scrutiny from the trial court.

Most recently, the New York City Office of the Comptroller released an audit report on ShotSpotter's performance there. N.Y.C. Off. of the Comptroller, *Audit Report on the New York City Police Department's Oversight of Its Agreement with ShotSpotter Inc. for the Gunshot Detection and Location System*, FP23-074A (June 20, 2024), https://comptroller.nyc.gov/wp-content/uploads/documents/FP23-074A.pdf. The results were damning. In the first two months reviewed, July and September 2022, ShotSpotter alerts corresponded to confirmed shootings only 20% and 17% of the time, respectively. *Id*. at 9. The audit then examined a six-month period from January through June 2023. For that period, results were even worse: for any given month, at most 13% of alerts corresponded to confirmed shootings; in one month, just 8% did. *Id*.

New York is hardly an outlier. In Chicago, a review by the Office of the Inspector General found that just 9.1% of alerts labeled as "probable" gunfire resulted in dispositions with any evidence of gun-related offenses. City of Chicago, Office of Inspector General, *The Chicago Police Department's Use of ShotSpotter Technology*, at 2, 14 (Aug. 24, 2021), https://igchicago.org/wp-

content/uploads/2021/08/Chicago-Police-Departments-Use-of-ShotSpotter-Technology.pdf. ShotSpotter also frequently missed gunfire, failing to generate an alert for over 20% of shootings and reckless firearm discharges over a 20-month period. Max Blaisdell, Ethan Corey & Jim Daley, *ShotSpotter Routinely Missed Reported Shootings, City Data Shows*, South Side Weekly (Oct. 9, 2024), https://southsideweekly.com/shotspotter-routinely-missed-reported-shootings-city-data-shows/. In Houston, over 80% of ShotSpotter deployments over 16 months were "canceled, marked as unfounded, dismissed as information calls or closed" for lack of evidence at the scene—even as ShotSpotter led to slower police response times. Yilun Cheng, *Houston's gunshot alert system isn't curbing violence but delays police response times, data shows*, Houston Chronicle (July 11, 2023), https://www.houstonchronicle.com/news/investigations/article/houston-gun-alert-police-delays-18117579.php (last accessed Nov. 13, 2024).

Similarly, in Durham, North Carolina, a 12-month assessment found that just 16% of all ShotSpotter alerts matched a confirmed shooting; for alerts unaccompanied by a 911 call, the rate of confirmed shootings was just 9%. Philip J. Cook & Adam Solimon, *Evaluation of Durham's ShotSpotter Installation: Results of a 12-Month Pilot Project*, Wilson Center for Science and Justice at Duke Law, 14 (Feb. 2024). ShotSpotter also logged false negative errors, failing to pick up multiple deadly shootings; based on these failures and the findings from the year-long

evaluation, Durham's city council voted to end its contract for ShotSpotter earlier this year. Zoe Kolenovsky & Jazper Lu, *Durham City Council votes to end controversial ShotSpotter program*, Duke Chronicle (Mar. 4, 2024), https://www.dukechronicle.com/article/2024/03/duke-university-durham-city-council-nc-votes-end-controversial-shotspotter-program-gunshot-detection-software.

Taken together, these data only confirm that ShotSpotter is not reliable and should not have been admitted in this case. While it is impossible to know the ground truth in situations where police found no evidence to corroborate or disprove gunfire at the location of an alert, the high rates of dead-end deployments suggests that ShotSpotter misidentifies or mislocates sounds far more often than its marketing department claims. At the very least, it should have received more thorough scrutiny than was afforded by the limited discovery provided in this case.

II. The ShotSpotter evidence here replicates patterns of flawed forensics known to produce wrongful convictions and likely influenced jurors' interpretation of other evidence.

This case exemplifies the conditions under which flawed forensic science has produced grave miscarriages of justice, up to and including wrongful convictions. The lack of transparency about Cayabyab's post-processing methods, the absence of empirical validation, and communications between police and ShotSpotter that may have introduced cognitive bias into Cayabyab's conclusions are all factors that have

been implicated in wrongful convictions in the past. As such, they are factors that should have precluded the Commonwealth's use of the ShotSpotter evidence, or at least induced trial counsel to retain a qualified expert or raise a *Daubert-Lanigan* challenge. *See Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593-94 (1993); *Lanigan*, 419 Mass. at 25-26.

A. Flawed or misapplied forensic science is a leading cause of wrongful convictions.

While forensic science has provided the legal system with powerful tools, its misuse and misapplication have contributed to the legal system's worst injustices. Of the 3,614 exonerations documented by the National Registry of Exonerations, false or misleading forensic evidence is identified as a contributing factor in 1,035—nearly one third of known exonerations. Nat'l Registry of Exonerations, *% Exonerations by Contributing Factor* (2024), https://www.law.umich.edu/special/exoneration/Pages/ExonerationsContribFactorsByCrime.aspx (last accessed Nov. 13, 2024).[3] Of the DNA exonerations documented by the Innocence Project, more than *half* involve "misapplied forensic science" as a contributing cause. Innocence Project, *Explore the Numbers: Innocence Project's Impact* (Sept. 30, 2024), https://innocenceproject.org/exonerations-data/ (last accessed Nov. 12, 2024).[4]

[3] Permanent link at https://perma.cc/SY5A-9ZVF.
[4] Permanent link at https://perma.cc/38CR-39ZX.

This is in part because jurors tend to accord great weight to expert testimony that sounds scientific, even if the methods underlying that testimony have not been scientifically validated—and even if jurors are told of the lack of validation. *See, e.g.*, Brandon L. Garrett et al., *Mock Jurors' Evaluation of Firearm Examiner Technology*, 44 L. & Hum. Behav. 412, 417 (2020) (finding that "mock jurors accord significant weight to a firearm examiner declaring a match"); Dawn McQuiston-Surrett & Michael J. Saks, *The Testimony of Forensic Identification Science: What Expert Witnesses Say and What Factfinders Hear*, 33 L. & Hum. Behav. 436, 443, 451 (2009) (finding jurors accorded significant weight to hair comparison testimony regardless of information about its limitations). In other words, cross-examination alone is unlikely to cure the prejudicial influence of unreliable forensic evidence.

One study, for instance, examined the effect of presenting jurors with expert hair comparison testimony. McQuiston-Surrett & Saks, *supra,* at 441. When told that hair from a crime scene was a "match" or "similar in all microscopic characteristics" to the defendant's hair, jurors were substantially more likely to believe that the defendant was the source of the crime scene hair and were more likely to infer guilt. *Id.* at 444-45. Crucially, this effect persisted even when jurors were told that, during cross-examination, the expert witness acknowledged that "the assumptions underlying the expert's opinion" had undergone "little scientific testing," and that the expert's conclusions "were his subjective judgment informed

by his experience working on prior cases" rather than by empirical validation. *Id*. at 446. In almost all cases, the study found, "[i]ntroducing the limitations of forensic science during the trial was seemingly ineffective in affecting jurors' judgments." *Id.* at 451. As such, the authors concluded that most jurors' "exaggerated view" of forensic science's capabilities "is not easily remedied." *Id.* This is "particularly problematic considering that judges may admit scientifically flawed/invalid evidence and that jurors often are not able to distinguish between sound and flawed science." *Id.* (internal citations omitted).

Jurors' reliance on forensic science testimony can have—and has had—profound and tragic consequences. In many cases, individuals who were misidentified or falsely inculpated by evidence that sounded scientific but lacked empirical validation have spent decades in prison before being exonerated. *See, e.g.*, Nat'l Registry of Exonerations, *Gary Cifizzari* (2022), https://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=5650 (last accessed Nov. 15, 2024) (documenting case of Gary Cifizzari, who was convicted in 1984 of murder based largely on conclusions of multiple forensic dentists who claimed to "match" his teeth to marks on victim's body, even though bitemark analysis wholly lacks scientific validity, and who remained in prison until DNA testing led to his exoneration in 2017); Nat'l Registry of Exonerations, *Victor Rosario* (2023), https://www.law.umich.edu/special/exoneration/Pages/casedetail.

aspx?caseid=5196 (last accessed Nov. 15, 2024) (documenting case of Victor Rosario, who was convicted of arson in 1983 based on testimony of fire investigators whom later experts determined had reached their conclusions of arson before even entering the building, and whose reasoning had been "debunked by years of scientific testing"; he was not exonerated until 2017). It is impossible to know how many people remain imprisoned for crimes they did not commit, lacking the evidence needed—DNA or otherwise—to challenge their convictions.

B. The contextual and potentially biasing information police gave the ShotSpotter analyst in this case poses an especially high risk.

One of the major sources of error in flawed forensic science testimony is analysts' exposure to extraneous information, which can bias their interpretation of the evidence. Such exposure can cause "some aspect of analysis to be overweighted, underweighted, or neglected," leading practitioners to base their conclusions on the extraneous information rather than on the methods they are qualified to practice. Dror, *supra*, at 8001. This contributes to several of the forms of cognitive bias discussed above: confirmation bias, circular reasoning, and determinations by forensic examiners that rely on inappropriate factors.

As with cognitive bias generally, this Court has already recognized the risks of extraneous and suggestive information in the context of eyewitness identifications. In the recent case *Commonwealth v. Gaines*, this Court considered a photo identification procedure where an eyewitness initially identified two photos

from a set of 61 photos (which did not include a photo of Gaines); he received a call some weeks later from a detective telling him that he "identified the wrong persons," and shortly afterward was given the same set of photos, this time with Gaines' photo and three others added. *Commonwealth v. Gaines*, 494 Mass. 525, 529 (2024) At the second identification procedure, the witness selected Gaines. *Id.* Acknowledging the extreme unreliability of this identification, this Court pointed to expert testimony that "suggestive statements[] from a third party can lead to false memories and erroneous identifications." *Id.* at 539. Affirming the motion judge's order granting a new trial, his Court held that advances in eyewitness identification science, which exposed the biasing influence of suggestive statements and police feedback, constituted newly discovered evidence. *Id.*

Contextual information, even if not as egregious as what the witness in *Gaines* was told, is similarly dangerous when given to forensic analysts. For instance, one study found that forensic pathologists treated identical medical information differently depending on the race and identity of the people involved. Itiel Dror et al., *Cognitive bias in forensic pathology decisions,* 66 J. Forensic Sci. 1751, 1753 (2021) Researchers in that study presented forensic pathologists with a hypothetical case about the death of a young child whose caregiver "described finding the toddler unresponsive." *Id.* Each pathologist received the same *medical* information, but a random subset of them were told that the child was white and the caregiver in

question was the child's grandmother, while the rest were told that the child was African American and the caregiver was the mother's boyfriend. *Id.* The extraneous information heavily influenced their decisions: when told the child was Black and the caregiver was the mother's boyfriend, pathologists were five times more likely to rule the child's death a homicide than an accident. *Id.* at 1753-54. In the case of a white child brought in by a grandmother, the opposite was true: they were more likely to label the death an accident versus a homicide, even though the medical information was the same. *Id*.

Extraneous information can even lead examiners to reverse their *own* prior decisions. For example, one study tested six fingerprint examiners, giving each of them a set of eight prints they had previous evaluated. Dror & Charlton, *supra*, at 610. Each set contained both prints the examiner had labeled as exclusions and prints they had labeled as inclusions during prior examinations. *Id.* at 607-08. In half the cases, examiners were also given contextual information, such as that the suspect had confessed (suggesting inclusion) or had been in custody at the time of the crime (suggesting exclusion). *Id.* at 608. Four of the six examiners made at least one decision inconsistent with their own prior determinations; the inconsistent decisions occurred twice as often in cases with contextual information compared to cases without it. *Id.* at 610.

The circumstances of this case clearly present a risk that the ShotSpotter report was biased by extraneous information. Cayabyab was prompted to conduct his post-processing analysis when a detective specifically told him that police believed that the March 24, 2015, ShotSpotter alert was both related to a homicide and mislocated. Tr. 1/24:24-25, 60-62. Even if police did not notify Cayabyab of the specific location where they believed gunshots had occurred, the very fact that they told him of a suspected mislocation error almost certainly influenced his interpretation of the acoustic data and his decisions about which pulses to treat as echoes versus possible gunfire. Yet Cayabyab did not document in his report his rationale for treating certain sounds as echoes and others as gunfire or the process by which he arrived at the revised location estimate. Tr. 1/24:24-25. Instead, during his voir dire, he specifically confirmed that ShotSpotter's "mathematical and . . . computer algorithms," which he agreed were "a substantial part of the basis of [his] conclusion," would not be disclosed. Tr. 1/24:24-25.

This is precisely the confluence of circumstances that poses the greatest risk of cognitive bias and error. Here, Cayabyab used a method that lacks empirical validation to assess whether it produces accurate results. That method relies on subjective and opaque judgments, on which different examiners make different decisions. Yet the ultimate results are highly sensitive to small differences in examiners' initial decisions: the fact that the revised location was off from the initial

one by more than 200 meters goes to show how minute differences in timing and acoustic signal interpretation produce large differences in location determinations. *See* Tr. 1/24:61 (testimony from officer that ShotSpotter activation placed location "200 or 300 yards away" from where deceased's body was found). Moreover, Cayabyab's method was neither transparent, nor standardized, nor reproducible. And finally, he was exposed to extraneous information from police that was irrelevant to the data captured by acoustic sensors: the police's belief that a mislocation error had occurred. It is entirely possible that a different examiner, conducting an analysis uncontaminated by a police theory that the location was wrong, would have reached a different conclusion.

Taken together, this is a perfect storm of risk factors—risk factors that have led not just to unreliable evidence but to profoundly unjust outcomes. Yet the trial court failed to adequately account for these risk factors, even when presented with an expert affidavit and testimony from a ShotSpotter employee exposing the subjectivity, inconsistency, and lack of empirical validation of post-processing determinations.

C. Reversal is warranted because the unreliable ShotSpotter evidence likely influenced how jurors interpreted other key evidence.

The ShotSpotter evidence cannot solely be considered in isolation. Rather, an analysis of its impact must account for its influence on jurors' perceptions of other evidence—crucially, the conflicting evidence about whether or not anyone saw or

heard gunshots at 1470 Dwight Street. *See* Tr. 1/31:120 (testimony of Reginald Herd reporting a "thumping" noise at that location one or two days prior to finding the body, but no gunshots). Where jurors must make a credibility determination to assess conflicting witness testimony—especially testimony from witnesses who may have motivations to cooperate with the prosecution or to lie—the import of purportedly "objective" and "scientific" expert testimony cannot be overstated. But when that expert testimony has not in fact been scientifically validated, and is not in fact reliable, it can serve to taint the rest of the evidence rather than provide a useful check for credibility.

It is clear, here, that the Commonwealth relied on the ShotSpotter evidence to bolster the accounts of its other witnesses. In the absence of any scientifically sound, objective evidence of the time and location of death, the Commonwealth argued that ShotSpotter corroborated the testimony of its cooperating witnesses. *See* Tr. 2/1:58-60. But at least one witness—Reginald Herd, who unlike other witnesses had no obvious motive to conform to the Commonwealth's theory of the case—gave testimony that cast doubt on whether the shooting occurred at the location the Commonwealth identified: he reported hearing no gunshots at that location during the relevant time frame. Tr. 1/31:120. Given the conflicting testimony, the key factor lending credence to the cooperating witnesses' accounts was the ShotSpotter report.

But that report, as discussed, rests on shaky, subjective, and empirically unsupported foundations.

To affirm the denial of a new trial on the basis that the ShotSpotter evidence was of minimal import, or that Mr. Rios' conviction was adequately supported by other evidence in the record, would be to gravely misconstrue ShotSpotter's role in this case. Such a conclusion would fail to account for the impact of the ShotSpotter evidence—especially given its purported objectivity and scientific-sounding presentation—on jurors' consideration of all the other testimony before them. The Commonwealth, in asking the Court to affirm on this ground, engages in its own form of circular reasoning: it makes the erroneous claim that ShotSpotter could not have been a major factor in the jury's decision in light of the other evidence, when in fact it was ShotSpotter that likely lent that other evidence credibility. ShotSpotter's unreliability undermines the reliability of the trial proceedings and Mr. Rios' conviction as a whole. Reversal is the appropriate remedy.

CONCLUSION

For the foregoing reasons, Amici respectfully request that this Court reverse the judgment and denial of a new trial.

Dated: November 15, 2024

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to Rule 17(c)(9) of the Massachusetts Rules of Civil Procedure, I, Radha Natarajan, hereby certify that the foregoing **Brief of Amici Curiae the New England Innocence Project and The Innocence Project in Support of Appellant** complies with the rules of court that pertain to the filing of amicus briefs, including, but not limited to:

Mass. R. A. P. 16(e) (references to the record);
Mass. R. A. P. 17(c) (cover, length, and content);
Mass. R. A. P. 20 (form and length of brief); and
Mass. R. A. P. 21 (redaction).

I further certify that the foregoing brief complies with the applicable length limitation in Mass. R. A. P. 20 because it is produced in the proportional font Times New Roman at size 14 points and contains 7,486 total non-excluded words as counted using the word count feature of Microsoft Word 365.

Dated: November 15, 2024

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COMMONWEALTH OF MASSACHUSETTS

SUPREME JUDICIAL COURT

No. SJC-12982

COMMONWEALTH OF MASSACHUSETTS,
Plaintiff-Appellee,
v.

LEE MANUEL RIOS,
Defendant-Appellant.

CERTIFICATE OF SERVICE

Pursuant to Mass. R. A. P. 13(e), I, Radha Natarajan, hereby certify, under the penalties of perjury, that on this date of November 15, 2024, I have made service of a copy of the foregoing **Brief of Amici Curiae the New England Innocence Project and The Innocence Project in Support of Appellant** in the above captioned case upon all attorneys of record by electronic service through eFileMA.

Dated: November 15, 2024

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