

IN THE SUPERIOR COURT OF THE STATE OF DELAWARE

SHOTSPOTTER, INC.,

Plaintiff,

v.

VICE MEDIA, LLC,

Defendant.

No. _____

Jury Trial Demanded

COMPLAINT

1. This defamation action arises out of VICE Media, LLC’s deliberate misrepresentation of court records that rebutted the false narrative that VICE set out to tell about police and ShotSpotter, Inc., a company whose gunfire-sound-detecting technology saves lives by reducing the response times of first responders. VICE targeted ShotSpotter in order to cultivate a “subversive” brand that enables VICE to sell “sponsored content”—advertising disguised as reporting—to corporations hawking goods like sneakers and “eco-friendly” beer. In executing that strategy, VICE was determined to publish stories about how “new technologies” are used “against people who are historically vulnerable and marginalized.”¹ So when court records *disproved* that false narrative about ShotSpotter, VICE intentionally misrepresented the truth because it was financially incentivized to do so.

¹ David Carr, *Inviting In a Brash Outsider*, N.Y. Times (Feb. 14, 2010); Motherboard Staff, *How to Pitch Motherboard*, VICE (Oct. 2018).

2. In furtherance of its marketing strategy, VICE targeted ShotSpotter with a story, podcast, and tweets—by the Editor-in-Chief of VICE’s “Motherboard” imprint, Jason Koebler—that falsely accused ShotSpotter of conspiring with police to fabricate gunshots from thin air to frame innocent Black men.



3. VICE’s agents recklessly disregarded or intentionally concealed facts that rebutted their smear campaign, for example: that ShotSpotter is led by a Black CEO and overseen by a board that includes the president of the largest civil rights organization in the United States, that ShotSpotter has saved the lives of Black gunshot victims, and that ShotSpotter’s expert witnesses have exonerated Black men of crimes they did not commit.

4. In endeavoring to make the facts conform to a false preconceived narrative that supported VICE's "subversive" branding strategy, VICE's agents also deliberately misrepresented court records demonstrating that ShotSpotter evidence has repeatedly withstood scrutiny in court and that no court has ever ruled that ShotSpotter altered or fabricated evidence.

5. As a result of VICE's false reporting, ShotSpotter has suffered substantial harm. ShotSpotter brings this lawsuit to recover damages in excess of \$300 million, to set the record straight, and to stand up for its dedicated employees, law enforcement officers, and the communities they serve that are disproportionately impacted by gun violence.

PARTIES

6. Plaintiff ShotSpotter, Inc. is a Delaware corporation with its principal place of business in Newark, California. Since 2014, ShotSpotter has contracted with the City of Wilmington, Delaware, to operate a gunshot monitoring system. The contract has been renewed annually since an initial three-year trial period ended, and the system has been expanded, now covering a five-mile radius within the city.

7. Defendant VICE Media, LLC is a media company organized under the laws of Delaware and headquartered in Brooklyn, New York.

FACTUAL ALLEGATIONS

ShotSpotter's real-time alerts save lives

8. Every day, more than 100 Americans are killed with guns, and more than 230 are shot and wounded.² More than 80% of gunshots are not reported to 911.³ Even when people do hear gunshots and call 911, their reports are often imprecise, erroneous, or too late to save the lives of gunshot victims.

9. To address this problem, ShotSpotter offers communities a network of gunfire-detecting acoustic sensors. When a loud, impulsive sound is detected by ShotSpotter's sensors, ShotSpotter's software automatically prescreens the sound and filters out noises likely to be fireworks and helicopters. The remainder are sent to a team of human reviewers that playback audio clips and analyze them to determine if the sound is gunfire. Based on the speed of sound and the times at which the sound reaches different sensors, ShotSpotter's software determines the approximate location of the gunfire, and ShotSpotter notifies law enforcement of the longitude and latitude of the gunfire and a corresponding street address—*all typically within 45-60 seconds*. ShotSpotter enables law enforcement to get on the scene faster to render aid to gunshot victims, reducing transport times to the hospital and saving lives.

² *Gun Violence in America*, Everytown for Gun Safety (May 19, 2020, updated Apr. 27, 2021).

³ Jillian B. Carr & Jennifer L. Doceac, *The geography, incidence, and underreporting of gun violence: new evidence using ShotSpotter data*, Brookings Institution (2016).

10. For example, this April in Chicago, ShotSpotter swiftly alerted Officer Rhonda Ward and Officer Julius Givens to the location where a 13-year-old boy had been shot while walking home. The officers put the boy in their squad car and rushed him to the emergency room, where he survived his injuries due to the swift treatment he received. If ShotSpotter had not promptly alerted police to the shooting, the boy might not be alive today.⁴



A 13-year-old Chicago resident was rushed to the emergency room by Officers Rhonda Ward and Julius Givens, after ShotSpotter alerted them to the location where he had been shot.

⁴ See Kelly Davis, 'He's a hero too': CPD officers recall saving 13-year-old boy shot on South Side, WGN9 (Apr. 29, 2021), <https://wgntv.com/news/hes-a-hero-too-cpd-officers-recall-saving-13-year-old-boy-shot-on-south-side/>.

11. He is not the only person alive today because of ShotSpotter. In 2020 alone, ShotSpotter alerted authorities in Oakland, California to 123 shooting victims before 911 calls came in. Of those victims, 101 survived, some because ShotSpotter alerts significantly reduced emergency response times, reportedly allowing police and emergency medical services to respond in as little as two minutes of a ShotSpotter activation.⁵

12. In Pittsburgh, Pennsylvania, ShotSpotter led first responders to 83 shooting victims and allowed police to get to victims and to crime scenes quicker, according to Commander Jason Lando. He reported that ShotSpotter was invaluable in helping Pittsburgh police render swift aid to shooting victims.⁶

13. Clinical research from Cooper Health in Camden, New Jersey, showed a 3.5-minute reduction in EMS and police transport time for gunshot victims to the hospital in ShotSpotter coverage areas compared to non-ShotSpotter areas.⁷

⁵ See Memorandum from Trevelyan Jones, Captain, Ceasefire Section, Oakland Police Dep't to LeRonne Armstrong, Oakland Chief of Police, at 2 (Jun. 7, 2021), <https://cao-94612.s3.amazonaws.com/documents/Special-Meeting-Packet.pdf>.

⁶ Adam Smeltz, Pittsburgh Council Backs Expanding Gunshot Detection System, Pittsburgh Post-Gazette (Mar. 14, 2018), <https://www.post-gazette.com/local/city/2018/03/14/Pittsburgh-City-Council-ShotSpotter-expansion-Wendell-Hissrich-North-Side-Jason-Lando-Darlene-Harris-Deborah-Gross/stories/201803140183>.

⁷ Cooper Health, Trauma Transport Time Savings, J. of Trauma & Acute Care (2019), https://journals.lww.com/jtrauma/Citation/2019/12000/Use_of_ShotSpotter_detection_technology_decreases.2.aspx.

14. The Policing Project, a non-profit entity at New York University School of Law, did a study measuring ShotSpotter's effects in St. Louis County, Missouri. The study compared a portion of a high crime area where ShotSpotter sensors were installed to another portion of the high crime area where ShotSpotter sensors were not installed and found that police were alerted to four times as many gunshot incidents in covered areas. Across the eight police beats with ShotSpotter, reported assaults, which include gun-related assaults, declined by about 30% following the implementation of the technology.⁸

ShotSpotter's expert witnesses and detailed forensic reports provide juries with the facts about where and when guns were fired

15. In addition to real-time alerts, ShotSpotter also offers detailed forensic reports and expert testimony that has repeatedly survived scrutiny under the *Frye* and *Daubert* standards.

16. These in-depth analyses are prepared by experts who spend hours reviewing audio recordings—sometimes including audio recordings from nearby sensors and/or immediately before or after the short audio clips identified in real-time—and evaluating wave patterns for echoes and other acoustic anomalies that may have impacted how gunfire was initially interpreted.

⁸ Policing Project at NYU Law, *Measuring the Effects of ShotSpotter on Gunfire in St. Louis County, MO*, at 1 (2021), <https://static1.squarespace.com/static/58a33e881b631bc60d4f8b31/t/603923e3a32c3f57d67dabec/1614357476874/Measuring+the+Effects+of+Shotspotter+on+Gunfire+in+St.+Louis+County%2C+MO.pdf>.

17. The detailed forensic analysis enables ShotSpotter to provide more precise and detailed information than what is gleaned from the real-time alerts that are generated in less than a minute.

18. For example, when there are multiple gunshots from a shooter who is on the move, the real-time alert will dispatch law enforcement to a single location in the approximate center of the gunshots—rather than generating multiple alerts for the same incident.

19. But, with hours to evaluate audio recordings, soundwave patterns, echoes, and other forensic data, experts can identify more precise locations of individual gunshots involved in a particular incident.

20. Similarly, when compared with real-time alerts, detailed forensic reports can provide a more complete picture of the context of an incident.

21. For example, out of respect for privacy concerns, ShotSpotter saves only short audio clips surrounding loud, impulsive sounds, and only those that are software-classified as likely gunfire are initially reviewed by human analysts during the 45-60-second real-time alert process.

22. However, during the more detailed post-incident review, experts can search and analyze the audio from multiple area sensors to obtain a more complete and detailed picture of the entire incident, which may uncover additional gunshots or additional information about the gunshots detected in real-time.

23. ShotSpotter's detailed forensic analysis is an additional level of review designed to provide more detailed and precise information.

24. Throughout the processes of generating real-time alerts and detailed forensic reports, the conclusions from each layer of review are preserved by ShotSpotter to ensure that the process is transparent and can be audited. The record is not "modified," and the process does not result in "altered" or "fabricated" evidence.

25. ShotSpotter's audio files, like all files, are assigned a 32-character alphanumeric code called an "MD5 hash."

26. If a file were edited in the slightest, a new hash would be assigned: in other words, ShotSpotter audio files cannot be edited without leaving an electronic trail.

27. Real-time alerts and detailed forensic reports are different services designed for different purposes.

28. While real-time alerts provide an approximate location of the gunfire to ensure that shooting victims are reached as quickly as possible, ShotSpotter's detailed forensic reports assist juries in determining the facts about where and when guns were fired, regardless of whether the facts support a conviction or an acquittal or dismissal.

29. ShotSpotter employs two expert witnesses, both of whom have testified for the prosecution *and for the defense*, Walter Collier III and Paul Greene:



Walter Collier III



Paul Greene

30. ShotSpotter's expert witnesses have repeatedly helped vacate convictions, secure acquittals and dismissals, and defend the constitutional rights of Black men.

31. By way of example only, in 2018, Rodney Tyrone Smith was convicted of shooting an elderly man in the face and was sentenced to 95 years in prison. But after ShotSpotter's evidence and expert testimony proved that Smith could not have been at the scene at the time of the shooting, the court vacated his conviction.⁹

⁹ *Georgia v. Rodney Tyrone Smith*, No. CR161037 (Ga. Super. Ct. Chatham Cty. Jul. 27, 2020) (Ex. 1).

VICE falsely accuses ShotSpotter of conspiring with police to fabricate and alter evidence to frame innocent Black men

32. On July 26, 2021, VICE launched a defamatory campaign in which it falsely accused ShotSpotter of conspiring with police to fabricate and alter evidence to frame Black men for crimes they did not commit. In support of this defamatory accusation, VICE also falsely claimed that ShotSpotter evidence has never been evaluated by a court because a “pattern” exists in which, when challenged, ShotSpotter evidence is withdrawn to avoid scrutiny.

33. VICE pushed these defamatory falsehoods in a story by Todd Feathers titled “Police Are Telling ShotSpotter to Alter Evidence from Gunshot-Detecting AI,” which VICE promoted with its “CYBER” podcast and in a series of tweets saying that “Police all over America are regularly asking Shotspotter, the AI-powered microphones that ‘detect gunshots’ to fabricate gunshots from thin air for court proceedings,” that a “ShotSpotter employee testified in court that police ask them to invent gunshots where they did not exist,” and that “fabricated Shotspotter evidence was the only evidence against [a] man” who was “exonerated and Shotspotter and the Rochester police mysteriously deleted all audio recorded. Blatant corruption.”¹⁰

¹⁰ See Jason Koebler (@jason_koebler), Twitter (Jul. 26, 2021, 10:09 a.m.), https://twitter.com/jason_koebler/status/1419661153278513157 (Ex. 2); Jason Koebler (@jason_koebler), Twitter (Jul. 26, 2021, 10:11 a.m.), https://twitter.com/jason_koebler/status/1419661624189849618 (Ex. 3); Jason Koebler (@jason_koebler), Twitter (Jul. 26, 2021, 10:17 a.m.), https://twitter.com/jason_koebler/status/1419663131853402113 (Ex. 4).

VICE intentionally misrepresented court records

34. As ShotSpotter informed Feathers before publication, evidence collected by the ShotSpotter system has been used by both prosecutors ***and defendants*** in 190 court cases in 20 states over the years. As court records reflect, no court has ever found that ShotSpotter altered or fabricated evidence.

35. Instead, court records reflect that ShotSpotter has repeatedly withstood challenges under the *Kelly-Frye* and *Daubert* standards, which VICE knew because ShotSpotter explicitly informed Feathers of this fact before publication. In fact, ShotSpotter evidence has survived scrutiny and been admitted by courts following at least fifteen *Frye* or *Daubert* hearings:

- *Missouri v Edward Roach*, No. 1022-CR04186-01 (Mo. Cir. Ct. 22d Cir.);
- *New York v. Durham*, No. 11-1078 (N.Y. Sup. Ct. Rensselaer Cty.) (**Ex. 5**);
- *Nebraska v. Thylun Hill*, No. CR12-861 (Neb. D. Ct. Douglas Cty.), *aff'd* 851 N.W.2d 670, 689–90 (Neb. 2014) (**Ex. 6**);
- *California v. Timonte Emari Cook*, No. 05-120946-9 (Cal. Super. Ct. Contra Costa Cty.) (**Ex. 7**);
- *California v. Zachery Goodwin*, No. F16900408 (Cal. Super. Ct. Fresno Cty.) (**Ex. 8**);
- *Samelton v. Indiana*, 57 N.E.3d 899 (Ind. Ct. App.) (**Ex. 9**);
- *Minnesota v. Talia Brooks*, No. 27-CR-14-11992 (Minn. 4th D. Ct.) (**Ex. 10**);
- *Johnson v. Indiana* (Ind. Ct. App. 2016) (**Ex. 11**);

- *Pennsylvania v. Tre Goins*, No. 7284-2016 (Penn. Ct. Com. Pl. Allegheny Cty.);
- *California v. Michael D. Reed*, No. 1615117 (Cal. Super. Ct. S.F.) (**Ex. 12**);
- *California v. Rickeoneico Williams*, No. 17-FE-007924 (Cal. Super. Ct. Sacramento Cty.) (**Ex. 13**);
- *California v. Luis Javier Morales*, No. 5-170990-6 (Cal. Super. Ct. Contra Costa Cty.);
- *California v. Todd Gillard*, No. 1-164044-0 (Cal. Super. Ct. Contra Costa Cty.);
- *Florida v. Ronald Bost*, No. 17-582049 (Fla. Cir. Ct. Duval Cty.) (**Ex. 14**);
- *California v. Fred Andre Bates*, No. 19-CR-016277 (Cal. Super. Ct. Alameda Cty.) (**Ex. 15**).

36. ShotSpotter has also prevailed over many additional *Frye* and *Daubert* challenges that were decided based on written submissions.

37. VICE’s agents who were involved in pushing false claims about ShotSpotter reviewed *at least* four of the 190 court cases that ShotSpotter referenced before publication: *Reed*, *Godinez*, *Williams*, and *Simmons*. The court records in those cases rebut VICE’s false claims about ShotSpotter, so VICE intentionally misrepresented them.

38. For example, VICE referenced testimony from a “2017 San Francisco case,” which is *California v. Michael D. Reed*, No. 16015117 (Cal. Super. Ct. S.F. Cty.). There, the court held a *Frye* hearing, carefully evaluated the ShotSpotter

evidence, and held that the ShotSpotter evidence *would* be admitted—rebutting VICE’s false accusation that there was a pattern of ShotSpotter evidence being withdrawn to avoid scrutiny in court.

39. The ShotSpotter evidence in the *Reed* case was not only admitted; it was unquestionably correct. The ShotSpotter alert was corroborated by video footage *and the defendant’s own testimony*, in which he admitted to firing at a passing car but claimed self-defense.¹¹

40. VICE also falsely claimed that ShotSpotter’s expert testified in the *Reed* case that ShotSpotter’s accuracy rates were invented by the marketing department. But that claim is rebutted by the very testimony at issue, which was that the marketing department created only the performance guarantee in ShotSpotter’s contracts, *not* ShotSpotter’s actual detection rate.

41. Moreover, VICE knew from a pre-publication email from ShotSpotter to Feathers that the testimony from ShotSpotter’s expert in the *Reed* case “referenced the minimum rate of detection we guarantee our customers and had nothing to do with the determination of our actual historical accuracy rate. While marketing and sales have appropriate input on our service level guarantees for our contracts, actual accuracy rates are based on detections that we record.”

¹¹ *People v. Reed*, No. A155280, 2021 WL 1207376, *1 (Cal. Ct. App. Mar. 30, 2021), *review denied* (Jun. 30, 2021).

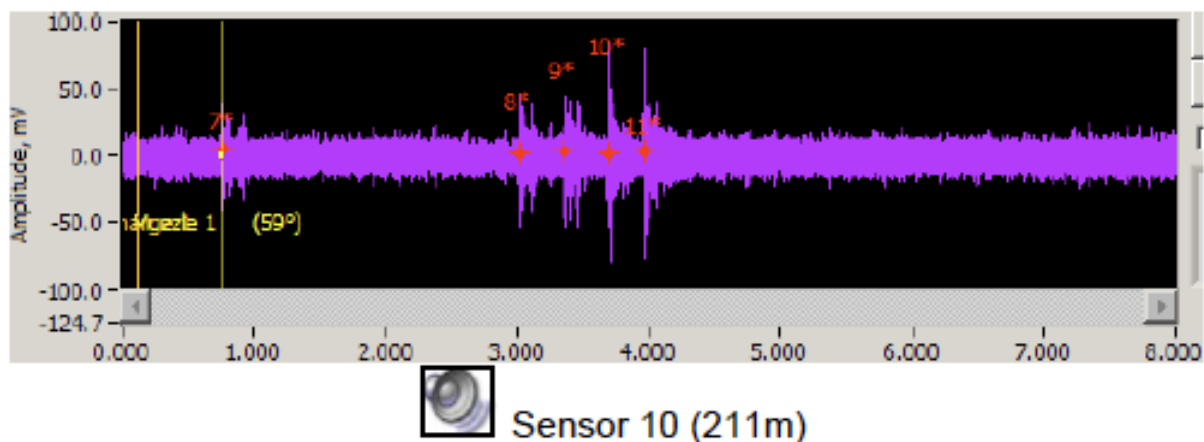
42. VICE likewise intentionally misrepresented court records from *United States v. Godinez*, No. 18-CR-278 (N.D. Ill.). In that case, the defense **failed** to persuade the judge that ShotSpotter’s technology was unsound. The records in *Godinez* showed that the ShotSpotter evidence survived scrutiny in court, rebutting VICE’s assertions to the contrary. Although the appellate court later found that the trial judge had committed a structural error, the appellate court’s finding had nothing to do with the reliability of ShotSpotter’s technology or whether the company was tampering with evidence, which the Seventh Circuit expressly noted.

43. VICE also deliberately misrepresented court records from *New York v. Simmons*, 71 N.Y.S.3d 924 (N.Y. Sup. Ct. Monroe Cty.). In that case, the court admitted the ShotSpotter evidence for trial, finding it sufficiently reliable to be admitted for consideration on the question of whether a weapon had been fired at police.

44. The jury found Simmons not guilty of those charges and instead found him guilty of only a gun possession charge. That conviction was then vacated because the jury’s split verdict—which suggested that jurors had not credited a police officer’s testimony about Simmons’s actions—left ShotSpotter as the sole piece of evidence supporting his conviction. But the sound of a gunshot, standing alone, was simply not enough to put a gun in Simmons’s hand. The ShotSpotter expert in the *Simmons* case did **not** testify that he had “fabricate[d] gunshots out of

thin air” as VICE falsely claimed, but simply that he had searched for—and found—audio recordings that provided additional context for the incident.

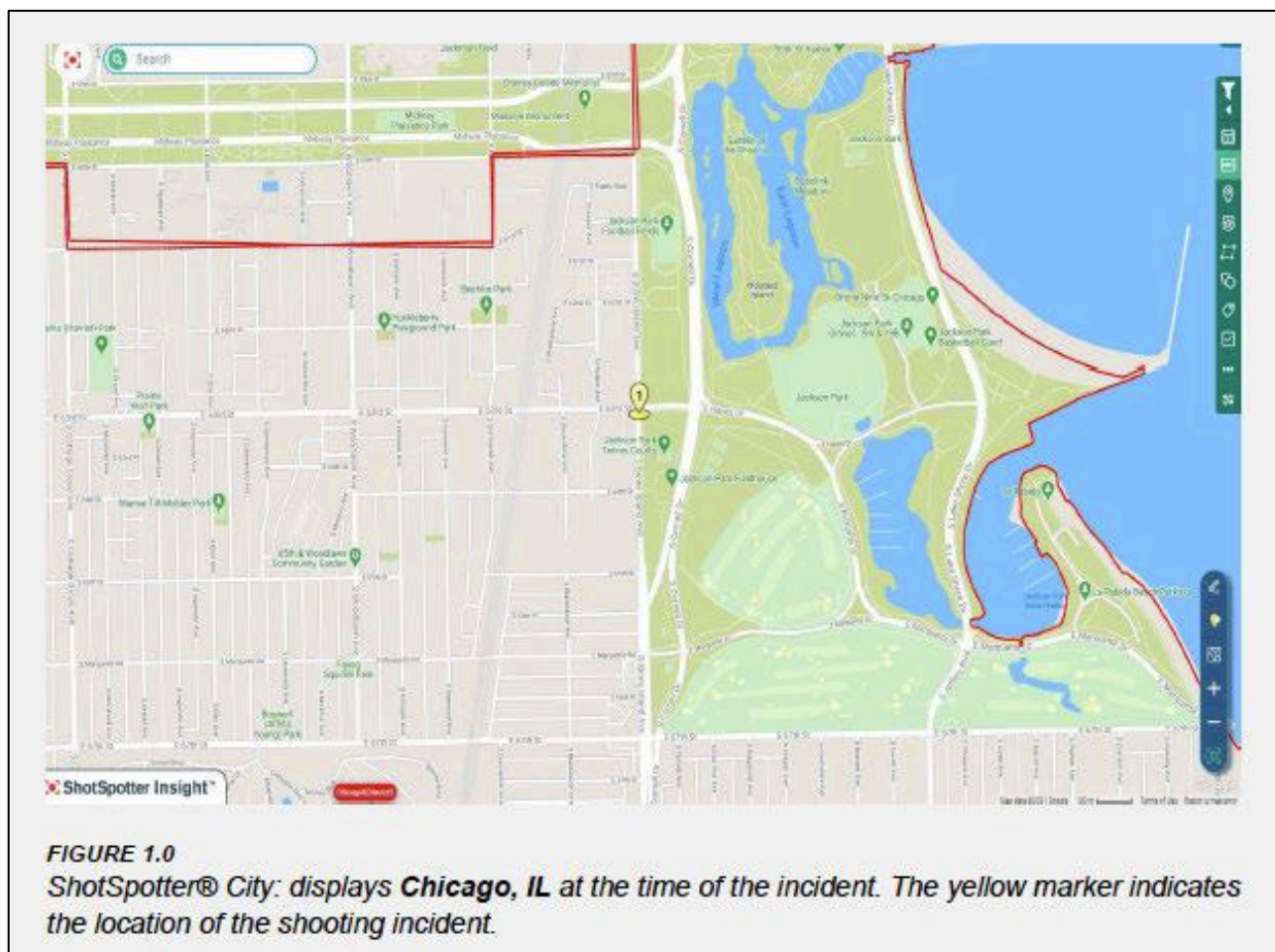
45. VICE’s accusation—that ShotSpotter conspired with police to “mysteriously delete[]” audio files of the so-called “fifth shot” in the *Simmons* case—is also demonstrably false. Before publication, Feathers and VICE’s other agents knew that the audio files had not been deleted because court records show that the recording of the five shots was introduced as Exhibit 120 and played for the jury at trial. Indeed, the pictorial representation of the soundwave—***and embedded audio recording***—of the shots were included in ShotSpotter’s detailed forensic report:



Excerpt from ShotSpotter’s detailed forensic report in *New York v. Simmons*, 71 N.Y.S.3d 924 (N.Y. Sup. Ct. Monroe Cty.), reflecting a first shot followed by four additional shots.

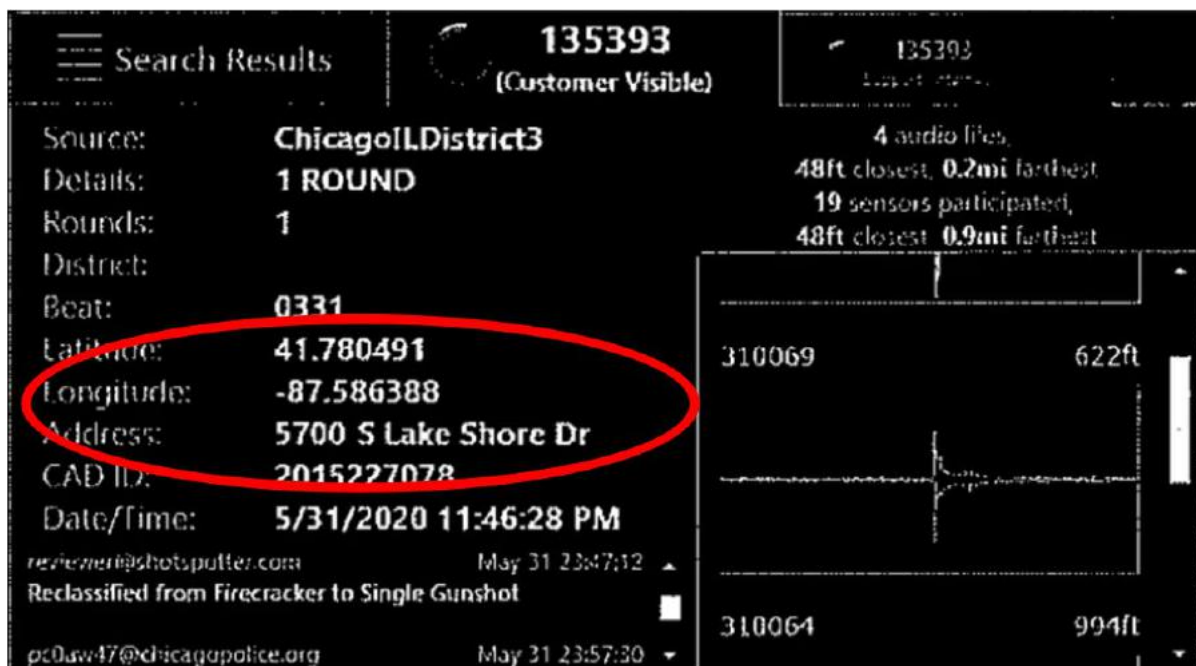
46. VICE likewise fundamentally misrepresented *Illinois v. Michael Williams*, No. 20 CR 0899601 (Ill. Cir. Ct. Cook Cty.). Specifically, VICE falsely claimed that ShotSpotter had changed the location of the gunfire by “more than a

mile” in order to support the prosecutor’s theory of the case. That is demonstrably false. ShotSpotter’s real-time alert accurately geolocated the shots at longitudinal and latitudinal coordinates near the intersection of South Stony Island Avenue and East 63rd Street, on the edge of a large park with a street address of 5700 South Lake Shore Drive. This is explained and depicted in ShotSpotter’s detailed forensic report of the incident:



47. Although the street address for the entrance to the park is approximately a mile away from the coordinates of the intersection where

ShotSpotter geolocated the gunfire on the edge of the park, Feathers and VICE's other agents knew before publication that ShotSpotter did **not** change the coordinates of the gunfire by "more than a mile," but that ShotSpotter's real-time alert had provided law enforcement with **both** the street address for the entrance to the park **and** specific latitudinal and longitudinal coordinates corresponding to the intersection on the edge of the park. VICE's agents knew this from a screenshot of the real-time alert that was contained in a court record that VICE's agents reviewed before publication:



48. Moreover, after ShotSpotter learned that prosecutors sought to prove that Williams had shot the victim inside a car, ShotSpotter reminded them that ShotSpotter expert testimony and evidence would not support the prosecution's theory of the case because—as set forth in ShotSpotter's contracts and the detailed

forensic report itself—ShotSpotter’s technology is only guaranteed to locate shots fired *outdoors*, not inside a car.¹² It was then that the prosecution dropped the case. In other words, the ShotSpotter evidence was not withdrawn to avoid scrutiny of ShotSpotter’s technology as VICE falsely claimed, but because ShotSpotter only offers expert conclusions that are supported to a reasonable degree of scientific certainty.

49. As another example of VICE’s deliberate misrepresentations, VICE, in its podcast, falsely accused ShotSpotter of nefarious conduct by claiming that “someone had accessed the ShotSpotter data and altered it so that something that had been registered as a firework in the database was then called a gunshot later.” VICE deliberately concealed from listeners that ShotSpotter’s human analyst was unquestionably correct: the victim was killed by a gunshot, not a firework.

50. In *none* of these cases—not *Reed*, *Godinez*, *Williams*, *Simmons*, nor any of the other cases that VICE’s agents reviewed or purposefully avoided—did a court find that ShotSpotter had manufactured, altered, or fabricated evidence, nor did ShotSpotter’s experts ever testify to that effect.

¹² ShotSpotter’s contract with Chicago explains that it is only accurate for “Detectable Gunfire,” which is defined to mean “unsuppressed discharges of ballistic firearms which occur fully outdoors in free space (i.e. not in doorways, vestibules, windows, vehicles, etc.)[.]” The detailed forensic report states that ShotSpotter can only detect “outdoor incidents” and notes that “[o]ther factors, such as ... weapon discharge in an enclosed space” can interfere with the sensors.

51. VICE fundamentally and intentionally misrepresented these four cases as supporting the false propositions that there is a “pattern of alterations,” a “pattern” of withdrawing evidence to avoid scrutiny, that ShotSpotter “invent[s] gunshots where they did not exist” and that ShotSpotter repeatedly “modif[ies] alerts,” “alter[s] reports,” or “[a]lter[s] [e]vidence” to frame innocent Black men.

52. VICE’s false narrative of ShotSpotter conspiring with police to frame innocent Black men is likewise rebutted by the fact that—as VICE knew before publication from an email to Feathers—court records reflect that ShotSpotter evidence and expert testimony have been introduced at trial as relevant to both guilt *and innocence*.

53. In sum, despite court records demonstrating that ShotSpotter evidence and testimony have repeatedly withstood scrutiny in court, that ShotSpotter’s expert witnesses have exonerated the innocent, and that no court has ever ruled that ShotSpotter altered or fabricated evidence, VICE’s agents intentionally misrepresented court records in support of their false preconceived narrative and their “subversive” branding and marketing strategy.

VICE intentionally misrepresented, disregarded, or concealed facts that rebutted its false preconceived narrative

54. From pre-publication communications with Feathers, VICE also knew—but intentionally misrepresented, disregarded, or concealed—facts that rebutted its false preconceived narrative, including that:

- The Brookings Institution found that more than 80% of gunshots were not reported to 911;
- ShotSpotter was designed to make communities safer and provides officers with more accurate information than 911 calls;
- ShotSpotter uses a two-phased review process to classify sounds as gunfire before alerts are dispatched;
- The system uses acoustic sensors throughout a coverage area to capture loud, impulsive sounds that may be gunfire. These incidents are transmitted to a central server that assigns them a gunfire probability percentage along with a location. ShotSpotter-trained employees listen to the incident audio from multiple sensors with playback tools, analyze the visual waveforms to see if they match the typical pattern of gunfire, and either publish the incident as gunfire or dismiss it as non-gunfire. The reviewers agree with the machine classification over 90% of the time;
- ShotSpotter helps police find victims of gun violence quickly when no one calls 911, and in 2020 in Oakland, California, 101 victims of gun violence were found and aided by police when before anyone called to report a shooting;
- Previous reporting showed that ShotSpotter had helped save the life of a 13-year-old boy in Chicago;
- The city of Pittsburgh, Pennsylvania credits ShotSpotter as playing a major role in reducing crime – including homicides – and saving lives year-over-year – including 84 gunshot victims found with the help of ShotSpotter;
- After adopting ShotSpotter’s gunshot detection technology in 2018, Greenville, North Carolina saw a 29% decrease in gun violence injuries in 2019 and a 20% reduction in homicides that same year;
- The University of Cincinnati found that 95% of residents thought ShotSpotter was an effective way to fight crime;
- After adopting ShotSpotter, the City of Miami saw a 35% reduction in homicides between 2014 and 2017;

- Omaha has reported an over 50% drop in victims of gun homicides since 2011;
- Fort Meyers, Florida has seen a 33% decrease in gunfire in 2020 and saw a 25% reduction in homicides the previous year;
- ShotSpotter sensor locations are chosen by analyzing historical gunfire and homicide data and most commonly sensors are placed in neighborhoods with the highest levels of gun violence to make the greatest impact;
- Paul Greene is an experienced forensic engineer who has testified about ShotSpotter evidence in more than 100 court cases;
- ShotSpotter evidence has survived challenges under the *Daubert* and *Frye* standards in multiple courtrooms; and
- ShotSpotter evidence is widely accepted by courts across the United States.

55. VICE's intentional or reckless disregard for the truth is also evidenced by the fact that its accusations are inherently improbable. It is inherently improbable that *any* company would fabricate gunshots out of thin air to frame innocent Black men; but that accusation is even more inherently improbable and facially ridiculous when leveled against a company that has helped save the lives of countless Black gunshot victims, that has helped exonerate innocent Black men (including with the expert testimony of a Black forensic analyst), and which is led by a Black CEO with Black directors comprising nearly half its board, including the president of the largest civil rights organization in the United States. VICE's agents recklessly omitted or deliberately concealed the above facts that undermined and rebutted their false preconceived narrative.

56. VICE had a powerful financial motive to misrepresent court records and conceal facts that undermined its false preconceived narrative. VICE markets itself as “edgy” and has been called “a global brand that confers status and cool on anyone associated with it.” Among VICE’s many imprints is “Motherboard,” the technology-focused publication that pushed the falsehoods at issue here.

57. Motherboard relies on branding as opposed to banner ads and is VICE’s twist on custom publishing. “Custom publishing” describes the practice of corporations paying media organizations for content to be written about them. VICE’s co-founder has said that by partnering with Motherboard, corporations “can bypass [advertising] agencies” and instead align themselves with VICE’s “subversive ideas and content.” Motherboard actively cultivates that “subversive” image by running articles critical of established corporations.

58. Motherboard’s guide to “How to Pitch Motherboard” on a story explains that “Motherboard is focused on a few core topics” including:

Power in Tech: We are interested in inequality in tech, how new technologies are disproportionately used to entrench traditional power structures (i.e. against people who are historically vulnerable and marginalized), and how big tech uses its largesse to entrench power politically and economically.¹³

¹³ Motherboard Staff, *How to Pitch Motherboard*, VICE (updated Oct. 2018), <https://www.vice.com/en/article/z4j579/heres-how-to-pitch-motherboard>.

59. Motherboard routinely publishes stories featuring this preconceived narrative:

<u>Tech</u> This High-Tech Police Lasso Is Being Condemned By Mental Health Experts	<u>Tech</u> Axon is Now Selling VR Training That Won't Stop Cops From Killing People
<u>Tech</u> This Company is Selling Bizarre and Expensive Spy Equipment to Police	<u>Tech</u> Health Department Had Opioid-Tracking AI Forced On Them By Utah Lawmakers, Emails Show

60. Todd Feathers has proved skilled at manufacturing such stories for VICE. Over and over, he has “found” bias, corruption, or other misconduct on the part of technology companies or users—at least 40 times in the last year alone. Over and over, VICE published these stories because they were consistent with the “subversive” brand VICE uses to sell ads to virtue-signaling corporations:

MOTHERBOARD by Vice

Flawed Algorithms Are Grading Millions of Students' Essays

By: Todd Feathers; August 20, 2019

Fooled by gibberish and highly susceptible to human bias, automated essay-scoring systems are being increasingly adopted, a Motherboard investigation has found.

MOTHERBOARD by Vice

Facial Recognition Is Racist. Why Aren't More Cities Banning It?

By: Todd Feathers; May 25, 2021

MOTHERBOARD by Vice

An Insurance Startup Bragged It Uses AI to Detect Fraud. It Didn't Go Well

By: Todd Feathers; May 26, 2021

Lemonade backtracked after suggesting it uses "non-verbal cues" like eye movements to reject claims. Its response raises more questions than answers.

MOTHERBOARD by Vice

Schools Spy on Kids to Prevent Shootings, But There's No Evidence It Works

By: Todd Feathers
December 4, 2019

Companies that make this software say that their machine learning detection systems keep students safe from themselves and away from harmful online content. Their numbers aren't always trustworthy and no independent research backs up their claims.

MOTHERBOARD by Vice

This Company Is Using Racially-Biased Algorithms to Select Jurors

By: Todd Feathers; March 3, 2020

*After again being put on formal written notice of the facts,
VICE refuses to retract*

61. On July 28, ShotSpotter emailed Feathers, Koebler, and Motherboard's Managing Editor, Emanuel Maiberg, requesting the following corrections and responses:

Assertion in 7/26 Article: Modifying Alerts at the Request of Police Departments

"We categorically deny any allegations that ShotSpotter manipulates any details of an incident at the request of the police. It is important to understand that real-time ShotSpotter alerts that detect and alert local law enforcement of a gunfire incident should not be conflated with Detailed Forensic Reports ("DFRs") or expert witness testimony. Real-time alerts are

optimized to quickly determine when and where gunfire has occurred within the Coverage Area.

A DFR on the other hand, is an entirely separate report created by a separate team of forensic analysts using specialized tools and the results are 100% accurate. A DFR is a court admissible analysis of a shooting incident captured by the ShotSpotter system. Our expert forensic analysts spend an average of eight hours per incident to put together a separate court admissible document that is exact on rounds fired, timing and sequence of shots fired – something they can testify to in court.

The original incident report is never altered, but new facts may be discovered upon thorough investigation by our forensic analysts. We respond to requests to further investigate an incident but only to provide the facts that we can determine and not to fit a predetermined narrative. This is about being diligent and providing the appropriate evidence and insights in the evidentiary chain of custody and nothing more.”

.....

Assertion in 7/26 Article: “The reliability of their technology has never been challenged in court and nobody is doing anything about it.”

“ShotSpotter evidence and ShotSpotter expert witness testimony have been successfully admitted in over 190 court cases in 20 states. ShotSpotter evidence has prevailed in ten successful *Frye* challenges and one successful *Daubert* challenge throughout the United States. Our data compiled with our expert analysis help prosecutors make convictions.”

62. Later, on August 16, September 2, and September 21, ShotSpotter sent letters to counsel for VICE that again explained the falsity of VICE’s reporting, provided supporting evidence including court records, audio recordings, and a

detailed report proving the falsity of VICE's claims, and asked for a retraction.¹⁴ Even after receiving evidence conclusively disproving its false claims, VICE refused to retract.

VICE has caused enormous harm to ShotSpotter

63. VICE's false reporting has endangered ShotSpotter's current and future contracts, damaged ShotSpotter's commercial relationships and reputation, and impaired ShotSpotter's enterprise value.

64. After VICE's defamatory campaign, VICE's falsehoods were foreseeably republished by others and people began calling for cities to cancel their contracts with ShotSpotter. In many cases, they specifically cited VICE's defamatory reporting:



¹⁴ Letter from T. Clare to Y. Berkovits (Aug. 16, 2021) (Ex. 16); Letter T. Clare to R. Strom (Aug. 23, 2021) (Ex. 17); Letter T. Clare & M. Meier to R. Strom (Sept. 21, 2021) (Ex. 18).

THE BUFFALO NEWS

Viewpoints: Buffalo should not spend federal dollars on ShotSpotter

Anthony O'Rourke and Jonathan Manes Aug 14, 2021 2

There have also been troubling reports that ShotSpotter evidence leads to wrongful prosecutions. **Vice Magazine** reported that ShotSpotter has changed its forensic reports to shore up questionable prosecutions. ShotSpotter and the

BLOCK
club
CHICAGO

NEIGHBORHOODS LATEST STORIES COVID-19 SEND NEWS TIPS SHOP SUBSCRIBE MY ACCOUNT DONATE

PILSEN, LITTLE VILLAGE, WEST LOOP

Chicago Should Cancel ShotSpotter Contract After Report Shows Police Influence On Technology, Activists Say

ShotSpotter is touted by police for its real-time gunshot detection technology, but recent reports have cast doubt on its reliability.

  **Mauricio Peña and Justin Laurence** 8:00 AM CDT on Jul 30, 2021

LITTLE VILLAGE — Gathered near the alley where police fatally shot 13-year-old Adam Toledo months ago, activists from across the city converged Thursday in Little Village to demand officials end a city contract with ShotSpotter.

The protest came three days after Vice Magazine reported instances of ShotSpotter analysts modifying data of shootings after being contacted by police departments, including Chicago police.

65. On September 14, 2021, 16 Chicago aldermen cited VICE's defamatory reporting and called for the Budget and Public Safety Committees to hold a joint hearing to consider canceling ShotSpotter's \$33 million contract.

66. After being misled by the falsehoods in VICE’s reporting, U.S. Senator Ron Wyden launched an inquiry into the use of federal funding to pay for the ShotSpotter system.

67. As a result of VICE’s false reporting, ShotSpotter’s stock began trading at a compressed revenue multiple and its stock price fell, resulting in market cap diminution of approximately \$100 million.

68. As a result of VICE’s false reporting, ShotSpotter’s stock was shorted.

COUNT ONE – DEFAMATION PER SE

69. ShotSpotter repeats and re-alleges the above paragraphs as if set forth fully herein.

70. VICE published the following false and defamatory statements of fact about ShotSpotter online to a worldwide audience.

(a) A July 26, 2021 story by Todd Feathers, “Police Are Telling ShotSpotter to Alter Evidence from Gunshot-Detecting AI,” which was posted to VICE.com, stated that:

- Headline: “Police Are Telling ShotSpotter to Alter Evidence From Gunshot-Detecting AI.”
- “Prosecutors in Chicago are being forced to withdraw evidence generated by the technology...”
- “Motherboard’s review of court documents from the Williams case and other trials in Chicago and New York State, including testimony from ShotSpotter’s favored expert witness, suggests that the company’s analysts frequently modify alerts at the request of police departments—some of which appear to be grasping for evidence that supports their narrative of events.”

- Section heading: “A pattern of alterations.”
- “Greene ... was involved in another altered report in Chicago, in 2018[.]”
- “Initially, the company’s sensors didn’t detect any gunshots, and the algorithms ruled that the sounds came from helicopter rotors.”
- Claims that Chicago prosecutors withdrew the evidence rather than face a *Frye* hearing and that “[t]he case isn’t an anomaly, and the pattern it represents could have huge ramifications for ShotSpotter in Chicago, where the technology generates an average of 21,000 alerts each year. The technology is also currently in use in more than 100 cities. “‘The reliability of [ShotSpotter] technology has never been challenged in court and nobody is doing anything about it’ ‘Chicago is paying millions of dollars for their technology and then, in a way, preventing anybody from challenging it.’”
- Section heading: “Untested evidence.”
- “If a court ever agrees to examine the forensic viability of ShotSpotter, or if prosecutors continue to drop the evidence when challenged, it could have massive ramifications.”
- “[T]he ShotSpotter audio files that were the only evidence of the phantom fifth shot have disappeared” in the *Simmons* case.
- In *Williams*, “after the 11:46 p.m. alert came in, a ShotSpotter analyst manually overrode the algorithms and ‘reclassified’ the sound as a gunshot. Then, months later and after ‘post-processing,’ another ShotSpotter analyst changed the alert’s coordinates to a location on

South Stony Island Drive near where Williams' car was seen on camera.”¹⁵

(b) The following July 26, 2021 promotional tweets posted by Motherboard's Editor-in-Chief to his Twitter account @Jason_Koebler:

- “SCOOP: Police all over America are regularly asking Shotspotter, the AI-powered microphones that ‘detect gunshots’ to fabricate gunshots from thin air for court proceedings, according to court records we obtained. This is horrifying and nuts”¹⁶
- “ShotSpotter employee testified in court that police ask them to invent gunshots where they did not exist ‘on a semi-regular basis’”¹⁷
- “This fabricated Shotspotter evidence was the only evidence against the man. He was exonerated and Shotspotter and the Rochester police mysteriously deleted all audio recorded. Blatant corruption”¹⁸

(c) A July 29, 2021 episode of VICE's “CYBER” podcast, which is widely available online and through podcasting apps, that featured the following exchange between VICE employees Ben Makuch and Lorenzo Franceschi-Bicchierai:

Franceschi-Bicchierai: ... And [ShotSpotter is] designed to detect when a gunshot goes off; the technology relies on algorithms. There's also some human review, which is not automatic. I think it just that comes into play if there's some issue. This story

¹⁵ Todd Feathers, *Police Are Telling ShotSpotter to Alter Evidence From Gunshot-Detecting AI*, VICE (July 26, 2021), <https://www.vice.com/en/article/qj8xbq/police-are-telling-shotspotter-to-alter-evidence-from-gunshot-detecting-ai> (Ex. 19).

¹⁶ Jason Koebler (@jason_koebler), Twitter (July 26, 2021, 10:09 a.m.), https://twitter.com/jason_koebler/status/1419661153278513157 (Ex. 2).

¹⁷ Jason Koebler (@jason_koebler), Twitter (July 26, 2021, 10:11 a.m.), https://twitter.com/jason_koebler/status/1419661624189849618 (Ex. 3).

¹⁸ Jason Koebler (@jason_koebler), Twitter (July 26, 2021, 10:17 a.m.), https://twitter.com/jason_koebler/status/1419663131853402113 (Ex. 4).

centers around the case in Chicago where a 60-year-old man is accused of murdering a 25-year-old. The accused claims that he wasn't, you know -- the other man was shot in a drive-by shooting and he just picked him up and brought him to the hospital, and the key evidence in the case is a report from ShotSpotter that places the shooting at a certain location. But it turns out that the shooting was a little bit further, and the defendant's lawyer essentially is arguing that this technology is not reliable, should not be entered into the case, and it's completely moot. And what's interesting here is that the prosecutor essentially said you know what, we're not going to use this evidence anymore. You know, let's drop the evidence which, you know, some of the experts interviewed in the piece essentially argue that this is a clear sign that the police does not want to talk about how this technology works, does not want to really get into how it was used in this case because if this was entered into evidence, then the defense would have had the right to really see all the nitty and gritty of how this worked.

And to Motherboard and CYBER listeners, this may sound familiar. Years ago, there were a lot of stories about sting rays, which are surveillance devices that the police uses to intercept text messages and locate people using cell phones, and years ago there were many cases where the police also dropped this kind of evidence in an attempt not to disclose how the technology actually worked.

Makuch: Yeah, and I want to highlight something very specific from this story too that I thought was really interesting. It's not just that they backed away -- in this particular case that they backed away from using the evidence. It appears based on documents that the man's public defender was able to turn up that someone had accessed the ShotSpotter data and altered it so that something that had been registered

as a firework in the database was then called a gunshot later, and they had also moved -- you said this, but specifically moved the location at which that shot was heard. And then as soon as someone called them on it, they abandoned it completely.

It's interesting when we have these new technologies, especially with forensic science, where we have something that's that supposedly is going to tell us objectives really what's occurred and where we have to be very careful, especially when we're talking about sending people to jail for a very long time.

Franceschi-Bicchierai: Yeah. And it's important to note that this is not the only case where evidence has been withdrawn and Todd, the author of the piece, also delves into another case where a jury acquitted a defendant because, you know, citing ShotSpotter's unreliability. So there's a history of controversial use of this evidence.¹⁹

71. These false statements, which repeatedly refer to ShotSpotter by name, were reasonably understood by those who read them to be statements of fact of, concerning, and regarding ShotSpotter.

72. VICE published these false statements to millions of people on the VICE website, which attracts around 30,000,000 unique monthly viewers; on Jason Koebler's Twitter account, which has 28,400 followers; and on the CYBER podcast, which regularly attracts over 15,000 listeners per episode.

¹⁹ Matthew Gault, *Gig Work Sucks, Just Ask Uber and Lyft Drivers*, VICE (July 30, 2021), <https://www.vice.com/en/article/g5gkvx/gig-work-sucks-just-ask-uber-and-lyft-drivers> (Ex. 20).

73. Following those publications, VICE's lies spread as people tweeted, retweeted, and expressed their outrage that ShotSpotter and the police were purportedly conspiring to fabricate evidence to put innocent men in prison. And that was completely foreseeable to—and intended—by VICE, which seeks to maximize user engagement, an important metric to its corporate advertisers.

74. Todd Feathers is a reporter who, at all relevant times, has been an agent for VICE. He has written over 60 articles for VICE over the past two years, which constitutes over 80% of his published work during that time. VICE editors supervised his reporting on the July 26 article, which VICE edited, published, and promoted.

75. Jason Koebler is Editor-in-Chief of Motherboard and, at all relevant times, has been a managing agent of VICE.

76. Ben Makuch holds the position of Correspondent at VICE and, at all relevant times, has been an agent for VICE.

77. Lorenzo Franceschi-Bicchierai holds the position of Staff Writer at Motherboard and, at all relevant times, has been an agent for VICE.

78. As set forth above in detail, VICE published the false statements with actual malice, even though VICE's agents actually knew or recklessly disregarded that the statements were false.

79. VICE's defamatory statements about ShotSpotter are false. ShotSpotter does not fabricate gunshots or alter evidence. No court has ever concluded otherwise, nor have ShotSpotter's experts ever testified otherwise. Further, ShotSpotter is not untested, unreviewed, or hiding its technology from scrutiny by courts. Rather, ShotSpotter evidence has been repeatedly scrutinized and admitted by courts over the past twelve years, prevailing in at least fifteen *Frye/Daubert* hearings and playing a part in more than 190 cases and counting.

80. VICE had no applicable privilege or legal authorization to make these false and defamatory statements, or if it did, VICE abused it.

81. These false statements charge ShotSpotter with conspiracy, criminal obstruction of justice, evidence tampering, and corruption, and they impair ShotSpotter's reputation in its trade. As such, they are defamatory *per se* and damages are presumed by law.

82. In addition to the injuries presumed by law, VICE's defamatory statements, whether taken individually or together in their cumulative impact, have damaged ShotSpotter in the ways enumerated above and in other ways yet to be determined.

83. ShotSpotter is entitled to compensatory damages arising out of VICE's defamation.

84. ShotSpotter is also entitled to punitive damages because (a) VICE acted with malice, oppression, wantonness, and a conscious desire to cause injury; (b) VICE purposefully made the defamatory statements heedlessly and with reckless and willful indifference to ShotSpotter's rights; and (c) VICE published its defamatory statements about ShotSpotter with actual malice. These acts were approved by VICE's managing agents and ratified by VICE itself.

COUNT II – DEFAMATION BY IMPLICATION

85. In the July 26 article, July 26 tweets, and the July 29 podcast, VICE created and published a false narrative about ShotSpotter and falsely implied and suggested to readers and listeners that ShotSpotter conspires with police to fabricate and alter evidence to frame Black men for crimes they did not commit, that ShotSpotter evidence has never been evaluated by a court because a "pattern" exists in which ShotSpotter evidence is withdrawn to avoid scrutiny when challenged. VICE's publications did this by, among other things:

- Using the headline "Police Are Telling ShotSpotter to Alter Evidence From Gunshot-Detecting AI" and the section headings "Untested evidence" and "A pattern of alterations."
- Stating that the story's assertions about ShotSpotter were based on "Motherboard's review of court documents from the Williams case and other trials in Chicago and New York State, including testimony from ShotSpotter's favored expert witness," which suggests that either courts found that ShotSpotter falsifies evidence or that a ShotSpotter employee testified to that effect.

- Suggesting that the “review” of court documents showed a “pattern of alterations,” a “pattern” of withdrawing evidence to avoid scrutiny, and that ShotSpotter has “frequently” or repeatedly modified, altered, or otherwise tampered with evidence.
- Concealing the fact that ShotSpotter has survived many *Daubert* and *Frye* challenges in states nationwide while affirmatively stating that the prosecutor withdrew ShotSpotter evidence after a *Frye* motion was filed in *Williams*, that this act was not an “anomaly,” that “[t]he reliability of [ShotSpotter] technology has never been challenged in court and nobody is doing anything about it,” that “[i]f a court ever agrees to examine the forensic viability of ShotSpotter, or if prosecutors continue to drop the evidence when challenged, it could have massive ramifications.”
- Stating that ShotSpotter employee Paul Greene is the company’s “favored” expert witness; that “Greene found a fifth shot, despite there being no physical evidence at the scene that Simmons had fired. Rochester police had also refused his multiple requests for them to test his hands and clothing for gunshot residue. Curiously, the ShotSpotter audio files that were the only evidence of the phantom fifth shot have disappeared”; and that “Greene—who has testified as a government witness in dozens of criminal trials—was involved in another altered report in Chicago, in 2018.”

86. Read in context of the entire publication, the foregoing statements would lead a reasonable person to believe that ShotSpotter was engaged in evidence tampering, evidence falsification, and other misconduct in connection with the provision of expert analysis and testimony.

87. VICE intended and endorsed these defamatory implications, as shown by VICE’s statements above and its other statements promoting the July 26 article:

- Motherboard editor-in-chief Jason Koebler tweeted a link to the July 26 article with the summary that “Police all over America are regularly asking Shotspotter, the AI-powered microphones that

‘detect gunshots’ to fabricate gunshots from thin air for court proceedings, according to court records we obtained. This is horrifying and nuts.”

- Motherboard editor-in-chief Jason Koebler tweeted on July 26 that “ShotSpotter employee testified in court that police ask them to invent gunshots where they did not exist.”
- Motherboard editor-in-chief Jason Koebler tweeted on July 26 that “fabricated Shotspotter evidence was the only evidence against [a] man” who was “exonerated and Shotspotter and the Rochester police mysteriously deleted all audio recorded. Blatant corruption.”
- During the July 29 podcast, after discussing the *Williams* case, Makuch expressly stated that “I want to highlight something very specific from this story too that I thought was really interesting. It’s not just that they backed away from in this particular case that they backed away from using the evidence.”
- Later during the podcast, Fanceschi-Bicchierai emphasized the point again, stating “it’s important to note that this is not the only case where evidence has been withdrawn” and “there’s a history of controversial use of this evidence.”

88. These defamatory implications were reasonably understood by those who read them to be statements of fact of, concerning, and regarding ShotSpotter.

89. VICE published these defamatory implications to millions of people on the VICE website, which attracts around 30,000,000 unique monthly viewers; on Jason Koebler’s Twitter account, which has 28,400 followers; and on the CYBER podcast, which regularly attracts over 15,000 listeners per episode.

90. Following those publications, VICE’s lies spread as people tweeted, retweeted, and expressed their outrage that ShotSpotter and the police were purportedly conspiring to fabricate evidence to put innocent men in prison. And that

was completely foreseeable to—and intended by— VICE, which seeks to maximize user engagement, an important metric to its corporate advertisers.

91. Todd Feathers is a reporter who, at all relevant times, has been an agent for VICE. He has written over 60 articles for VICE over the past two years, which constitutes over 80% of his published work during that time. VICE editors supervised his reporting on the July 26 article, which was part of a three-part series Feathers wrote for VICE, which then edited, published, and promoted the story.

92. Jason Koebler is Editor-in-Chief of Motherboard and, at all relevant times, has been a managing agent of VICE.

93. Ben Makuch holds the position of Correspondent at VICE and, at all relevant times, has been an agent for VICE.

94. Lorenzo Franceschi-Bicchierai holds the position of Staff Writer at Motherboard and, at all relevant times, has been an agent for VICE.

95. As set forth above, VICE published each defamatory implication with actual malice, even though VICE's agents actually knew or recklessly disregarded that the defamatory implications were false.

96. VICE's defamatory implications about ShotSpotter are false. ShotSpotter does not fabricate gunshots or alter evidence. No court has ever concluded otherwise, nor have ShotSpotter's experts ever testified otherwise. Further, ShotSpotter is not untested, unreviewed, or hiding its technology from

scrutiny by courts. Rather, ShotSpotter evidence has been repeatedly scrutinized and admitted by courts over the past twelve years, prevailing in at least fifteen *Frye/Daubert* hearings and playing a part in more than 190 cases and counting.

97. VICE had no applicable privilege or legal authorization to make these false and defamatory implications, or if it did, VICE abused it.

98. These defamatory implications charge ShotSpotter with conspiracy, criminal obstruction of justice, evidence tampering, and corruption, and they impair ShotSpotter's reputation in its trade. As such, they are defamatory *per se* and damages are presumed by law.

99. In addition to the injuries presumed by law, VICE's defamatory implications, whether taken individually or together in their cumulative impact, have damaged ShotSpotter in the ways enumerated above and in other ways yet to be determined.

100. ShotSpotter is entitled to compensatory damages arising out of VICE's defamation.

101. ShotSpotter is also entitled to punitive damages because (a) VICE acted with malice, oppression, wantonness, and a conscious desire to cause injury; (b) VICE acted heedlessly and with reckless and willful indifference to ShotSpotter's rights; and (c) VICE published its defamatory statements about ShotSpotter with

actual malice. These acts were approved by VICE's managing agents and ratified by VICE itself.

PRAYER FOR RELIEF

WHEREFORE, ShotSpotter respectfully requests that the Court enter an award and judgment in its favor, and against VICE Media LLC, as follows:

- 1) awarding ShotSpotter general damages in amount to be determined at trial, but not less than \$50 million;
- 2) awarding ShotSpotter damages for (a) future lost profits of not less than \$50 million; (b) lost enterprise value of not less than \$100 million; and (c) expenses incurred combatting the disinformation campaign of not less than \$100,000;
- 3) awarding ShotSpotter exemplary or punitive damages in an amount to be determined at trial, but not less than \$100 million;
- 4) awarding ShotSpotter pre- and post-judgment interest;
- 5) awarding ShotSpotter all expenses and costs, including attorneys' fees; and
- 6) such other and further relief as the Court deems appropriate.

JURY DEMAND

ShotSpotter demands a trial by jury on all claims and issues so triable.

Dated: October 11, 2021

Respectfully submitted,

FARNAN LLP

/s/ Brian E. Farnan

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Attorneys for Plaintiff

Exhibit 1

**IN THE SUPERIOR COURT OF CHATHAM COUNTY
STATE OF GEORGIA**

e-Filed in Office

Tammie Mosley

Clerk of Superior Court

Chatham County

Date: 7/27/2020 10:55 AM

Reviewer: DH

STATE OF GEORGIA,

§

vs.

§

Indictment No. CR16-1037-J4

§

RODNEY TYRONE SMITH,

§

Defendant.

§

§

§

§

ORDER GRANTING DEFENDANT'S MOTION FOR NEW TRIAL

After reading and considering Defendant's Motion for New Trial (as amended), the State's Response, reviewing all argument and evidence of record, and the applicable law, the Court **GRANTS** the Motion.

On June 8, 2016, Rodney Tyrone Smith ("Defendant") was indicted by a Chatham County Grand Jury on the offenses of Aggravated Assault (3 Counts), Aggravated Battery (2 Counts), Abuse of an Elder Person, Possession of a Firearm During the Commission of a Felony (3 Counts), Possession of Cocaine with intent to Distribute, and Possession of a Firearm by a Convicted Felon.

From April 3, 2018 through April 6, 2018, the case was tried before a Chatham County jury. At the conclusion of the jury trial, Defendant was found guilty on all counts. A sentencing hearing was conducted on April 19, 2018. For purposes of sentencing, Count 1 merged into Count 2 and Count 4 merged into Count 2. Pursuant to Georgia's recidivist statute, O.C.G.A. § 17-10-7 (c), the Defendant received ninety years to serve, and consecutively, five years to serve.

On May 1, 2018, Defendant, through trial counsel, filed a timely Motion for New Trial based on general grounds. On October 25, 2018, appellate counsel filed a Motion for New Trial, as Amended, which included an ineffective assistance of counsel claim based on the failure of trial counsel to present evidence shown by ShotSpotter. Defendant alleged the ShotSpotter evidence would have shown his innocence of the first assault. On March 27, 2019, appellate counsel filed a Motion for New Trial, Second

Amendment, based on a Brady violation for the failure of the State to provide ShotSpotter information available to the Savannah Police Department.

On January 2, 2019, Defendant filed a Motion for Discovery and Disclosure under Brady v. Maryland requesting the State of Georgia to provide to Defendant certain materials pursuant to O.C.G.A. § 17-16-1, *et seq.* and Brady v. Maryland, 373 U.S. 83, 83 S.Ct. 1194, 10 L. Ed. 2d 215 (1963). On January 9, 2019, Defendant filed a Subpoena for Production of Evidence served on the Savannah Police Department requesting the same information.

The State filed notices of supplemental discovery disclosure on February 6 and March 20, 2019, providing evidence the Savannah Police Department produced from its electronic connection with ShotSpotter.

On March 29, 2019, Defendant filed a Motion for Funds for Forensic Report and Expert Testimony requesting the Court to provide funding for the preparation of a Forensic Report from ShotSpotter, Inc., and for Expert Testimony as required at court proceedings in the above-referenced case. On April 8, 2019, the Court granted the requested funds.

On May 2, 2019, Defendant filed a discovery disclosure noting the provision, on April 30, 2019, of certain forensic reports produced for Defendant by ShotSpotter to the District Attorney:

- A) ShotSpotter Detailed Forensic Report for Flex ID (FID) 13830-13832;
- B) ShotSpotter Detailed Forensic Report for Flex ID (FID) 15235-15237.

On June 11, 2019, and June 24, 2019, the various motions identified above came before the Court for a hearing. The subject of the evidentiary hearings included the following claims of error:

- 7) Trial counsel provided ineffective assistance of counsel under the standard set in Strickland v. Washington, 466 U.S. 668, 104 S.Ct. 2052, 80 L. Ed. 2d 674 (1984), by failing to present evidence shown by ShotSpotter, which illustrated a conflict in the State's theory¹ that the same person committed the separate assaults within the indictment.
- 9) The State of Georgia withheld exculpatory evidence from Defendant in the form of data produced by ShotSpotter technology, including ShotSpotter

¹ The State's theory was that the same individual, driving a Ford Mustang, shot Abraham Johnson, III, at 7 E. Victory Drive and, shortly after, committed an assault with a firearm at Chu's Convenience Store, located at 2 W. DeRenne Avenue, and then committed a third assault with a firearm, located at 108 Mills Run Lane.

Flex reports and audio of gunshots, in violation of Brady v. Maryland, 373 U.S. 83, 83 S.Ct. 1194, 10 L. Ed. 2d 215 (1963).

Having had an evidentiary hearing on March 25, 2019, Defendant's Motion for New Trial (as amended) is now ripe before the Court.

RELEVANT FACTS

In the early morning hours of March 14, 2016, Rotaisha McCKinney loaned a gray newer model Ford Mustang convertible to Defendant. Defendant was dressed in a black shirt and camouflage shorts. Around 5:00 a.m., Angel Vargas saw Defendant driving a vehicle of the same description in the area of 219 W. 33rd Street in Savannah. After he saw Defendant, he heard gunshots. Vargas described Defendant as wearing a black shirt and camouflage shorts.

Abraham Johnson, III (hereinafter, "Johnson"), who was sixty-seven at the time, had pulled into his driveway at 7 East Victory Drive in Savannah after he returned home from work. While Johnson was still in his car, he saw a newer model gray Ford Mustang stop in front of his house. Johnson was shot in the face twice. Subsequent to being shot, Johnson watched the Ford Mustang sit in front of his house for a few minutes before the vehicle drove away. He did not see the individual who shot him.

Shortly after Johnson was shot, Defendant was captured on video at Chu's Convenience Store on the corner of Derenne Avenue and Bull Street in Savannah.² The video showed Defendant driving a gray Ford Mustang and wearing a black shirt, camouflage shorts and a black hat. Inside the store, Defendant pointed a gun at Tyre Smith and the gun made a click. Khadijah Jenkins, an employee of Chu's Convenience Store who was working that day, and Alexis Proctor, a patron of Chu's Convenience Store, both witnessed Defendant point a gun at Smith. Proctor also saw Defendant exit the store, enter a gray newer model Ford Mustang convertible, and drive away from the store.

² At trial, the State entered into evidence a video which showed that Defendant entered the parking lot of Chu's Convenience Store at 5:08:53 a.m. According to testimony during the evidentiary hearing, a diagram produced by the State in pretrial discovery showed that ShotSpotter detected gunshots in the vicinity of 7 E. Victory Drive, where Johnson was shot, with the latest detected at 5:08:34 a.m.

A short time later, Defendant went to 108 Mills Run Lane. Defendant knocked on the front door and when Jamelle Sanders opened his door, Defendant pointed a gun at Sanders. Sanders heard a click sound, as if the gun did not have bullets in it.

The police arrested Defendant later that day at 107 Mills Run Drive, the residence directly across the street from where Sanders lived. When the police arrived, they noticed a gray newer model Ford Mustang convertible in the driveway. The vehicle matched the same description as: (1) the one loaned to Defendant by Rotaisha McKinney; (2) the one driven by Defendant as witnessed by Angel Vargas; (3) the one driven by the person who shot Abraham Johnson, III; and (4) the one then seen on video being driven by Defendant at Chu's Convenience Store. Defendant was also arrested wearing the same clothes he was described to have been wearing by Rotaisha McKinney and Angel Vargas, and the same clothes that he was seen wearing on video at Chu's Convenience Store.

Inside 107 Mills Run Lane, Detective Eric Blaser recovered a 9mm Glock and a bag of cocaine from a laundry basket. The police also found a scale, baggies and cash. Inside the gray Ford Mustang, Detective Kevin Fikes found spent 9mm shell casings and a small bag of cocaine in the back seat. The shell casings were tested and proven to have been fired from the Glock 9mm that was found in 107 Mills Run Road. Additionally, an expert from Georgia Bureau of Investigation concluded that the bullet fragments extracted from Johnson's face were fired from a Glock 9mm.

ARGUMENT AND CITATION OF AUTHORITY

The Court has attempted to address each of Defendant's various claims in his Motion for New Trial (as amended). Accordingly, any claim not specifically addressed herein is **DENIED**.

I. THE VERDICT WAS NOT CONTRARY TO THE EVIDENCE AND THE PRINCIPLES OF JUSTICE AND EQUITY, NOR WAS IT DECIDEDLY AND STRONGLY AGAINST THE WEIGHT OF EVIDENCE.

Defendant has failed to cite to any point in the transcript or any authority that would support any of the numerous insufficiency of the evidence claims. Due to Defendant's failure to include any citations or authority this Court deems any such claims abandoned.

Holmes v. State, 301 Ga. 143, 146, 800 S.E.2d 353, 355 (2017). The Court has reviewed the record and finds that in this case the evidence presented to the jury was more than sufficient to allow a rational trier of fact to find the Defendant guilty beyond a reasonable doubt of the offenses charged. Jackson v. Virginia, 443 U.S. 307 (1979). Although Defendant's view of the evidence was different from that of the State, such differences were a matter for the jury to resolve. "Conflicts in the testimony of the witnesses, including the State's witnesses, [are] a matter of credibility for the jury to resolve," Bell v. State, 226 Ga. App. 271, 272, 486 S.E.2d 422, 425 (1997). Likewise, the Court finds that the verdict is not decidedly and strongly against the weight of evidence admitted at trial. O.C.G.A. § 5-5-21.

II. DEFENDANT WAS DENIED EFFECTIVE ASSISTANCE OF COUNSEL AS GUARANTEED BY THE SIXTH AND FOURTEENTH AMENDMENTS OF THE UNITED STATES CONSTITUTION AND ARTICLE I, SECTION I, PARAGRAPH XIV OF THE 1983 GEORGIA CONSTITUTION.

A convicted Defendant must satisfy a two-prong test in order for the Court to uphold the validity of a claim addressing ineffective assistance of counsel *at trial*.

First, the defendant must show that counsel's performance was deficient. This requires showing that counsel made errors so serious that counsel was not functioning as the "counsel" guaranteed the defendant by the Sixth Amendment. Second, the defendant must show that the deficient performance prejudiced the defense. This requires showing that counsel's errors were so serious as to deprive the defendant of a fair trial, a trial whose result is reliable. Unless a defendant makes both showings, it cannot be said that the conviction . . . resulted from a breakdown in the adversary process that renders the result unreliable.

Strickland v. Washington, 466 U.S. 668, 687 (1984). "There is a strong presumption that the performance of trial counsel falls within the wide range of reasonable professional assistance. The reasonableness of the conduct is viewed at the time of trial and under the circumstances of the case," Williams v. State, 277 Ga. 853, 857, 596 S.E.2d 597, 602 (2004) (citation and punctuation omitted). If an appellant fails to meet his burden of proving either prong of the Strickland test, the reviewing court need not examine the other prong. See Strickland, supra, 466 U.S. at 697; Fuller v. State, 277 Ga. 505, 591 S.E.2d 782 (2004).

As explained in Powell v. State, the Defendant's burden is significant:

To prove he has received ineffective assistance of counsel, the defendant must show both that counsel's performance was deficient and that this deficiency prejudiced the defense. Thus, counsel's performance will not be found to be deficient if it falls within the range of 'reasonably effective assistance'. The defendant must overcome the strong presumption that counsel's conduct falls within the broad range of reasonable professional conduct. As to deficient performance, errors in judgment and tactical errors do not constitute denial of effective assistance of counsel.

198 Ga. App. 509, 510, 402 S.E.2d 108, 109 (1991).

A new trial should not be granted on the basis of an ineffective assistance claim unless conduct by trial counsel so undermined the proper functioning of the adversarial process that the trial could not have produced a just result. Holland v. State, 250 Ga. App. 24, 25, 550 S.E.2d 433, 436 (2001). The Holland Court explained further:

Whether an attorney's trial tactics are reasonable 'is a question of law', not fact. The test for reasonable attorney performance has nothing to do with what the best lawyers would have done. Nor is the test even what most good lawyers would have done. We ask only whether some reasonable lawyer at the trial could have acted, in the circumstances, as defense counsel acted at trial ... (W)e are not interested in grading lawyers' performances; we are interested in whether the adversarial process at trial, in fact, worked adequately.

A. Defendant's trial counsel rendered ineffective assistance by failing to present evidence shown by ShotSpotter.

The State provided pretrial discovery in this case on August 24, 2016. The discovery contained a diagram produced from raw data taken from the City's ShotSpotter program. The diagram was created by Gianna Nelson, an analyst with the Savannah Police Department, who summarized the raw data generated on the date of the shooting. The diagram showed that the ShotSpotter program detected gunshots at 5:07:43 a.m. at 510 E. Victory Drive, Savannah, Georgia, 5:08:10 a.m. at 2601 Drayton Street, Savannah, Georgia, and at 5:08:34 a.m. at 15 E. Victory Drive, Savannah, Georgia.³

The diagram is important because the ShotSpotter evidence reveals a significant inconsistency in State's theory; that Defendant shot Johnson at 7 E. Victory Drive and

³ These locations are adjacent to 7 E. Victory drive where Abraham Johnson, III was shot.

subsequently committed an assault at Chu's Convenience Store on West DeRenne Avenue in Savannah. In order for this theory to hold up the Defendant would have to have had sufficient time to travel from the Johnson shooting on Victory Drive to Chu's Convenience Store on West DeRenne Avenue. As shown on the diagram, ShotSpotter detected gunfire seemingly related to the Johnson shooting at 5:08:34 a.m. At trial, the State presented evidence from Chu's Convenience Store on West DeRenne Avenue that showed Defendant entering the store parking lot at 5:08:53 a.m.⁴ The State introduced a map which showed the distance between Johnson's house and Chu's Convenience Store is two miles with several traffic signals on the numerous intersections.⁵

Furthermore, the State presented Defendant's statement to the police in which he admitted to being at Chu's Convenience Store, but denied being at the East Victory Drive location. Defendant's admission that he was at Chu's (essentially at the same time that ShotSpotter indicated or recorded the shots fired at the East Victory Drive vicinity) was corroborated by the State's video evidence.

Moreover, Johnson testified that the shooter did not leave immediately or speedily after Johnson was shot:⁶

- A. What had happened when he shot me, he sat there. I couldn't figure it out. I guess (unintelligible) see if I would have gotten out. He probably would have killed me. And he sat for a few minutes to watch. Because after this my car done ran into everything. And he just sat there. And all of a sudden, he just slowly drove away. (T.80)

Based on the ShotSpotter evidence, as shown on the diagram, and in light of the evidence produced at trial by the State, it is reasonable for one to conclude that it would have been impossible for Defendant to both shot Johnson and been at Chu's Convenience Store at the times presented in the State's evidence.

Accordingly, the Court finds that trial counsel's handling of the ShotSpotter evidence, and the timeline it establishes, was deficient. The deficiencies include failure to

⁴ There was never a suggestion that the time stamp of the video was inaccurate. At trial, the State introduced a business record certificate for an unedited video from Chu's Convenience Store. Additionally, Defendant's trial counsel elicited testimony from the Chu's Convenience Store representative that the time and date on the video was accurate, showing Monday, March 14, 2016, at 5:08.

⁵ Chu's Convenience Store is located at 2 W. DeRenne Avenue.

⁶ Johnson also testified that he did not see the individual who shot him.

present the diagram and evidence of the ShotSpotter information to the jury and failure to argue the conflict in the State's theory that Defendant shot at Johnson on Victory Drive.⁷ Each of the points above could have been used by Defendant's trial counsel to illustrate a conflict in the State's theory and present an alibi defense. Given the critical nature of the ShotSpotter data, as shown in the diagram prepared by the Savannah Police Department, a reasonably effective trial lawyer would have taken proper steps to insure that the diagram would have been presented to the jury to show Defendant's innocence of the assaults on Johnson. Accordingly, the record demonstrates that despite the critical nature of the ShotSpotter data in the diagram, there was an apparent lack of consideration that was ultimately detrimental to Defendant.

Having found that Defendant's counsel was deficient, the Court must now determine if Defendant was prejudiced. "When considering the prejudice prong for multiple claims of ineffective assistance of counsel, [the court] look[s] to whether 'the cumulative effect of counsel's [alleged] errors,' leads to a reasonable probability that the outcome of the trial would have been different," Schofield v. Holsey, 281 Ga. 809, 812, 642 S.E.2d 56 (2007).

The Court finds that but not for the trial counsel's deficient performance there is a reasonable likelihood that the outcome of the trial would have been different. Here, the trial counsel was deficient in multiple ways by failing to present the diagram provided by the State, failing to elicit testimony about the specific timeline of the assaults, failing to illustrate the conflict in the State's theory, and failing to present a possible alibi (that he was at Chu's Convenience Store at about the same time as the Johnson shooting). The evidence that gunfire was detected at East Victory Drive at 5:08:34 was critical given the State's presentation of evidence that Defendant was also at Chu's Convenience Store at 5:08:53. Trial counsel failed to argue to the jury that the State's timeline was flawed or that the States own evidence proved the impossibility of its theory on the Johnson Shooting. There was no mention of the nineteen seconds separating the assaults on Johnson and the Defendant's appearance at Chu's Convenience Store combined with

⁷ The State did not elicit testimony about the specific timeline of the assaults during the trial, which would have revealed the inability of Defendant to have committed the shooting at 7 E. Victory Drive, as he appeared on video two miles away at Chu's Convenience Store.

the two-mile distance between the locations of the two assaults. Defendant's potential alibi (that he was at Chu's at the time of the Johnson shooting) was supported by Defendant's admission that he was at Chu's Convenience Store, the State's evidence of Defendant on video at the store, and the two eye-witness identifications of Defendant as being at the store. The alibi was additionally supported by Johnson's testimony that the shooter "sat for a few minutes" after Johnson was shot. For these reasons, the trial counsel failed to argue Defendant was not the individual who shot Johnson. See Moss v. State, 298 Ga. 613, 619, 783 S.E.2d 652, 658 (2016).

As stated by the Supreme Court in Strickland, "The benchmark for judging any claim of ineffectiveness must be whether counsel's conduct so undermined the proper functioning of the adversarial process that the trial cannot be relied on as having produced a just result." Strickland, 466 U.S. 668 at 686(II). Here, the Court finds that the trial counsel's conduct undermined the proper functioning of the adversarial process, and the Court concludes that Defendant was prejudiced.

B. Defendant's trial counsel was not ineffective for failing to challenge the admissibility of Defendant's statement.

Defendant claims that his trial counsel was ineffective for not challenging the admission of his statement to the police after his Constitutional Rights were invoked. "To establish ineffective assistance of counsel on the basis of counsel's failure to file a timely motion to suppress, [the Defendant] must make a strong showing that had the motion been considered, the damaging evidence would have been suppressed." Brown v. State, 311 Ga. App. 405, 407, 715 S.E.2d 802, 804 (2011). On April 3, 2016, the Court held a hearing pursuant to Jackson v. Denno, 378 U.S. 368 (1964). At the hearing the State entered a copy of a Constitutional Rights form that was presented to Defendant. The State also entered a video which showed Defendant conversing with officers. After Defendant invoked his right to remain silent, Defendant told an officer that he "needed" to speak with Detective Richard Wiggins ("Wiggins"). Defendant was reminded that he had invoked his rights. Defendant again said that he needed to speak with Wiggins. The Court finds Defendant waived his Constitutional Rights after telling officers that he "needed" to speak

with Detective Wiggins.⁸ Accordingly, Defendant cannot show that had his trial counsel challenged the admissibility of the statement, the statement would have been suppressed. Therefore, Defendant has failed to meet the burden, and the Court concludes that Defendant's trial counsel was not ineffective for failing to challenge the admissibility of Defendant's statement to police.

C. Defendant's trial counsel was not ineffective for failing to object to the Court's instructions on the offense of violation of the Georgia Controlled Substances Act.

Defendant claims that his trial counsel was ineffective for failing to object to the Court's instructions on the offense of violation of the Georgia Controlled Substances Act. In this case, Defendant was charged in Count 10 of the Indictment with Possession of Cocaine with the Intent to Distribute. Defendant argues the Court's instruction on the offense of a violation of the Georgia Controlled Substances Act was erroneous because it included a reference to simple possession of cocaine as a violation of the Georgia Controlled Substances Act, and thus could have misled the jury into convicting Defendant on possession with intent to distribute on evidence of simple possession. Defendant's trial counsel did not object to the instruction at trial, and now Defendant contends that his trial counsel was ineffective for failing to object to the instruction. As discussed further hereunder, Defendant cannot show that the jury instruction prejudiced his case, and therefore, Defendant cannot succeed on his ineffective assistance claim. See Gomillion v. State, 236 Ga.App. 14, 18 (3) (c), 512 S.E.2d 640 (1999) ("Failure to object to a court's charge [] ... is not ineffective assistance where the appellant does not show how this prejudiced his case.")

III. THE STATE OF GEORGIA DID NOT WITHHOLD EXCULPATORY EVIDENCE FROM THE DEFENDANT.

In Brady v. Maryland, 373 U.S. 83 (1963), the United States Supreme Court established that the prosecution has a constitutional duty to disclose certain information to the defense. The duty applies to "material" information". In United States v. Bagley,

⁸ The Supreme Court of Georgia has found that incriminating statements made to police, after the invocation of his rights, which are made as a result of the Defendant initiating a conversation, are admissible. State v. Brown, 287 Ga. 473, 474, 697 S.E.2d 192, 194 (2010).

State v. Rodney Smith

Case No. CR16-1037-JS

Order on Motion for New Trial (as amended)

473 U.S. 667 (1985) the United States Supreme Court explained the standard for materiality in Brady challenges. The court held:

The evidence is material only if there is a reasonable probability that, had the evidence been disclosed to the defense, the result of the proceeding would have been different. A "reasonable probability" is a probability sufficient to undermine confidence in the outcome.

473 U.S. at 682. As explained by the Georgia Supreme Court in Walker v. Johnson, 282 Ga. 168, 646 S.E.2d 44 (2007):

To succeed on his Brady claim, [the Defendant is] required to show: (1) the State possessed evidence favorable to his defense; (2) he did not possess the favorable evidence and could not obtain it himself with any reasonable diligence; (3) the State suppressed the favorable evidence; and (4) had the evidence been disclosed to the defense, a reasonable probability exists that the outcome of the trial would have been different.

282 Ga. at 169, 646 S.E.2d at 46; Danforth v. Chapman, 297 Ga. 29, 30, 771 S.E.2d 886, 887 (2015)

The Court applies Brady as follows:

1. The State Possessed Evidence Favorable to Defendant's Defense.

In this case, the State was in possession of gunshot audio and two certain forensic reports produced by ShotSpotter to the State which were not provided to Defendant before trial. Specifically, the State was in possession of ShotSpotter Detailed Forensic Report for Flex ID (FID) 13830-13832 and ShotSpotter Detailed Forensic Report for Flex ID (FID) 15235-15237.

2. Defendant Possessed the Favorable Evidence.

The question this Court must wrestle with is whether Defendant possessed the favorable evidence even though he was not provided the two reports and audio of the gunshots. The State provided pretrial discovery in this case on August 24, 2016. As has been established, Defendant was provided with a diagram created by an analyst with Savannah Police Department, which reflected the ShotSpotter information concerning location and times of gunfire detected by the system. There are only two points of information that were not present in the discovery that the State sent to Defendant in its discovery disclosures: (1) the longitude and latitude of the alerts, and (2) the actual

recordings of the gunshots. While the longitude and latitude of the alerts were not provided numerically on the diagram provided in discovery, the addresses corresponding to the longitudes and latitudes are present and reflected on the diagram. Here, the Court finds Defendant possessed the favorable evidence given that Defendant's trial counsel was provided with the diagram in pretrial discovery.

3. The State Did Not Suppress the Favorable Evidence.

The suppression by the prosecution of evidence favorable to an accused upon request violates due process where the evidence is material either to guilt or to punishment, irrespective of the good faith or bad faith of the prosecution. Brady, 373 U.S. at 87. Although Defendant was not provided copies of the two Flex Reports or the audio of the gunshots, his trial counsel was in possession of the diagram, which contained the same data and information that was depicted in the diagram. Although the reports and gunshots would have provided additional evidence of the gunshots detected in the East Victory Drive vicinity, Defendant was not deprived of the time and location of the gunshots detected by ShotSpotter, which as discussed above, was critical to his defense. Moreover, although the audio recordings of the gunshots were not produced to Defendant, they contained no exculpatory information. Under these circumstances the Court finds that the ShotSpotter evidence was not suppressed by the State.

4. A Reasonable Probability Exists that the Outcome of the Trial Would Not Have Been Different.

Under the final prong of the analysis the Court must determine if there is a reasonable probability that had Defendant been provided with the two forensic reports and the audio the outcome of the trial would have been different. A "reasonable probability" is a probability sufficient to undermine confidence in the outcome. Bagley, 473 U.S. at 682. In this analysis the Court cannot ignore an analysis of the effectiveness of the Defendant's trial counsel. As explained above, the Court finds that the Defendant's trial counsel was ineffective and deficient in his representation of Defendant, specifically in his handling of the diagram. As Defendant's trial counsel testified during the June 11, 2019 post-trial hearing, Defendant's counsel failed to notice the time issue, as exhibited in the diagram, in his trial preparation:

Q. Does that -- did you recognize that diagram indicated those shots were fired at the same time that the incident at Chu's was beginning?

A. Actually I did not at the time...

(MT. June 11, 2019, 53-54).

Q. But you did not -- it's safe to say you did not really notice the -- the fact that the Shot Spotter indicated or recorded the shots were fired at the same time as the video at Chu's was started with the defendant entering the parking lot?

A. No, I did not.

(MT. June 11, 2019, 81).

This testimony revealed that Defendant's trial counsel did not notice that the evidence on the diagram indicated the shots fired on Johnson were essentially at the same time as the incident at Chu's Convenience Store. Consequently, the Court concludes that there is a reasonable probability that the outcome of the trial would not have been different if the two forensic reports and audio had been provided to Defendant.

IV. THE COURT PROPERLY ADMITTED EVIDENCE OF A PRIOR AGGRAVATED ASSAULT, FAMILY VIOLENCE, PURSUANT TO O.C.G.A. § 24-4-404(b).

Defendant seeks to relitigate the admission of evidence related to an April 12, 2009 incident in which Defendant committed aggravated assault with a firearm, terroristic threats, and cruelty to children. The State gave notice of its intent to offer evidence of other crimes or acts of Defendant under Rule 404(b) on August 24, 2016.⁹ Oral argument was heard on January 3, 2017. In light of the proffer made by the State at the hearing, and after considering the objections to the proffer by Defendant, the Court found that the April 12, 2009 incident was allowed.¹⁰ Specifically, the Court found the evidence of the

⁹ The State also sought to introduce evidence of two other incidents: a May 6, 2007 incident, in which the Defendant was charged with terroristic threats and possession of a firearm in committing a crime, and a January 4, 2007 incident, in which Defendant was charged with possession of a controlled substance, misdemeanor marijuana, and kidnapping.

¹⁰ The May 6, 2007 and January 4, 2007 incidents were not allowed because the evidence was not relevant for the purposes proposed by the State, and the probative value the evidence may have had with respect to the crimes charged under the Indictment was substantially outweighed by undue prejudice to Defendant.

April 12, 2009 incident admissible pursuant to O.C.G.A. § 24-4-404(b) for the purposes of proving motive, identity, and intent. Additionally, the Court provided a limiting instruction to the jury, both at the time the other act evidence was introduced and in the final charge to the jury, concerning the appropriate purposes for and the limitations upon the evidence. Having reviewed Defendant's arguments in his amended motion, the Court stands by its ruling on the other acts evidence.

V. THE COURT PROPERLY ADMITTED EVIDENCE OF A STATEMENT MADE BY THE DEFENDANT.

As addressed above, the Court finds it was proper to admit evidence of the statements made by Defendant to Detective Wiggins after Defendant invoked his right to remain silent. Defendant waived his Constitutional Rights after telling officers that he "needed" to speak with Detective Wiggins. Defendant was reminded that he had invoked his right to remain silent; however, Defendant clearly requested to speak with Detective Wiggins. Defendant initiated a conversation with Detective Wiggins subsequent to invoking his rights, and therefore, his statement was admissible.¹¹

VI. THE COURT DID NOT ERR IN INSTRUCTING THE JURY ON A VIOLATION OF THE GEORGIA CONTROLLED SUBSTANCES ACT BY GIVING THE PROVISIONS OF BOTH O.C.G.A. § 16-13-30(a) AND (b).

Defendant contends the Court committed error by instructing the jury on a violation of the Georgia Controlled Substances Act by giving the provisions of both O.C.G.A. § 16-13-30(a) and (b), in reference to Count 10 of the Indictment charging Possession with the Intent to Distribute. In defining the alleged offense to the jury, the Court instructed:

The offense charged in this indictment – an offense charged in this indictment is a violation of the Georgia Controlled Substances Act which provides that it is unlawful for any person to A) possess or have under one's control or B) possess with intent to distribute any quantity of cocaine which is a controlled substance. Distribute means to deliver a controlled substance other than by administer or dispensing it. Intent to distribute means intent to unlawfully deliver or sell.

¹¹ See Footnote 8.

Defendant argues the Court's instruction was erroneous because it included a reference to simple possession of cocaine as a violation of the Georgia Controlled Substances Act, and thus could have misled the jury into convicting Defendant on possession with intent to distribute on evidence of simple possession.¹²

"While instructing the jury that a crime can be committed in a manner different from that charged in the indictment can constitute reversible error, a reversal is not mandated where . . . the charge as a whole limits the jury's consideration to the specific manner of committing the crime alleged in the indictment." McNorrell v. State, 338 Ga.App. 466, 789 S.E.2d 823 (2016), citing Machado v. State, 300 Ga.App. 459, 462, 685 S.E.2d 428 (2009).

Here, the Court read the indictment to the jury, instructed the jury that the State had the burden of proving every material allegation of the indictment beyond a reasonable doubt, further instructed the jury that it could find the Defendant guilty if it found beyond a reasonable doubt that he committed the offenses alleged in the indictment, and provided the indictment to the jury during its deliberations. When considered as a whole, these instructions limited the jury's consideration to the specific manner of committing the crime as alleged in Count 10 of the Indictment. Accordingly, the Court did not err in the Court's instruction on Count 10.

VII. THE COURT DID NOT ERR IN SENTENCING THE DEFENDANT SEPARATELY ON COUNT 2, AGGRAVATED BATTERY AGAINST ABRAHAM JOHNSON, AND COUNT 3, AGGRAVATED BATTERY AGAINST ABRAHAM JOHNSON.

Defendant argues that the Court committed error in sentencing Defendant separately on Count 2, Aggravated Battery against Abraham Johnson, and Count 3, Aggravated Battery against Abraham Johnson. Defendant contends that the two counts of aggravated battery should have merged for the purposes of sentencing because the counts stemmed from a single act against a single victim.

Under OCGA § 16-5-24(a), "[a] person commits the offense of aggravated battery when he or she maliciously causes bodily harm to another by depriving him or her

¹² Defendant's Motion for New Trial, As Amended, filed on October 25, 2018, p. 4.

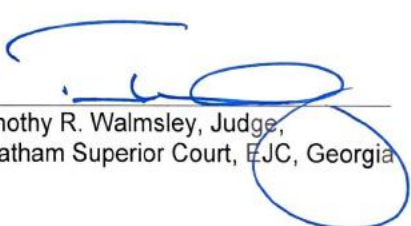
of a member of his or her body, by rendering a member of his or her body useless, or by seriously disfiguring his or her body or a member thereof."

Here, Defendant was charged of two separate counts of aggravated battery based on two separate acts of shooting the victim: Count 2 alleged that Defendant caused bodily harm to Abraham Johnson "by seriously disfiguring his right ear"; and Count 3 alleged Defendant caused bodily harm to Abraham Johnson "by seriously disfiguring his nose." At trial, the State presented evidence that two separate and specific injuries occurred from two separate acts. Accordingly, the Court finds that it was proper to sentence the Defendant separately on the two aggravated battery convictions. See Ledford v. State, 289 Ga. 70, 71, 709 S.E.2d 239, 245 (2011) (separate convictions of aggravated battery predicated on separate blows to the victim's body that caused separate injuries to the victim's lung, head, face and larynx did not merge with each other).

CONCLUSION

For the reasons set forth above, the Court **GRANTS** Defendant's Motion for New Trial (as amended).

SO ORDERED, this 27th day of July, 2020.



Timothy R. Walmsley, Judge,
Chatham Superior Court, EJC, Georgia

cc: David Lock, Esq.
Kristjan Whiteway, Asst. Dist. Atty.

Exhibit 2



Jason Koebler ✓
@jason_koebler



SCOOP: Police all over America are regularly asking Shotspotter, the AI-powered microphones that "detect gunshots" to fabricate gunshots from thin air for court proceedings, according to court records we obtained. This is horrifying and nuts



Police Are Telling ShotSpotter to Alter Evidence From Gunshot-Detecting AI
Prosecutors in Chicago are being forced to withdraw evidence generated by the technology, which led to the police killing of 13-year-old Adam Toledo ...
[🔗 vice.com](#)

10:09 AM · Jul 26, 2021 · Twitter Web App

10.1K Retweets **1,476** Quote Tweets **15.3K** Likes



Exhibit 3



Jason Koebler ✓
@jason_koebler



Shotspotter employee testified in court that police ask them to invent gunshots where they did not exist "on a semi-regular basis"

In this case, ShotSpotter only detected the final two shots that you heard in the audio clip. An hour or so after the incident occurred, we were contacted by Chicago PD and asked to search for -- essentially, search for additional audio clips. And this does happen on a semiregular basis with all of our customers.

EXCERPT FROM THE TRANSCRIPT OF PAUL GREENE'S EXPERT WITNESS TESTIMONY DURING THE TRIAL OF ERNESTO GONZALEZ.

10:11 AM · Jul 26, 2021 · Twitter Web App

1,534 Retweets **93** Quote Tweets **3,993** Likes



Exhibit 4



Jason Koebler ✓
@jason_koebler



This fabricated Shotspotter evidence was the only evidence against the man. He was exonerated and Shotspotter and the Rochester police mysteriously deleted all audio recorded. Blatant corruption

Curiously, the ShotSpotter audio files that were the only evidence of the phantom fifth shot have disappeared.

Both the company and the Rochester Police Department "lost, deleted and/or destroyed the spool and/or other information containing sounds pertaining to the officer involved shooting," according to Simmons' civil suit. "Greene acknowledged at plaintiff's criminal trial that employees of Shotspotter and law enforcement customers with an audio editor can alter any audio file that's not been locked or encrypted."

A jury ultimately acquitted Simmons of attempted murder and a judge overturned his conviction for possession of a gun, citing ShotSpotter's unreliability.

10:17 AM · Jul 26, 2021 · Twitter Web App

1,015 Retweets **26** Quote Tweets **3,354** Likes



Exhibit 5

105224

1

STATE OF NEW YORK COUNTY COURT
COUNTY OF RENSSELAER CRIMINAL TERM

THE PEOPLE OF THE STATE OF NEW YORK,

- against - Indictment No. 11-1078

JOSEPH DURHAM,

Defendant.

Rensselaer County Courthouse
Congress and Second Streets
Troy, New York 12180
March 24, 2012

Frye Hearing

B e f o r e:

HONORABLE ANDREW G. CERESA
County Court Judge

A p p e a r a n c e s:

For THE PEOPLE OF THE STATE OF NEW YORK:

RICHARD McNALLY, ESQ.
Rensselaer County District Attorney
By: SHANE HUG, ESQ. and
MICHAEL SHANLEY, ESQ.,
Assistant District Attorneys
Rensselaer County Courthouse
Troy, New York 12180

For DEFENDANT:

Office of the Rensselaer County
Conflict Defender
By: JOSEPH M. AHEARN, ESQ.
Assistant Conflict Defender
61 Second Street
Troy, New York 12180

Also Present:

Joseph Durham, Defendant

OFFICE OF
RENSSELAER COUNTY CLERK
2013 APR 19 P 1:54
FRANK J. MEROLA

ORIGINAL

Colloquy

evidence from defense?

MR. AHEARN: None, your Honor. Thank you.

THE COURT: The Court will take a brief recess and return with its decision.

(Whereupon, the matter was in brief recess.)

THE COURT: The decision whether to allow expert testimony is one which lies within the sound discretion of the trial Court.

Under *Frye v. United States*, expert testimony on a novel scientific theory is admissible if the scientific techniques, when properly performed, generate results acceptable as reliable within the relevant scientific community.

The Court has conducted a *Frye* hearing and has considered the testimony given by Robert

Colloquy

Calhoun, a well-credentialled expert in the field of engineering and mathematics, as well as the exhibits that were received into evidence at this hearing.

The Court fully credits Mr. Calhoun's testimony in its entirety. In particular, the Court notes the following testimony given by Mr. Calhoun:

ShotSpotter has been in existence since 2002. Since that time, it has generated 200 to 300 reports. On approximately 25 occasions, a representative from ShotSpotter has testified on this topic at a trial.

The scientific principles underlying ShotSpotter have been tested two to three other times in *Frye* hearings and once in a *Dobert* hearing.

In each of those instances,

Colloquy

the principles have been found to be reliable and generally accepted.

ShotSpotter relies upon a system of sensors. Each sensor includes a microphone, a micro-processor and a GPS component.

In order to determine the location of a particular gunshot, three sensors are required. The sensors determine arrival time, latitude and longitude, including basic scientific and mathematical principles, including the speed of sound.

The same principles are used in determining the location of the epicenter of earthquakes and GPS systems.

The computation methodology is generally accepted within the field of mathematics, and the formula used for determining the speed of sound is known as

Colloquy

accepted in the scientific community.

ShotSpotter was evaluated by the National Law Enforcement and Corrections Center and found to be 95 percent accurate in connection with that evaluation. That finding was then forwarded to the Department of Justice.

Based upon the foregoing, the Court concludes as follows:

Number one, the proposed expert testimony is relevant to material issues in this trial.

Number two, the proposed expert testimony concerns subject matter which is outside the ken of the average juror; and number three, the People have demonstrated by a preponderance of the evidence that the principles relied upon in connection with the proposed expert testimony are generally accepted as reliable

Colloquy

within the relevant scientific community.

In reaching these determinations, the Court has, again, considered all of Mr. Calhoun's testimony and credits all of his testimony, notwithstanding the fact that in this decision, the Court has only highlighted certain portions of that testimony.

Based upon all of the foregoing, the defendant's motion to preclude is denied and the proposed expert testimony will be allowed.

(Whereupon, the Frye hearing concluded.)

o o o

Exhibit 6

IN THE DISTRICT COURT OF DOUGLAS COUNTY, NEBRASKA

STATE OF NEBRASKA

Case No. CR 12-861

Plaintiff,

THYLUN M. HILL,

Defendant.

ORDER

COPY

Pending before the Court is Defendant's Motion *in Limine* to determine the admissibility of expert testimony and expert conclusion and opinion related to technology known as "ShotSpotter". Hearing was had on January 31, 2013. The State was represented by Jim Masteller and Shawn Hagerty. Kelly Steenbock and Cindy Tate appeared with and on behalf of Defendant. Evidence was adduced and briefs were scheduled to be submitted. Upon receipt of the final written submission on March 18, 2013, the Court took the matter under advisement. The Court has carefully reviewed the evidence, the relevant legal authorities, and the arguments and briefs of counsel.

ShotSpotter is an acoustic gunfire detection and location system designed to detect a gunshot, within seconds, and provide accurate location information to the customer. Additionally, the system is able to archive the audio information for later forensic analysis. Plaintiff presented evidence from Paul Greene ("Greene"). Greene's education and experience is set forth in Exhibit 6. Greene is currently employed for SST, Inc. He is a lead customer support engineer and forensic engineer for the company. SST, Inc. manufactures, installs, services and interprets data from ShotSpotter. The Omaha Police Department contracted with SST, Inc. and the ShotSpotter system was installed in a particular area of Omaha, NE in 2011. At the time a system is first installed in a

coverage area, a live fire test is conducted to verify that the system is functioning properly. This testing was conducted when the technology was located in Omaha, NE.

ShotSpotter's General Technology

Generally, the ShotSpotter system is a network of audio sensors designed to detect impulsive audio pulses (sounds) generated within a designated coverage area. Arrays of microphoned sensors are dispersed within a particular geographic area (designated by the client city). Sensors are linked to a centralized processing server that has an interface with local dispatch personnel. The sensors record and measure the sounds and the server calculates geographic location and transmits that information to local personnel. When a particular detected sound is initially classified as a gunshot, the sensor maintains a copy of the actual recorded sound and transmits it to the server. To account for the possibility of an initial false positive identification of an impulsive audio pulse as a gunshot, the system will have the actual recorded sounds from the sensors transmitted to the ShotSpotter Incident Review Center ("IRC"). The IRC provides for a trained operator to listen to the available sounds and reclassify if necessary. Upon review, the operator publishes the event to the client's dispatch personnel with the click of a button. A Flex Alert Console ("FAC") plays an alert noise and flashes. The FAC zooms in on street address, time and designates the incident as a single or multiple gunshot event.

Triangulation

ShotSpotter sensors are distributed, within the coverage area, at distances of 400 to 500 meters. This distribution is designed by the ShotSpotter technicians to obtain the

best possible acoustic triangulation of sound waves emitted from gunfire. As a sensor detects an impulsive sound, the input is transmitted to an Omaha Central system server location that triangulates the location by computer. A ShotSpotter sensor has a known range of detection for impulsive sound, up to two miles (Ex. 7). Also each sensor has an accurate time source. Time is measured by the system in thousands (.001) of a second, using the atomic clock. The speed at which sound travels is a known variable. Triangulation is accomplished with a comparison of the data from individual sensors. As the impulsive sound reaches each sensor, the difference in distance between the impulsive sound and each sensor can be determined within a radius. There will be overlap in the detection radius of the two sensors (portrayed as a differential hyperbola in Figures 7, 8 and 9 in Ex. 7). Triangulation requires detection by three or more sensors. The principle related to the third detecting sensor is similar. The three overlapping detection radius circles will now only have one location of intersection which will be the probable location of the sound. The more sensors that detect the sound, the more detection radius circles (differential hyperbola) will be plotted thereby narrowing the location as they intersect. ShotSpotter utilizes a minimum of three sensors detecting a single gunshot sound to triangulate and a fourth sensor detection to confirm. Multiple gunshot sounds involve a repetition of pulse data and therefore only three sensors are minimally necessary for triangulation. The actual ShotSpotter technology is more sophisticated in identification of location, as it recognizes and accounts for the fact that sound will reduce in amplitude over distance, the closer sensor will detect a better wave form. The principals involved in triangulation are well established and recognized in the fields of mathematics and physics. Triangulation is recognized in various scientific

disciplines, including of sonar applications and seismology, as a methodology for location of an event.

ShotSpotter guarantees 80% of detectable outdoor gunfire will be picked up and accurately located. (Ex. 8) ShotSpotter's triangulation calculation is 100% accurate within a twenty-five meter radius circle. Although the twenty-five meter radius circle is the company's designated range for accuracy, Greene testified that ShotSpotter regularly accurately detects location to within a ten foot radius circle.

Classification

Each ShotSpotter sensor takes the input from its microphone and compares the impulsive audio pulse against twenty-eight (28) different audio characteristics, such as amplitude of the pulse, sharpness, medium frequency, the bass, the rise time, and the duration of the pulse. The 28 preprogrammed criteria or measurements are intended to identify sounds that are consistent with the previously identified characteristics made by a gunshot. If the impulsive audio pulse meets the preprogrammed criteria in the digital signal processor (those predetermined to be consistent with a gunshot), the sensor then marks it with a time stamp from the GPS receiver and transmits its measurements to the central server.

After the audio impulse origin location is identified, the location server then begins a process known as classification. In the classification process, the location server initiates an automated process of comparing the audio measurements taken by the sensors to a different set of criteria in order to classify the incident as a single gunshot, multiple gunshots, fireworks, possible gunfire, explosions, among other possible impulsive noises.

The purpose of the classification process is to identify and eliminate any impulsive noises that are not gunshots. If the impulsive noise is determined by the classification process to be a single gunshot, multiple gunshots, or possible gunshot, the sensors are requested to transmit audio recordings of the incident to the server and SST's IRC will receive an alert.

The IRC will conduct an individual review of each incident referred, to further verify the classification of the impulsive noise as a single gunshot, multiple gunshots, or possible gunshot. This review is not done by the computer; rather, the operator at the incident review center will listen to all of the available audio recordings of the incident and make a determination as to whether or not the incident is consistent with gunfire. If the operator believes the incident is not an incident involving gunfire, the operator will reclassify the incident. However, if the operator believes that the incident does involve gunfire, they will classify it as a single gunshot, multiple gunshots, or a possible gunshot and then forward all the pertinent information to the customer.

Operators at the IRC typically have experience and are familiar with the sounds of gunshots. Individuals with musical backgrounds who are proficient in distinguishing tone variations are also hired as operators. Once hired, the operators go through an initial training program and are required to review 500 audio recordings of known gunfire as well as 500 audio recordings of sounds known to not be gunfire. (At the completion of this initial training, operators must complete a proficiency exam where they must correctly identify incidents as gunfire or not gunfire with an accuracy rate of at least 80 percent.) After being hired, the operators receive ongoing training and continue to review impulsive audio pulses known to be gunfire. Operators are also tested for proficiency

every quarter. SST, Inc. has seen the accuracy of their operators in classification actually increase over the duration of their employment.

Greene testified that there is no recognized rate of error for classification and it is not guaranteed. In his opinion, a gunshot is more likely to be missed than misclassified. The client is directed to attempt to confirm any incident classification with a scene investigation to determine "ground truth". This would include witnesses or physical evidence.

Forensic Analysis

Upon request of the customer, SST will generate a detailed forensic report with the assistance of an engineering application which allows the analysts to duplicate the process from the central server at a slower speed. The analyst is able to examine the archived sensor data points and recordings, verify time stamps, locate each separate gunshot and locate each shot onto a Google Earth map. A written report is prepared for the client and includes a graphic representation of the differential hyperbola for triangulation, the audio recordings of the detected gunshots and pictorial representations (graphic audio wave form) of the audio files. As gunshots have a characteristic audio wave form, a pictorial representation provides an additional verification to the analyst. The author of the forensic report will also listen to the audio recordings, applying training and experience in gunshot sound recognition, to verify the original classification. A forensic analysis was performed by Greene and submitted as Ex. 7. Greene concludes that "ShotSpotter detected three gunshots incidents on February 18, 2012. Further, after review, the locations and times of seven rounds fired were calculated". (Ex. 7, p. 13).

Discussion

The decision to admit or exclude expert testimony is an issue of fact for the Court under Neb. Rev. Stat. 27-104(1). Defendant challenges the admissibility of Plaintiff's proffered technology, ShotSpotter, as well as any conclusions and opinions derived from the data generated by the ShotSpotter system.

The Defense argues that ShotSpotter technology does not meet the criteria for admissibility from *Daubert* and recognized in *Shafersman v. Agland Coop*, 262 Neb. 215, 631 N.W. 2d 862 (2001).. *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993); *State v. Tolliver*, 268 Neb. 920, 689 N.W.2d 567 (2004).

"Before admitting any expert opinion testimony, the trial court must determine whether the expert's knowledge, skill, experience, training, and education qualify the witness as an expert. If the opinion involves scientific or specialized knowledge, trial courts must also determine whether the reasoning or methodology underlying the expert's opinion is scientifically valid." *State v. Casillas*, 279 Neb. 820, 835-36, 782 N.W.2d 882, 896-97 (2010).

Paul Greene testified for the State. As previously mentioned, his qualifications are set forth in Ex. 6. The Court will not repeat those here. Of note, Greene has extensive experience in hearing and recognizing gunshot sounds and in IT system design and operation. The Defense does not raise a challenge to Greene's qualifications. The Court finds that Greene is qualified as an expert in the design, installation and function of the ShotSpotter system. Further, the Court finds Greene to possess sufficient knowledge,

skill, experience, training and education to qualify him to be an expert in gunshot sound recognition. Therefore, if the ShotSpotter technology is scientifically reliable and the methodology used to arrive at conclusions from the data produced by ShotSpotter is reliable, then Greene's conclusions are admissible.

The Defense does not challenge the underlying mathematical and physics principles incorporated by ShotSpotter to triangulate location. Instead, Defendant challenges ShotSpotter's testing, positioning, and maintenance of the sensors and the process of classification of an individual impulsive sound as a gunshot.

Defendant alleges that SST failed to conduct reliable testing at the time of installation of the ShotSpotter system in 2011. Greene testified that there is testing done with an individual system. This testing is done after the sensors are installed and is used to ensure sensor accuracy and to help calibrate the sensors. The client selects 3 to 5 locations within a coverage area. Shots will be fired at the select point and a SST project manager will record the number of shots, the caliber and type of weapon, the GPS location of the shooter and the time. The system is then allowed to operate as designed and the documented information is compared to the ShotSpotter system output for verification. Greene testified that, upon testing and evaluation, the Omaha system operated accurately to record and locate the shots. The Defense argues that since the SST project manager was present, the testing was not sufficient. Defense contends that the testing was not "blind". Blind studies are useful in predicting scientific reliability. Although blind testing is certainly preferred when determining proficiency in laboratory technicians, it is not a necessary requirement in determining if electronic equipment operates properly. Essentially, blind testing requires that the individual performing the

test not be aware of the correct outcome. There is no evidence to suggest that the SST technician interfered with the testing results or somehow influenced the outcome. Even in true "blind" testing, the final result obtained by the "test" must be compared to a predetermined accurate set of data. For the geolocation portion of the "live fire" testing, the Defense argument is not persuasive. Arguably the operators at the IRC should have no "inside information" when participating in a "live fire" test. However, due to the speed at which the entire process of the system operates (less than one minute from trigger pull to alert) it is difficult to imagine how tampering could occur. Additionally, Greene testified that the operators are subjected to proficiency testing separate from the "live fire" tests of individual systems.

Rule 702 reflects an attempt to liberalize the rules governing the admission of expert testimony. The rule clearly is one of admissibility rather than exclusion. Under Rule 702 and *Daubert* the court serves as gatekeeper to ensure that a witness is qualified as an expert by knowledge, skill, experience, training, or education, that the testimony is based upon sufficient facts or data, . . . [and] is the product of reliable principles and methods, and that the witness [applies] the principles and methods reliably to the facts of the case. When evaluating the methodology that an expert witness applies, it may be important to consider (1) whether the theory or technique can be (and has been) tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the known or potential rate of error; and (4) whether the theory has been generally accepted. These factors are not exclusive, however, and they need not be considered in every case because, [o]f course, the *Daubert* reliability factors should only be relied upon to the extent that they are relevant and the district court must customize its inquiry to fit the facts of each particular case. The inquiry envisioned by Rule 702 is, we emphasize, a flexible one.

Shuck v. CNH Am., LLC, 498 F.3d 868, 872-875 (8th Cir. Neb. 2007) (internal citations omitted). See *Lauzon v. Senco Prods., Inc.*, 270 F.3d 681, 686 (8th Cir. 2001);

Weisgram v. Marley Co., 169 F.3d 514, 523 (8th Cir. 1999), *aff'd*, 528 U.S. 440, 120 S. Ct. 1011, 145 L. Ed. 2d 958 (2000); *Arcoren v. United States*, 929 F.2d 1235, 1239 (8th Cir. 1991); *Peitzmeier v. Hennessy Indus., Inc.*, 97 F.3d 293, 2971020; *Jaurequi v. Carter Mfg. Co.*, 173 F.3d 1076, 1083 (8th Cir. 1999).

Defendant argues that there is no scheduled maintenance of the sensors and there is no way to determine, at the time an incident occurs, whether all sensors were working properly. The evidence indicated that faulty sensors are replaced when the overall system function is reduced by 10%. This means when the active sensor count falls below 90%, a technician will be sent to replace the faulty sensors. Sensors are constantly monitored for sensor health, including the on board microphones and the GPS system. Each sensor sends a pulse every 30 seconds to ensure contact with the system. If a sensor is defective there will be no contact with the system. The sensor array is configured, within the coverage area, to be able to accurately detect sound location even with a loss of up to 20% of the sensor capability. There are sufficient safeguards in the protocol to support the reliability of the technology. If a sensor is faulty, no data will be obtained and transmitted to the server for incorporation into the final analysis, therefore as long as the minimum number of sensors detect and transmit an incident, the results are not affected by a faulty sensor. The direction of orientation of the sensor is not important to triangulation. The microphones are placed in several directions on each sensor and the resulting location information radiates in a circular pattern from each sensor accounting for all direction. It is the intersection of the various radius boundaries that is significant.

The mathematical and scientific principles utilized by the ShotSpotter program to determine the location of an impulsive audio pulse represents widely recognized, reliable methodology for triangulating a location.

Defendant's final challenge is to the classification protocol or process. Final classification is a three step process. The forensic analysis is the review of the location and verification of the three step classification process. The determination that a particular impulsive audio pulse is a gunshot is made in three phases. First, the sensor's digital signal processor determines whether the audio pulse meets the preprogrammed criteria of 28 audio characteristics. Next, the location server will compare the audio pulse to additional criteria, and finally, if the classification is still that of a gunshot, the location server will transmit the audio to the IRC to be reviewed by a trained operator for final classification.

This Court recognizes that science is distinguished from other fields of study by the application of the "scientific method". The "scientific method" creates a reviewable framework to test hypothesis and render conclusions. The responsibility of the Court is to ensure that evidence, under the guise of expert opinion, is not simply subjective and conclusory without an assessment of reliability. However, competing experts will often argue as to the significance and interpretation of particular steps in reliable protocols. The Nebraska Court has recognized that an expert's opinion must come from a sound, reasonable basis "such that an expert is able to express a reasonably accurate conclusion as distinguished from a mere guess or conjecture." *Kirchner v. Wilson*, 262 Neb. 607, 614 (Neb. 2001).

The first and second steps in the classification process rely on certain predetermined criteria to conclude that the sound detected should be classified as gunfire. The criteria are arrived at by the developers of the ShotSpotter program as being those criteria consistent with the characteristics of the sounds made from gunshot. The sensor's digital signal processor takes measurements of particular sounds. Those measurements are compared with the 28 preprogramed characteristic measurements. These characteristics (measurements) include the amplitude (loudness), the sharpness, the medium frequency, the base, the rise time, and the duration of the pulse. If the sound meets the 28 characteristic measurements, it will be time stamped, called "impulsive" and sent to the server. The server determines, based upon these measurements, whether the incident is classified as a single, multiple, or possible gunshot. If any of these classifications are given, the incident is referred to the IRC for the final level of screening. If a sound is consistent with the identified characteristics and is classified as a gunshot(s), the third step involves an IRC operator actually listening to the sounds as recorded. Since the system has "been known" to give a false positive, the operator will listen to all available sound to draw their own conclusion. The operator has the discretion to reclassify the pulse. The operators, or incident reviewers, are usually people familiar with firearms. Some have musical experience. SST seeks people with a more developed ear. Their training includes frequently listening to live gunfire and reviewing at least 500 known audio files from gunshot incidents. They also listen to another 500 known audio files that are not gunfire. Then they are tested with the known audio files without knowing whether they are confirmed gunfire. The reviewers also train on a year's worth of customer audio data and conduct reclassification of the incidents.

The first two steps in classification involve the application of predetermined criteria to a sound captured by the sensors. Those criteria are screening tools based upon the company's determination that they are most consistent with gunfire sounds. Whether the criteria are appropriately chosen is a matter for cross examination, not admissibility. The Nebraska Supreme Court and the Eighth Circuit have examined whether erroneous factual assumptions require the exclusion of an opinion. "As a general rule, the factual basis of an expert opinion goes to the credibility of the testimony, not the admissibility, and it is up to the opposing party to examine the factual basis for the opinion in cross-examination. Only if the expert's opinion is so fundamentally unsupported that it can offer no assistance to the jury must such testimony be excluded." *Hose v. Chicago Northwestern Transp. Co.*, 70 F.3d 968, 970 (8th Cir. 1996) (internal citations and quotations omitted).

... [a]n appellate court is not a super expert and will not lay down categorically which factors and principles an expert may or may not consider. Such matters go to the weight and credibility of the opinion itself and not to its admissibility.

Kirchner v. Wilson, 262 Neb. 607, 614 (Neb. 2001) (quoting from *Nebraska Nutrients v. Shepherd*, 261 Neb. 723, 770, 626 N.W.2d 472, 510 (2001)).

There is a risk for a false positive classification of a sound as a gunshot. Classification is not guaranteed by the company and there is not a known rate of error. The ShotSpotter technology is based upon validated scientific principles but is designed primarily to meet the needs of law enforcement to respond quickly to a gunshot incident. It is not designed to prove that a particular sound was, *in fact*, a gunshot. However, an opinion that a *recorded sound is consistent with the sound made from a gunshot* can

reasonably be drawn by a trained, experienced individual upon review of the pictorial representations of the audio files and listening to the recordings themselves.

The final determination for the Court is whether the ShotSpotter technology and protocol has been applied in a reliable manner. *Carlson v. Okerstrom*, 267 Neb. 397, 675 N.W. 89 (2004). Greene performed a forensic analysis upon the information generated by the ShotSpotter program and protocol for the incident at issue, occurring February 18, 2012. His review of each step of the program revealed that the ShotSpotter program and protocol worked as designed. ShotSpotter sufficiently tests, supports, documents and archives all aspects of the protocol.

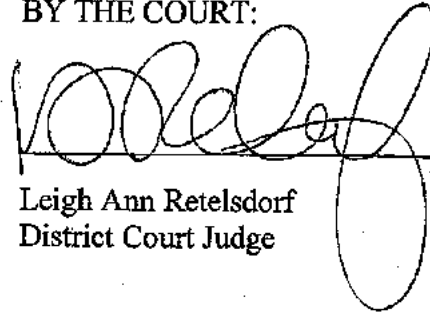
"[O]bservations coupled with expertise generally may form the basis of an admissible expert opinion." See *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 150, 119 S. Ct. 1167, 143 L. Ed. 2d 238 (1999); *Shuck v. CNH Am., LLC*, 498 F.3d 868, 872-875 (8th Cir. Neb. 2007). Based upon Greene's qualifications and expertise, the reliability of the ShotSpotter technology and the applicability of the technology to the facts in this case, the Court finds that Greene should be allowed to proffer an opinion as to the location of origin and time of the audio pulses, the number of recorded audio pulses and whether the audio pulses were consistent with those made by gunshots.

Therefore, the Court finds that Defendant's Motion *in Limine* should be overruled with the limiting qualification on the opinions to be offered by the State.

IT IS HEREBY ORDERED, ADJUDGED AND DECREED that the Defendant's Motion *in Limine* shall be overruled with the limiting qualification on the opinions to be offered by the State.

Dated this 22 day of March, 2013.

BY THE COURT:

A handwritten signature in black ink, appearing to read "Leigh Ann Retelsdorf", written over a horizontal line. The signature is stylized with large loops and a long vertical stroke extending downwards.

Leigh Ann Retelsdorf
District Court Judge

cc: Jim Masteller/Shawn Hagerty
Kelly Steenbock/Cindy Tate

288 Neb. 767
Supreme Court of Nebraska.

STATE of Nebraska, appellee,

v.

Thylun M. HILL, appellant.

No. S-13-698

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Filed August 8, 2014

Synopsis

Background: Defendant was convicted in the District Court, Douglas County, [Leigh Ann Retelsdorf](#), J., of first degree murder. Defendant appealed.

Holdings: The Supreme Court, [McCormack](#), J., held that:

defendant was not “seized,” for Fourth Amendment purposes, until he was subdued by police subsequent to his flight;

probable cause existed to arrest defendant at the time he was seized;

good-faith exception to exclusionary rule applied to any lack of probable cause for residential search warrant;

trial court did not abuse its discretion in admitting expert testimony relating to gunshot location system; and

evidence supported conviction.

Affirmed.

Syllabus by the Court

***767 1. Expert Witnesses: Appeal and Error.** The standard for reviewing the admissibility of expert testimony is abuse of discretion.

2. Expert Witnesses: Appeal and Error. Abuse of discretion is the proper standard of review of a district court's evidentiary ruling on the admission of expert testimony under [Daubert v. Merrell Dow Pharmaceuticals, Inc.](#), 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993).

3. Judges: Words and Phrases. A judicial abuse of discretion exists when a judge, within the effective limits of authorized judicial power, elects to act or refrain from acting, but the selected option results in a decision which is untenable and unfairly deprives a litigant of a substantial right or a just result in matters submitted for disposition through a judicial system.

4. Constitutional Law: Search and Seizure: Motions to Suppress: Appeal and Error. In reviewing a trial court's ruling on a motion to suppress based on a claimed violation of the Fourth Amendment, an appellate court applies a two-part standard of review. Regarding historical facts, an appellate court reviews the trial court's findings for clear error. But whether those facts trigger or violate Fourth Amendment protections is a question of law that an appellate court reviews independently of the trial court's determination.

5. Search and Seizure. Application of the good faith exception to the exclusionary rule is a question of law.

6. Expert Witnesses: Appeal and Error. An appellate court's standard of review with respect to a sufficiency of the evidence claim is very narrow, in that the court must find the evidence to be sufficient if there is any evidence, when viewed in a light favorable to the prosecution, upon which a rational finder of fact could conclude that the State has met its burden of proof beyond a reasonable doubt.

7. Police Officers and Sheriffs: Arrests: Search and Seizure. When a police officer makes an arrest, in the absence of physical contact, the fact that a reasonable person would have believed he or she was not free to leave is a necessary, but not a sufficient, condition for seizure; the subject must also yield to that show of authority.

8. Constitutional Law: Search and Seizure: Search Warrants: Probable Cause. The Fourth Amendment to the U.S. Constitution guarantees the right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, and further provides that no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

9. Search Warrants: Affidavits: Probable Cause. A search warrant, to be valid, must be supported by an affidavit which establishes probable cause.

10. Search Warrants: Probable Cause: Words and Phrases. Probable cause sufficient to justify issuance of a search warrant means a fair probability that contraband or evidence of a crime will be found.

768 11. Search Warrants: Affidavits: Evidence: Appeal and Error.** In evaluating *675** the sufficiency of an affidavit used to obtain a search warrant, an appellate court is restricted to consideration of the information and circumstances contained within the four corners of the affidavit, and evidence which emerges after the warrant is issued has no bearing on whether the warrant was validly issued.

12. Search Warrants. Even when a search warrant is invalid, the exclusionary rule applies only in those cases in which exclusion will further its remedial purposes.

13. Motions to Suppress: Search Warrants: Affidavits: Police Officers and Sheriffs: Probable Cause. The good faith exception to the exclusionary rule provides that in the absence of an allegation that the magistrate issuing a warrant abandoned his or her detached and neutral role, suppression is appropriate only if the officers were dishonest or reckless in preparing their affidavit or could not have harbored an objectively reasonable belief in the existence of probable cause.

14. Motions to Suppress: Search Warrants: Affidavits: Police Officers and Sheriffs: Evidence. Evidence obtained through the execution of an invalid warrant may appropriately be suppressed only if (1) the

magistrate or judge in issuing a warrant was misled by information in an affidavit that the affiant knew was false or would have known was false except for his or her reckless disregard of the truth, (2) the issuing magistrate wholly abandoned his or her judicial role, (3) the warrant is based on an affidavit so lacking in indicia of probable cause as to render official belief in its existence entirely unreasonable, or (4) the warrant is so facially deficient that the executing officer cannot reasonably presume it to be valid.

15. Search Warrants: Affidavits: Probable Cause: Police Officers and Sheriffs: Appeal and Error. When evaluating whether a warrant was based on an affidavit so lacking in indicia of probable cause as to render official belief in its existence entirely unreasonable, an appellate court should address whether the officer, considered as a police officer with a reasonable knowledge of what the law prohibits, acted in objectively reasonable good faith in relying on the warrant.

16. Search Warrants: Affidavits: Police Officers and Sheriffs: Appeal and Error. In assessing the good faith of an officer's conducting a search pursuant to a warrant, an appellate court must look to the totality of the circumstances surrounding the issuance of the warrant, including information possessed by the officers but not contained within the four corners of the affidavit.

17. Courts: Expert Witnesses. Under the Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993), and Schafersman v. Agland Coop, 262 Neb. 215, 631 N.W.2d 862

(2001), jurisprudence, the trial court acts as a gatekeeper to ensure the evidentiary relevance and reliability of an expert's opinion.

18. Homicide: Intent: Time. To commit first degree murder, no particular length of time for premeditation is required, provided that the intent to kill is formed before the act is committed and not simultaneously with the act that caused the death.

****674** Appeal from the District Court for Douglas County: Leigh Ann Retelsdorf, Judge. Affirmed.

Attorneys and Law Firms

Thomas C. Riley, Douglas County Public Defender, and Kelly M. Steenbock for appellant.

Jon Bruning, Attorney General, and Erin E. Tangeman for appellee.

****676** Heavican, C.J., Wright, Connolly, Stephan, McCormack, Miller–Lerman, and Cassel, JJ.

McCormack, J.

***769** I. NATURE OF CASE

Thylun M. Hill appeals from his conviction of first degree murder. Hill argues that evidence found on his person the night of the murder should have been suppressed because he was seized the moment officers encountered Hill in the street, even though he fled. Hill argues that evidence found where he lived should have been suppressed because the affidavit

in support of the search warrant was so lacking in indicia of probable cause that it was wholly unreasonable for the executing officer to presume it to be valid. Hill argues that the court should have suppressed expert testimony and exhibits relating to Omaha's "ShotSpotter" system and its detection of the gunshots that killed the victim, because the testing of the accuracy of the system was inadequate. Finally, Hill alleges that the evidence presented at trial was insufficient to support his conviction. We affirm.

II. BACKGROUND

Hill was convicted, among other crimes, of first degree murder in connection with the shooting death of an acquaintance of Hill's on the night of February 18, 2012. Hill made three pretrial motions to suppress evidence, all of which were denied.

1. Motion to Suppress Results of Search of person

First, Hill moved to suppress all evidence gained as a result of the alleged illegal search of his person on the night of the *770 shooting. The motion alleged that the officers who apprehended Hill lacked reasonable suspicion sufficient to justify a stop and frisk under *Terry v. Ohio*¹ and that the search was not incident to a lawful arrest.

¹ *Terry v. Ohio*, 392 U.S. 1, 88 S.Ct. 1868, 20 L.Ed.2d 889 (1968).

At the hearing on the motion, Officers Mickey Larson and Jeff Wasmund described the circumstances surrounding their encounter with Hill on the night in question. Larson and Wasmund testified that at approximately 10:41 p.m. on February 18, 2012, they were in their police cruiser and Larson was pulling the cruiser out of the lot of the northeast police station, located between North 30th Street and North 31st Avenue. They were traveling in an all-black gang unit cruiser. The cruiser did not have emergency lights on top, but was marked in large print as Omaha Police on the sides. The officers were wearing tactical vests also marked "POLICE," but otherwise were not wearing uniforms.

Almost immediately, both officers heard what sounded like gunshots. They explained that it was clear to them that the shots had been fired nearby. Wasmund was "very confident" that the gunshots had come from the west; he was less certain that they also came from the south. The officers headed one-half block west to 31st Avenue and then turned south.

The officers radioed the precinct to determine if the ShotSpotter detection system was able to pinpoint a more precise location for gunfire. As will be described in more detail below, the ShotSpotter system uses microphones and a global positioning system (GPS) to pinpoint the time and location of sounds consistent with gunshots in the area covered by the system. The ShotSpotter soon gave the officers an address on North 31st Avenue about 2 ½ blocks north of the police station. Thus, while the officers had been correct that the **677 gunfire originated west of their original location, the ShotSpotter indicated the shots originated from

the northwest, not the southwest. The officers had traveled only about two blocks south on North 31st Avenue when they turned around and headed north.

***771** The officers arrived at the address indicated by the ShotSpotter and parked their cruiser in the middle of the street. Only 1 minute had passed since the shots had been heard.

About the same time the officers were stopping in front of the house identified by the ShotSpotter as the source of the gunfire, the officers observed a male rounding the corner at the end of the block and heading down the middle of North 31st Avenue directly toward them. This man was later identified as Hill. The officers noted that Hill was the only civilian the officers had seen in the area since they heard the gunshots. They sought to determine whether Hill was the shooter, a victim, or a witness to the gunshots.

Both officers testified that they stepped out of their vehicle and shined the vehicle spotlight in Hill's direction. They then announced, " 'Omaha police.' " During cross-examination, Larson was asked whether they had yelled, " 'Omaha police, stop,' " when they exited the vehicle. Larson answered "[u]h-huh," but almost immediately thereafter, when defense counsel asked Larson to clarify whether they had ordered Hill to "stop" during their initial encounter with Hill, Larson indicated that they did not; they "just announced 'Omaha police.' " Later at trial, Larson clarified that he announced only "Omaha police" and that he used a "normal tone of voice."

The officers did not have the emergency lights on. Hill paused. The officers did not observe a weapon on Hill, and they began to walk in Hill's direction. The officers did not have their weapons drawn at that time.

Hill immediately turned around and fled, running northbound. The officers ran in pursuit, drew their weapons, and advised Hill that "we were police officers and you need to stop running."

Hill attempted to hurdle the white picket fence of a nearby house and tripped. Hill broke the top of a few of the pickets and hit the ground. The officers, trailing close behind, observed at that time a black revolver fall out from somewhere on Hill's person. Hill picked up the gun and began running again before the officers could catch up to him. The officers thereafter fired at Hill, and he was apprehended.

***772** Numerous additional officers arrived at the scene almost immediately, and Hill was placed under arrest. Several of these officers also testified at the hearing on Hill's motion to suppress. The officers described that they began searching Hill to determine if he had a weapon and whether he had been shot. The officers conducting the search emptied Hill's pockets. The items in Hill's pockets included paper, a wallet, and some latex gloves. A short while thereafter, officers discovered the discarded firearm in the path of Hill's flight from the police. They also discovered the victim, whose body was located behind the house identified by the ShotSpotter as the source of the gunshots heard by Larson and Wasmund.

The court denied the motion to suppress. The court found that the officers had yelled for Hill to stop only after he began running away. The court reasoned that Hill was not “seized” until he was physically apprehended and subdued by the pursuing officers. Therefore, the court did not analyze whether the officers had reasonable suspicion prior to that time. The court found that by the time ****678** Hill was apprehended, which was when he was placed under arrest, the officers knew that Hill was in the area of the shooting at the time of the shooting and also that he had a gun and had fled from police. The court concluded that such information not only provided reasonable suspicion, but also probable cause for Hill's arrest. The court concluded that the search of Hill's person was proper incident to Hill's arrest. Furthermore, the court noted that the firearm had not been seized from Hill, since he had discarded it before any seizure of his person.

2. Motion to Suppress Results of Search of Home

Hill moved to suppress the evidence found in the apartment where he was living at the time of the shooting. In particular, he sought to suppress bullets found in the bedroom where he slept, which a ballistics expert connected at trial to the bullets used in the shooting of the victim. Hill alleged that the affidavit in support of the search warrant, made by Officer Thomas Queen, lacked probable cause.

***773** Queen, of the homicide unit of the Omaha Police Department, completed the affidavit for a warrant to search the apartment where Hill was receiving his Department of

Labor benefits. In the affidavit, Queen averred that he had reason to believe ammunition, companion equipment, venue items, and other items of evidentiary value “to the homicide that occurred on the 18th day of February 2012 at 2240 Hours at [the address]” would be found at the apartment. The affidavit then explicitly set forth as grounds for the issuance of the warrant:

On Saturday, February 18th, 2012 at about 2240 Hours officers of the Omaha Police Department were in the area of 31 Avenue and Meredith Avenue Omaha, Douglas County, Nebraska, when they heard several gunshots close by.

Shortly after the shots Officers observed a party in the same area and attempted to make contact with him. The party ran from officers and dropped a R.G. Industries .38 caliber revolver. The party was apprehended and identified as Thylun M. HILL.

Shot Spotter was checked and it indicated that the shots were fired in the back yard of [address]. Officers went to that location and found a party deceased from apparent gunshot [wounds](#).

A data check showed that Thylun M. HILL was convicted of 1st Degree Manslaughter in Hennipin, Minnesota on April 16th, 1998[.]

A check of Department of Labor records showed that Thylun M. HILL was receiving benefits at [address] and was scheduled to receive those benefits up through October 27th, 2012 at that address.

It is the belief of Officer Thomas QUEEN # 1182 of the Omaha Police Department that,

should this warrant be issued, the listed items would be recovered from the listed address. The county court judge signed the warrant, and Queen testified that he executed the warrant in good faith, believing it to be valid. At the apartment, officers seized 37 live rounds *774 of .38-caliber ammunition inside a knit glove located inside a gray bag in the bedroom where Hill slept.

The trial court denied the motion to suppress. The court agreed with Hill that certain information was missing from the search warrant affidavit. Most notably, the court found that the affidavit did not specify the time of death of the victim or that the death from apparent gunshot [wounds](#) was a homicide. The court also found missing from the affidavit the explicit allegations that (1) the officers responded to an area within several houses of **679 where the shots were fired and the victim was located, (2) the officers arrived in the area within a minute of the gunshots, and (3) Hill was the only person in the area. The court said that it could not fill in this necessary factual information with commonsense inferences, and, thus, the affidavit lacked probable cause.

Nevertheless, the court found that the officers acted in good faith when relying on the warrant and that therefore, the motion to suppress should be denied. The court noted, among other things, that Queen had knowledge of all the facts missing from the affidavit that would support probable cause. Because it was objectively reasonable for Queen to rely on the warrant, the court found no basis for suppression of the evidence.

3. *Daubert* Motion in Limine

Finally, Hill filed a pretrial motion in limine under [Daubert v. Merrell Dow Pharmaceuticals, Inc.](#),² stating that he questioned whether proposed witness Paul Greene qualified as an expert; “whether the reasoning and methodology used by the State’s witness to draw conclusions, inferences, and locations regarding the ability to triangulate noises using a so-called ‘shot spotter’ is valid”; and whether the proposed testimony was relevant and more probative than prejudicial.

² [Daubert v. Merrell Dow Pharmaceuticals, Inc.](#), 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993).

At the hearing on the motion, Greene testified he is an ex-Marine and the lead customer support engineer at SST, Inc. SST sells a product called the ShotSpotter to cities across the country. Greene stated he has experience in hearing and *775 recognizing gunshot sounds and in the information technology system design and operation of the ShotSpotter. The ShotSpotter is an acoustic gunfire detection and location system of GPS-enabled microphones placed in various locations of a municipal area. SST has been in existence since 1995 and has been selling and maintaining ShotSpotter systems since 1996. In the summer of 2011, SST installed a ShotSpotter system in northeast Omaha.

On February 18, 2012, the ShotSpotter system in Omaha consisted of approximately 80 sensors, spaced roughly 400 to 500 meters apart. Each sensor has four GPS-enabled microphones. The digital signal processors of the sensors measure sound input to

determine if the sound meets 28 different audio characteristics of “impulsive audio pulses,” or a “bang, boom, or pop,” and could thus be categorized as a possible gunshot.

If the sound meets the preprogrammed criteria for a possible gunshot, the system transmits the information to a central location server, which uses triangulation to pinpoint the latitude and longitude of the sound and uses a process called “geolocation” to place that location on a map.

Incident review staff in California then quickly look at the audio waveform and listen to a recording of the event to discern if it is a false positive for a possible gunshot. Once the incident review staff rule out a false positive, they send an alert to the police dispatchers.

Greene testified that the incident review staff are specially trained in recognizing the audio waveform characteristics of gunfire and in recognizing the sound of gunfire. SST requires the staff to be able to correctly identify 80 percent of 500 audioclips during performance testing.

Greene explained that the science behind the ShotSpotter system has been recognized for decades:

****680** The principles—the mathematical principles used for the triangulation, the location of the event or object we would call trying to locate an unknown point using two or more known points, the mathematics behind that are actually very old. The practical application of it, you know, in the use of technology is a little more recent, ***776** but still fairly old. Came about with the advent of World War I and

sonar. Since then, seismologists use the same mathematics, the same techniques to determine the epicenter of earthquakes. It's still used by the Navy in sonar applications. It's used in space as well.

Greene described that the ShotSpotter system has “multiple redundancy” of the sensors, such that losing power on an individual basis does not detract from the accuracy of the array. Greene testified that in order to triangulate a gunshot, only three sensors are required to actually hear and participate in the incident. A fourth sensor is used for confirmation information in the event of a single gunshot. When there are multiple shots, the repetition of the pulse data serves as its own confirmation. The GPS satellites are synchronized down to a thousandth of a second from the atomic clock at the National Institute of Standards and Technology in Boulder, Colorado.

Greene testified that the official margin of error for the location of detected gunfire is a 150-foot radius, but that they regularly achieve accuracy of a radius of 10 or 20 feet or better. The ShotSpotter guarantees that it will give a correct location, within this margin of error, for 80 percent of detectible outdoor gunfire in the system area. Gunfire that is silenced or masked by other sounds is not considered detectible.

When the system was installed in 2011, SST performed a live fire test that verified the accuracy of the system. Greene stated that an SST project manager was present during this testing. SST has not performed such a test since that time. Greene explained, however, that SST “monitor[s] for sensor health constantly.” The sensors self-calibrate every 48 hours,

and if a sensor does not self-calibrate, SST is automatically notified. In addition, each sensor sends a “heartbeat pulse” once every 30 seconds. In fact, each GPS sensor, as well as each of the four microphones attached to it, independently communicates with the ShotSpotter server about its health.

When enough sensors lose network communication with the system, SST dispatches a technician to replace all of the inactive sensors. At the hearing on the motion in limine, Greene testified that SST generally dispatches a technician when the active sensor count is 90 percent or less. At trial, Greene *777 elaborated that SST's written policy guarantees that SST will dispatch technicians to replace sensors when SST detects that the system reaches a “20 percent or better” reduction in sensor capacity. Greene testified that the system is designed so that it can lose up to 20 percent of its capacity and still make accurate detections.

Greene created a “ShotSpotter Detailed Forensic Report” for the shooting on February 18, 2012. He testified that in his experience, he believed to a reasonable degree of certainty that the sounds detected by the ShotSpotter were consistent with gunfire. The report reflects that the alert containing the precise location of the shots detected on February 18 was given to Omaha police dispatch 48 seconds after the time the sound was detected by the ShotSpotter sensors.

Three of the shots were detected by 11 sensors. The last shot was detected by four sensors. Greene explained that while **681 there are a multitude of environmental reasons why the

number of sensors detecting an incident might be higher or lower, changing the direction of fire can have a significant impact on the number of detecting sensors. At trial, Greene further explained that if a shot were fired at the ground, fewer sensors would detect it, because the ground tends to absorb some of the acoustic energy.

Greene testified that he did not specifically note the number of sensors in Omaha that were not working at the time of the incident, because the data in the report was based on the sensors' actually detecting the gunshots; a compromised sensor would not produce location detection data. Greene explained further at trial that even if there had been sensors in the area not working, that fact would not affect the conclusions drawn in the ShotSpotter report.

Based on the testimony at the hearing and the arguments made by counsel, the court characterized the *Daubert* analysis in terms of two basic questions: (1) the detection and location of sound and (2) the classification of that sound as a gunshot. The court noted that Hill did not challenge the underlying mathematical and physics principles of triangulation utilized by the ShotSpotter, but instead challenged the “ShotSpotter's testing, positioning, and maintenance of the sensors and the *778 process of classification of an individual impulsive sound as a gunshot.”

In a 15–page order denying the motion in limine, the court found that Greene was qualified as an expert in the design, installation, and function of the ShotSpotter system and in gunshot sound recognition. The court also found that the ShotSpotter system was

sufficiently reliable. The court noted Hill's argument that because an SST project manager was present during the original testing of the system, there was no "blind" testing conducted. But the court reasoned that blind studies are not necessary when determining if electronic equipment operates properly and that there was no evidence that the SST project manager somehow influenced the testing results. The court also found that despite the lack of regularly scheduled maintenance, there were sufficient safeguards in the protocol, which provided for constant monitoring and maintenance when necessary, to support the reliability of the technology. Finally, the court found that there was a sufficient factual basis to support the classification of the sounds as being consistent with gunfire.

At trial, Hill renewed his objection under [*Daubert*](#) to Greene's testimony and to various exhibits concerning the ShotSpotter detection of the shots fired on February 18, 2012. Hill did not object, however, to the testimony of Larson, Wasmund, and other officers concerning their understanding of the ShotSpotter technology and their responses to the ShotSpotter alerts on February 18.

4. Evidence at Trial

(a) Chase

During the trial, Larson and Wasmund reiterated their testimony from the suppression hearing. They testified that at the time of the incident, they were assigned to the north gang suppression unit. They primarily worked in

the area of the northeast precinct, which was characterized as a "high crime area."

Larson and Wasmund testified that as they were leaving the precinct parking lot, with the vehicle windows rolled partway *779 down, they heard "loud" and "distinct" multiple gunshots nearby. They headed in the direction they thought the shots came from. They corrected their course about 30 to 40 seconds later when the ShotSpotter gave them an address.

****682** As they approached the residential address given by the ShotSpotter, approximately in the middle of the block, Larson and Wasmund observed Hill as the only civilian in the area. Hill was rounding the far corner from where the alley ran behind the residence specified by the ShotSpotter. Hill was heading in their direction.

The officers parked their vehicle in front of the house. The officers then shone a spotlight toward Hill, exited their vehicle, and identified themselves in a normal tone of voice as Omaha police. The officers did not yet know a homicide had been committed, and they did not see a gun on Hill. They sought only to inquire whether Hill was a witness, victim, or the perpetrator of the shots they heard and which were identified by the ShotSpotter. Hill paused for a moment, turned, and fled.

The officers ran after Hill, yelling "Omaha police." In his flight, Hill tripped over a picket fence and a gun fell from his person. At that moment, Wasmund was about 8 feet from Hill, and Larson was about 5 feet away, and both clearly saw the weapon.

Hill picked up the gun and resumed his flight. The officers split up to try to catch him. Wasmund fired a shot at Hill when he saw Hill change direction and appear to have an open line of fire at both Larson and Wasmund. Larson heard two shots and, not knowing if Hill had fired at Wasmund or the other way around, fired one shot at Hill. Shortly thereafter, Hill was apprehended.

At least seven other officers arrived almost immediately on the scene. It was revealed during the defense that one of those officers was a sergeant who was later under investigation by the Douglas County Attorney's office for an unrelated incident of an indefinite nature and which incident resulted in a recommendation that the sergeant be terminated from the Omaha Police Department. However, no officers reported observing ***780** the sergeant doing anything out of keeping with standard Omaha Police Department protocols on the night of February 18, 2012.

Officers who arrived at the scene shortly after Hill was apprehended emptied Hill's pockets. The officers discovered a pair of latex gloves and a camouflage ski mask, as well as other miscellaneous personal items.

When it was discovered from the search of his person that Hill no longer carried the gun he had previously dropped and picked up, the officers searched the area. They found a revolver lying on the ground in the path of Hill's previous flight. Both Larson and Wasmund identified that revolver as the same one they saw fall from Hill's person during his flight.

The officers also went to the backyard of the address identified by the ShotSpotter. There they found the body of the victim, lying face down in the backyard. The victim's pants were pulled down to his thighs. Near the scene, officers found a pack of cigarettes, a lighter, two cell phones, a beer can, and other miscellaneous items eventually identified by nonforensic means as likely belonging to the victim.

(b) Victim's Cell Phones

The cell phones, in particular, were identified as belonging to either the victim or the victim's mother. The victim's mother testified that because the victim's cell phone did not make telephone calls, the victim often borrowed her cell phone.

Over 6 months had passed before the police were asked by the Douglas County Attorney's office to attempt to discover the telephone records for those cell phones.

By the time the police investigated the telephone logs for the cell phones carried by the victim, the telephone company connected ****683** with the victim's mother's cell phone no longer maintained the call records for the time of the shooting.

What the mother had identified as the victim's cell phone was actually registered to an unrelated party who did not know the victim. Call records for that cell phone were able to be obtained. The records showed several calls and text messages ***781** to the victim on the day of the shooting from a prepaid cell phone

registered to “John Doe” with the address of a U.S. Cellular store, as well as several telephone calls from the victim to “John Doe.”

The records obtained closest to the time of the shooting reflected that at 8:50 p.m. the night of February 18, 2012, the victim and “John Doe” had a 64-second telephone conversation. At 10:19 p.m., the victim sent a text to “John Doe.” At 10:26 p.m., the victim called “John Doe” and reached his voice mail. At 10:27 p.m., the victim again called “John Doe” and reached his voice mail. “John Doe” thereafter attempted to call the victim three times in an 11-minute period shortly after midnight and subsequent to the shooting. There were no attempted telephone calls from “John Doe” to the victim after the victim's death was announced the following day on the news.

(c) Cause of Death

A pathologist determined that the victim had suffered three gunshot [wounds](#). One [wound](#) entered the right cheek and exited the left cheek at a straight angle through the sinuses, causing little damage. The other two shots had entered the victim's back and lodged in his body. One entrance [wound](#) was located in the left lateral chest. The bullet had entered at an upward angle and had punctured the victim's diaphragm and stomach. The other entrance [wound](#) was located in the middle of the victim's lower back. That bullet had also entered at an upward angle and it punctured the victim's heart.

The [wounds](#) in the victim's face and chest would not have been fatal unless left unattended. But the [wound](#) to his lower back

rendered the heart nonfunctional as soon as it was hit, leaving the victim only about 15 to 20 seconds of consciousness thereafter.

The pathologist did not observe any lacerations or trauma, other than the bullet [wounds](#), to the victim's body. The bullet [wounds](#), because there was no evidence of soot or stippling, were made by a firearm held at a distance at least 12 inches away.

*782 (d) ShotSpotter Report

At trial, Greene reiterated his testimony from the hearing on the motion in limine. In addition, the detailed forensic report prepared by Greene to document the incident was entered into evidence. The report indicated that beginning at approximately 10:40 p.m. on February 18, 2012, four shots were fired in fairly rapid succession. The shots began either in the alley or on the side of the alley opposite where the victim's body was found. The last shot was located approximately where the body was found. That last shot occurred after a slightly longer pause of 3.8 seconds from the preceding shot. From the first shot to the last, a total of 6 ½ seconds passed. The last shot occurred approximately 10 feet from the first three. The report also identified the correct location of the officers' shots in pursuit of Hill, which were time stamped as occurring at 10:43 p.m.

(e) Ballistics Evidence From Gun

The gun that Larson and Wasmund identified as being carried by Hill and discarded during his flight had four spent casings inside the

cylinder. The gun was discovered to have been registered in 1982 to a woman unrelated to Hill and who had been deceased since 2000. An expert ****684** working in the area of firearm and toolmark examination for the Omaha Police Department testified that the bullets found in the victim's body were fired from the weapon found in the path of Hill's flight and identified by Larson and Wasmund as the gun that Hill had dropped during that flight. The expert testified that test-fired bullets from the gun were consistent with the bullets found in the victim's body, in both general and class characteristics and individual and specific characteristics.

(f) Relationship Between Hill and Victim and Events on Night of Shooting

Testimony at trial established that Hill lived in the same apartment building as the victim. Hill lived with his girlfriend, her infant child, and his girlfriend's brother. According to the brother, Hill and the victim knew each other. They “hung out sometimes, drank together, you know, normal neighbor stuff.” He often heard Hill and the victim in the hallway engaging in ***783** “casual daily arguments.” The brother described such arguments as common amongst most of the people in the building and “[n]othing out of the ordinary.”

About 6 weeks before the shooting, the brother had told Hill he thought the victim was an informant for the Omaha Police Department. The brother had come to this conclusion because often he saw the victim with brand-new \$100 bills and the victim acted like he was a “big deal.”

On the day of the shooting, the brother and Hill had been drinking continuously since the early hours of the morning. Sometime in the evening, Hill and the brother ran into the victim in the hall of the apartment building. The brother testified that Hill and the victim began “[d]runk shit talking.” The brother did not know what Hill and the victim were arguing about, but they were yelling at each other.

The brother went back into the apartment. But he continued to hear loud talking in the hallway. The next thing the brother remembered, Hill was in the apartment, seemingly upset. Hill was in the bathroom with the light off either whispering to himself or breathing heavily. The brother then passed out and did not wake up until the following morning.

The victim's mother recalled that at some point in the evening, there had been a knock on their apartment door and the victim left. She did not see or hear from the victim after that.

(g) Bullets Found Where Hill Lived

Officers testified that the day after the shooting, they conducted a search of the apartment where Hill lived. In the bedroom where Hill slept with his girlfriend and the infant, they found a gray bag. Inside the bag were latex gloves and also a knit glove with 37 live rounds of ammunition inside it. The ammunition was head stamped “R–P 38 SPL.” It was the same as the ammunition used in the shooting.

(h) Telephone Call Made by Hill in Jail

The State presented evidence that while Hill was incarcerated awaiting charges against him, he made a telephone call in which he told an unidentified person to have his girlfriend “ ‘get rid of that bag, that gray bag.’ ”

*784 (i) No DNA Evidence

There was no DNA or fingerprint evidence found either connecting Hill to the shooting or excluding him.

III. ASSIGNMENTS OF ERROR

Hill assigns that the trial court erred when (1) it overruled his motion to suppress and exclude from use against him at trial any statements he made and any evidence obtained by Omaha police officers as a result of the illegal search and seizure of his person conducted by Omaha police officers **685 on February 18, 2012; (2) it overruled Hill's motion to suppress evidence obtained from the search of the residence where he lived, because it erroneously concluded that the search was conducted pursuant to the good faith exception to the warrant requirement; (3) it overruled Hill's motion in limine challenging the admissibility of the State's expert testimony regarding the ShotSpotter technology; and (4) it found the evidence sufficient to support the guilty verdict for first degree murder.

IV. STANDARD OF REVIEW

The standard for reviewing the admissibility of expert testimony is abuse of discretion.³

³ [*State v. McClain*, 285 Neb. 537, 827 N.W.2d 814 \(2013\).](#)

Abuse of discretion is the proper standard of review of a district court's evidentiary ruling on the admission of expert testimony under [*Daubert*](#).⁴

⁴ See [*State v. Leibhart*, 266 Neb. 133, 662 N.W.2d 618 \(2003\).](#)

A judicial abuse of discretion exists when a judge, within the effective limits of authorized judicial power, elects to act or refrain from acting, but the selected option results in a decision which is untenable and unfairly deprives a litigant of a substantial right or a just result in matters submitted for disposition through a judicial system.⁵

⁵ [*Id.*](#)

In reviewing a trial court's ruling on a motion to suppress based on a claimed violation of the Fourth Amendment, we apply a two-part standard of review. Regarding historical *785 facts, we review the trial court's findings for clear error. But whether those facts trigger or violate Fourth Amendment protections is a question of law that we review independently of the trial court's determination.⁶

⁶ [*State v. Sprunger*, 283 Neb. 531, 811 N.W.2d 235 \(2012\).](#)

Application of the good faith exception to the exclusionary rule is a question of law.⁷

⁷ *Id.*

Our standard of review with respect to a sufficiency of the evidence claim is very narrow, in that we must find the evidence to be sufficient if there is any evidence, when viewed in a light favorable to the prosecution, upon which a rational finder of fact could conclude that the State has met its burden of proof beyond a reasonable doubt.⁸

⁸ See *State v. Matit*, 288 Neb. 163, 846 N.W.2d 232 (2014).

V. ANALYSIS

Hill challenges four rulings of the trial court. First, Hill argues that the court should have suppressed the evidence of the gloves and mask found on his person, because he had allegedly been stopped without probable cause. Second, Hill argues that there was no good faith exception to the lack of probable cause in the affidavit supporting the search warrant of the apartment where he lived and that the court should have suppressed the ammunition found there pursuant to the search warrant. Third, Hill argues that expert testimony and exhibits concerning the ShotSpotter system, which detected the location of the shots fired the night of the murder, should have been excluded under *Daubert*.⁹ Finally, Hill argues that the ****686** evidence at trial was insufficient to support his conviction of first degree murder.

⁹ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, *supra* note 2.

1. Motion to Suppress Results of Search of Person

We first address Hill's motion to suppress the search of his person. According to Hill, he was subjected to a *Terry* stop ***786** “the very moment [the] encounter between [Hill] and the officers was initiated.”¹⁰ Hill describes that he was walking down the sidewalk when the officers commanded him to stop. Hill argues that merely walking down the sidewalk in an area where sounds consistent with gunfire were detected is insufficient to support reasonable suspicion of criminal activity. Therefore, all evidence later seized on Hill's person and statements made by Hill should have been suppressed.

¹⁰ Brief for appellant at 19.

Hill's descriptions of the relevant events are not entirely consistent with the testimony presented at the suppression hearing, nor with the trial court's findings in its order denying the motion to suppress. In any event, we agree with the trial court that Hill was not seized until he was subdued by police subsequent to his flight. By that time, there was probable cause for his arrest.

In *California v. Hodari D.*,¹¹ the U.S. Supreme Court held that the defendant who fled from police was not seized by the officers' show of authority until he was tackled subsequent to his flight. The Court said that in the absence of physical contact, the fact that a reasonable person would have believed he or she was not free to leave is a “*necessary*, but not a *sufficient*, condition for seizure.”¹² The subject must also yield to that show of authority. Thus, the Court held in *Hodari D.* that the cocaine the defendant abandoned while he was running from the police, who were at that time pursuing

him and ordering him to stop, was not the fruit of a seizure. The defendant's motion to exclude that evidence was accordingly properly denied. The Court further explained that if the officers saw the defendant discard the cocaine and recognized it as such, the cocaine would provide reasonable suspicion for *787 the unquestioned seizure that occurred when the defendant was eventually tackled.¹³

¹¹ [*California v. Hodari D.*, 499 U.S. 621, 111 S.Ct. 1547, 113 L.Ed.2d 690 \(1991\)](#). See, also, e.g., [*State v. Van Ackeren*, 242 Neb. 479, 495 N.W.2d 630 \(1993\)](#); [*State v. Cronin*, 2 Neb.App. 368, 509 N.W.2d 673 \(1993\)](#).

¹² [*California v. Hodari D.*, 499 U.S. at 628, 111 S.Ct. 1547](#) (emphasis in original).

¹³ [*California v. Hodari D.*, *supra* note 11](#).

We reject Hill's argument that he was seized before his flight. Hill did not yield to Larson and Wasmund until after his flight and the officers discovered Hill was carrying a gun.

Hill does not appear to argue that there was insufficient cause to seize him after his flight. In any event, we affirm the trial court's conclusion that the officers had probable cause to arrest Hill by the time he was seized. The U.S. Supreme Court, in [*Illinois v. Wardlow*](#),¹⁴ said: "Headlong flight—wherever it occurs—is the consummate act of evasion: It is not necessarily indicative of wrongdoing, but it is certainly suggestive of such." Headlong flight while carrying a gun in a high-crime area where shots were heard within the last 3 minutes is sufficiently suggestive of wrongdoing to support probable cause. We affirm the judgment of the trial court denying Hill's motion to suppress the evidence found on Hill's person.

¹⁴ [*Illinois v. Wardlow*, 528 U.S. 119, 124, 120 S.Ct. 673, 145 L.Ed.2d 570 \(2000\)](#).

****687** 2. Motion to Suppress Results of Search of Home

We next address Hill's argument that the trial court erred in failing to suppress evidence found at his residence pursuant to the search warrant. Hill agrees with the trial court's assessment of the affidavit in support of the search warrant as lacking in probable cause. But Hill disagrees with the trial court's determination that the officers carrying out the warrant acted in good faith, such that the evidence found during the search was admissible. The State argues the trial court was incorrect in finding that no probable cause was stated in the affidavit but that, in any case, the trial court was correct in finding applicable the good faith exception to the exclusionary rule.

The Fourth Amendment to the U.S. Constitution guarantees "[t]he right of the people to be secure in their persons, *788 houses, papers, and effects, against unreasonable searches and seizures ..." and further provides that "no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized." The Nebraska Constitution provides similar protection.¹⁵

¹⁵ See [*Neb. Const. art. I, § 7*](#).

The execution of a search warrant without probable cause is unreasonable and violates these constitutional guarantees.¹⁶ Accordingly, a search warrant, to be valid, must be supported

by an affidavit which establishes probable cause.¹⁷ Probable cause sufficient to justify issuance of a search warrant means a fair probability that contraband or evidence of a crime will be found.¹⁸

¹⁶ *State v. Nuss*, 279 Neb. 648, 781 N.W.2d 60 (2010).

¹⁷ *Id.*

¹⁸ *Id.*

In reviewing the strength of an affidavit submitted as a basis for finding probable cause to issue a search warrant, an appellate court applies a “totality of the circumstances” test.¹⁹ The question is whether, under the totality of the circumstances illustrated by the affidavit, the issuing magistrate had a substantial basis for finding that the affidavit established probable cause. In evaluating the sufficiency of an affidavit used to obtain a search warrant, an appellate court is restricted to consideration of the information and circumstances contained within the four corners of the affidavit, and evidence which emerges after the warrant is issued has no bearing on whether the warrant was validly issued.²⁰

¹⁹ *Id.*

²⁰ *Id.*

But even when a search warrant is invalid under this test, the exclusionary rule applies only in those cases in which exclusion will further its remedial purposes.²¹ The exclusionary rule is a judicially created remedy designed to *789 deter police misconduct.²² It is an “extreme sanction”²³ of “‘last resort.’”²⁴

²¹ See, e.g., *United States v. Leon*, 468 U.S. 897, 104 S.Ct. 3405, 82 L.Ed.2d 677 (1984); *State v. Davidson*, 260 Neb. 417, 618 N.W.2d 418 (2000).

²² *Id.*

²³ *United States v. Leon*, 468 U.S. at 926, 104 S.Ct. 3405.

²⁴ *Herring v. United States*, 555 U.S. 135, 140, 129 S.Ct. 695, 172 L.Ed.2d 496 (2009).

****688** In *Herring v. United States*,²⁵ the Court said, “[t]o trigger the exclusionary rule, police conduct must be sufficiently deliberate that exclusion can meaningfully deter it, and sufficiently culpable that such deterrence is worth the price paid by the justice system.” Otherwise, application of the exclusionary rule, as the Court explained in *United States v. Leon*,²⁶ would offend “basic concepts of the criminal justice system” and “ ‘generat[e] disrespect for the law and administration of justice.’ ”

²⁵ *Id.*, 555 U.S. at 144, 129 S.Ct. 695.

²⁶ *United States v. Leon*, 468 U.S. at 908, 104 S.Ct. 3405.

The good faith exception to the exclusionary rule accordingly provides that “[i]n the absence of an allegation that the magistrate abandoned his detached and neutral role, suppression is appropriate only if the officers were dishonest or reckless in preparing their affidavit or could not have harbored an objectively reasonable belief in the existence of probable cause.”²⁷ It is, after all, “the magistrate’s responsibility to determine whether the officer’s allegations establish probable cause and, if so, to issue a warrant comporting in form with the requirements of the Fourth Amendment.”²⁸ And, ordinarily, “an officer cannot be expected to question the magistrate’s probable-cause determination or his judgment that the form

of the warrant is technically sufficient.”²⁹ Penalizing the officer for the magistrate's error does not “logically contribute to the deterrence of Fourth Amendment violations.”³⁰

²⁷ *Id.*, 468 U.S. at 926, 104 S.Ct. 3405.

²⁸ *Id.*, 468 U.S. at 921, 104 S.Ct. 3405.

²⁹ *Id.*

³⁰ *Id.*

***790** In sum, evidence obtained through the execution of an invalid warrant may appropriately be suppressed only if (1) the magistrate or judge in issuing a warrant was misled by information in an affidavit that the affiant knew was false or would have known was false except for his or her reckless disregard of the truth, (2) the issuing magistrate wholly abandoned his or her judicial role, (3) the warrant is based on an affidavit so lacking in indicia of probable cause as to render official belief in its existence entirely unreasonable, or (4) the warrant is so facially deficient that the executing officer cannot reasonably presume it to be valid.³¹

³¹ See *State v. Nuss*, *supra* note 16.

Hill asserts that the search warrant affidavit was so lacking in indicia of probable cause that it was entirely unreasonable for Queen to have relied upon it. When evaluating whether the warrant was based on an affidavit so lacking in indicia of probable cause as to render official belief in its existence entirely unreasonable, an appellate court should address whether the officer, considered as a police officer with a reasonable knowledge of what the law prohibits, acted in objectively reasonable good faith in relying on the warrant.³² In assessing

the good faith of an officer's conducting a search pursuant to a warrant, an appellate court must look to the totality of the circumstances surrounding the issuance of the warrant, including information possessed by the officers but not contained within the four corners of the affidavit.³³

³² *State v. Davidson*, *supra* note 21.

³³ See, *United States v. Leon*, *supra* note 21; *State v. Davidson*, *supra* note 21; *State v. Holguin*, 14 Neb.App. 417, 708 N.W.2d 295 (2006).

****689** Hill asserts that “Officer Queen's omission from the affidavit that [the victim's] death was an apparent homicide and that the police assumed [Hill] was involved because he was in the same area shortly after the apparent homicide was a glaring mistake.”³⁴ Our review of the affidavit reveals that, in fact, contrary to Hill's assertion and some of the trial court's ***791** findings, the affidavit referred in its introductory statements to a “homicide” at approximately 10:40 p.m. on February 18, 2012, at a stated address. The affidavit further referred to the fact that Hill was found in that area near the time of the homicide.

³⁴ Brief for appellant at 22.

Considering those allegations, as well as the other allegation in the affidavit, we are certainly not presented here with a case of a “bare bones” affidavit—one which relies only on uncorroborated tips or mere suspicion.³⁵ The affidavit described how the officers had heard gunshots near their location at approximately 10:40 p.m. and how they arrived shortly thereafter at the address identified by the ShotSpotter as the location of the gunshots. The affidavit described Hill's flight from the officers

and the fact that he was carrying a gun. Finally, the affidavit described that the victim had died from apparent gunshot [wounds](#) and was found at the address identified by the ShotSpotter and near where Hill was seen when officers arrived.

³⁵ See, [State v. Sprunger](#), *supra* note 6; [State v. Holguin](#), *supra* note 33.

Courts are free to reject suppression motions posing no important Fourth Amendment questions by turning immediately to a consideration of the officers' good faith.³⁶ We affirm the trial court's decision that the evidence obtained during the search of Hill's residence should not have been suppressed, because the good faith exception applied. Like the affidavit presented in [Leon](#), Queen's affidavit certainly provided at least "evidence sufficient to create disagreement among thoughtful and competent judges as to the existence of probable cause."³⁷ Thus, as in [Leon](#), the officers' reliance on the magistrate's determination of probable cause was, by definition, objectively reasonable.³⁸ Therefore, the district court was correct that application of the extreme sanction of exclusion was inappropriate.

³⁶ See [United States v. Leon](#), *supra* note 21.

³⁷ *Id.*, 468 U.S. at 926, 104 S.Ct. 3405.

³⁸ See *id.*

*792 3. Motion in Limine Challenging ShotSpotter Technology

We turn now to Hill's argument that the trial court should have excluded Greene's testimony that the ShotSpotter detected gunshots at the specified address near North

31st Avenue on February 18, 2012. Under our [Daubert](#)³⁹/[Schafersman](#)⁴⁰ jurisprudence, the trial court acts as a gatekeeper to ensure the evidentiary relevance and reliability of an expert's opinion.⁴¹ The purpose of the gatekeeping function is to ensure that the courtroom door remains closed to " 'junk science' " that might unduly influence the jury, while admitting reliable expert testimony that will assist the trier of fact.⁴² This gatekeeping function entails a preliminary assessment ****690** whether the reasoning or methodology underlying the testimony is valid and whether that reasoning or methodology properly can be applied to the facts in issue.⁴³

³⁹ [Daubert v. Merrell Dow Pharmaceuticals, Inc.](#), *supra* note 2.

⁴⁰ [Schafersman v. Agland Coop](#), 262 Neb. 215, 631 N.W.2d 862 (2001).

⁴¹ [State v. Daly](#), 278 Neb. 903, 775 N.W.2d 47 (2009).

⁴² [State v. Casillas](#), 279 Neb. 820, 834, 782 N.W.2d 882, 896 (2010).

⁴³ [State v. Daly](#), *supra* note 41.

In determining the admissibility of an expert's testimony, a trial judge may consider several more specific factors that might bear on a judge's gatekeeping determination.⁴⁴ These factors include whether a theory or technique can be (and has been) tested; whether it has been subjected to peer review and publication; whether, in respect to a particular technique, there is a high known or potential rate of error; whether there are standards controlling the technique's operation; and whether the theory or technique enjoys general acceptance within a relevant scientific community.⁴⁵ These factors are, however, neither exclusive nor

binding; different factors may prove more significant in different cases, and additional factors may prove relevant under particular circumstances.⁴⁶

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.*

***793** In support of his assertion that the ShotSpotter technology was not established as reliable under our *Daubert/Schafersman* jurisprudence, Hill makes only three arguments: (1) that “blind” tests of the system have never been performed; (2) that Greene did not know what percent capacity the Omaha ShotSpotter system was operating at on February 18, 2012; and (3) that the SST employees at the incident review center “are ultimately just people using their own subjective opinions about whether particular sound files are consistent with gunfire.”⁴⁷

⁴⁷ Brief for appellant at 25.

Hill does not challenge the underlying GPS triangulation methodology upon which the ShotSpotter location is based. Thus, insofar as these challenges present *Daubert/Schafersman* issues at all, they focus on whether that methodology properly can be applied to the facts in issue in this case.

We first observe that Hill's arguments challenging the ShotSpotter detection in this case are somewhat dubious given that the sounds of gunshots in the general area identified by ShotSpotter were simultaneously heard by Larson and Wasmund, and given that the victim was confirmed shot in almost the exact location identified by the ShotSpotter as

the source of the shots Larson and Wasmund heard. Indeed, the principal import of the ShotSpotter evidence in this case apparently was the precise measurement of the timing between the four shots fired at the victim, and Hill does not challenge the ShotSpotter's time stamps.

In any event, we find no merit to Hill's arguments that the trial court abused its discretion in denying his motion in limine. A court performing a *Daubert/Schafersman* inquiry should not require absolute certainty.⁴⁸ Instead, a trial court should admit expert testimony if there are good grounds for the expert's conclusion, even if there could possibly be better grounds for some alternative conclusion.⁴⁹ An abuse of discretion in the trial court's *Daubert/Schafersman* determination occurs when a trial court's decision is based upon reasons that are untenable ***794** or unreasonable or if its action is clearly ****691** against justice or conscience, reason, and evidence.⁵⁰

⁴⁸ *State v. Daly, supra* note 41.

⁴⁹ *Id.*

⁵⁰ *Id.*

It was neither untenable nor unreasonable for the trial court to conclude that the absence of blind testing did not seriously undermine the reliability of the ShotSpotter system in northeast Omaha. The court noted that there was no evidence that the presence of the SST project manager influenced the results of the electronic equipment, which accurately located the source of the test gunshots fired by police officers in the project manager's presence.

Likewise, the reliability of the ShotSpotter technology was not seriously undermined by Greene's failure to identify the percent capacity of the Omaha ShotSpotter system at the time of the shooting. Greene's testimony indicated that the system would have been running at least at an 80-percent capacity, according to their maintenance protocols. Furthermore, Greene testified that incapacitated sensors would not report data for the triangulation of the gunshots and that there were sufficient sensors reporting data for the shots in question to accurately triangulate their location.

Finally, the court did not err in admitting the ShotSpotter evidence over Hill's objection that SST employees were unqualified to characterize sounds as being consistent with gunshots. Greene testified that SST employees were extensively trained in the recognition of sounds consistent with gunshots. Greene testified as to his experience in identifying sounds consistent with gunshots, as well as the visual wavelength consistent with gunshots, and he testified to a reasonable degree of certainty that the sounds detected by the ShotSpotter at approximately 10:40 p.m. on February 18, 2012, were consistent with gunshots. We also note that the system itself first identifies the wavelength of the sound as consistent with gunshots before sending data to the incident review staff.

None of Hill's arguments regarding the ShotSpotter system demonstrate that the trial court abused its discretion in admitting Greene's testimony or the ShotSpotter report.

***795** 4. Sufficiency of Evidence

Lastly, we address Hill's argument that the evidence was insufficient to support the verdict of first degree murder. Hill argues that the evidence supports, at most, second degree murder upon a sudden quarrel.

Hill points out that there were no witnesses to the shooting; that there was no blood, mudstains, or gunshot residue on Hill; and that the angle of the gunshot to the victim's cheek indicates a taller shooter than Hill. He also argues that the State failed to establish any motive for the crime. He generally asserts the police conducted a deficient investigation, pointing out that one involved officer was under investigation and that the State failed to pursue DNA testing on certain items or to timely pursue telephone records of the cell phones found on the victim. Thus, Hill argues that the State failed to discover other possible suspects. He asserts that the "John Doe" who was calling the victim the night of the murder may have been the real killer. Finally, Hill alleges there was evidence of a physical altercation precluding premeditation: the victim's pants were pulled down and he had scrape marks on his body.

All these arguments were made to and rejected by the jury, which was given a step instruction on second degree murder. These arguments do not demonstrate that the evidence was insufficient to support the jury's verdict. Our standard of review ****692** with respect to a sufficiency of the evidence claim is very narrow, in that we must find the evidence to be sufficient if there is any evidence, when viewed

in a light favorable to the prosecution, upon which a rational finder of fact could conclude that the State had met its burden of proof beyond a reasonable doubt.⁵¹

⁵¹ See *State v. Matit*, *supra* note 8.

Hill concedes the evidence at trial established that Hill was near the crime scene shortly after the officers heard gunshots and that Hill carried the gun that was used to shoot the victim. He further concedes that officers subsequently found ammunition for that weapon in Hill's residence. The evidence at trial also demonstrated that several shots were fired at the victim and that at least two shots were fired at the *796 victim's back. And, as demonstrated by the ShotSpotter time stamps, there was more than sufficient time between shots for Hill to form premeditation. To commit first degree murder, no particular length of time for premeditation is required, provided that the intent to kill is formed before the act is committed and not simultaneously with the act that caused the death.⁵²

⁵² See *State v. Nolan*, 283 Neb. 50, 807 N.W.2d 520 (2012).

Further, viewing the evidence in a light most favorable to the prosecution, we find there are explanations consistent with a finding of first degree murder for the physical state of the victim and his clothing, the cell phone conversations, and the angles of the shots. The condition of the victim could have been the result of running or falling. It is mere speculation that the unknown "John Doe" was the killer, and any inadequacies in the investigation of another possible killer were a matter for the jury to consider. The angle of the shots, as the State argued at trial, could

have been the result of the victim's either being hunched over or on the ground when the shots were fired. In fact, Greene explained at trial without objection that the later shots were detected by fewer ShotSpotter sensors, which was consistent with the shots being fired toward the ground.

Hill assigns that the trial court erred when it found the evidence was sufficient to support the guilty verdict for first degree murder. It was conceded at oral argument that the gun in Hill's possession was the weapon that killed the victim. The victim was shot three times, twice in the back and once in the face. The victim was killed in a dark, secluded alley. The brother of Hill's girlfriend testified that earlier in the evening of the shooting, Hill and the victim engaged in an argument and were yelling at each other, and that afterward, he remembered Hill was in the apartment seemingly upset. The brother testified that he had told Hill he thought the victim was an informant for the Omaha Police Department. If the trier of fact believed this evidence, these facts would be sufficient for a conviction of premeditated first degree murder.

*797 VI. CONCLUSION

We hold that the trial court properly denied Hill's motions to suppress and motion in limine, and we find the evidence sufficient to support the jury's verdict of first degree murder. We affirm the judgment below.

Affirmed.

All Citations

288 Neb. 767, 851 N.W.2d 670

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Exhibit 7

1 IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA
2 IN AND FOR THE COUNTY OF CONTRA COSTA
3 BEFORE THE HONORABLE CLARE MAIER, JUDGE
4

5 --oOo--

6 THE PEOPLE OF THE STATE OF CALIFORNIA,

7 Plaintiff,

8 vs.

No. 5-121583-9

9 TIMONTE COOK,

10 Defendant.
11 _____/

CERTIFIED COPY

12
13
14 REPORTER'S TRANSCRIPT OF PROCEEDINGS

15 DEPARTMENT NO. 36

16 A.F. BRAY BUILDING, MARTINEZ, CALIFORNIA

17 NOVEMBER 24, 2014
18
19

20 A P P E A R A N C E S

21 For the People: MARK A. PETERSON, DISTRICT ATTORNEY
22 BY: SATISH JALLEPALLI
23 Deputy District Attorney
24 Contra Costa County

25 For the Defendant: GORDON BROWN LAW OFFICE
26 BY: GORDON BROWN
27 400 29th Street, Suite 206
28 Oakland, California 94609

Reported by: Jennifer J. Matteo, CSR, RPR
Official Court Reporter, CSR License No. 12139

1 THE COURT: Mr. Jallepalli, submitted?

2 MR. JALLEPALLI: Yes.

3 THE COURT: All right. I listened very
4 carefully to the evidence. And as you both know,
5 I spent a bit of time, more than I would like to admit,
6 preparing for the hearing. And I found in particular
7 the attachments to Mr. Jallepalli's opposition helpful
8 once I waded through them.

9 I will note that of the Court's exhibits that
10 were admitted, almost all of them are in the packet, but
11 there were additional materials that I did consider
12 including the Nebraska Supreme Court case which
13 Mr. Jallepalli just referenced, as well as I looked very
14 carefully at Judge Kennedy's decision with regard to the
15 Kelly-Frye standard and the difficulties or the
16 omissions that he found which made this particular
17 technology fall short of being generally accepted in the
18 relevant scientific community.

19 I will not repeat all of what he had to say,
20 but I will note that the Kelly-Frye standard is
21 important to be upheld because jurors may give undue
22 weight to experimental techniques presented by
23 credentialed experts whose testimony may convey an aura
24 of scientific certainty.

25 There are three prongs to Kelly-Frye, and the
26 first prong is the test must be generally accepted in
27 the relevant scientific community, there must be a
28 consensus drawn from a typical cross-section of relevant

1 and qualified scientific -- or scientists; and the
2 second prong, the testimony must be given by properly
3 qualified experts; and the third prong, the correct
4 procedures must have applied in the case at issue.

5 I would agree with Judge Kennedy that the
6 primary field of the relevant scientific communities is
7 acoustic engineering. However, in addition, sound
8 propagation, wave propagation, and computer science of
9 developing software in order to make the calculations of
10 location are all implicated in this technology.

11 The information that was before Judge Kennedy
12 included a Popular Science magazine article from 1918
13 which referenced the use of multilateration to locate
14 German guns in World War II, a U.S. Geological Survey in
15 the 1990s that was referred to but was not in evidence,
16 and the ShotSpotter's test-firing in Richmond, and then
17 finally an anecdotal questionnaire commissioned by
18 ShotSpotter conducted independently by the National
19 Organization of Black Law Enforcement Executives. This
20 study I did not have before me, nor did I have the
21 Popular Science article nor the test-fires in Richmond.

22 But in general, Judge Kennedy also reviewed
23 the article by Robert Calhoun which describes the
24 science and technology of acoustic gunshot location.
25 I do not believe he had the two articles that Mr. Dunham
26 coauthored, "Three Layers of Battlefield Gunfire
27 Protection - Soldier, Vehicle, and Area Protection
28 Sensors," as well as -- that's Court's Exhibit 8 -- as

1 well as Court's Exhibit 7, "Acoustic Gunshot Location in
2 Complex Environments - Concepts and Results." Those
3 were not before Judge Kennedy.

4 MR. JALLEPALLI: I'm sorry, Your Honor, I do
5 apologize. I wanted to interrupt just to clarify for
6 the Court, the Calhoun presentation to the New Jersey
7 forensic scientists was not actually in evidence.

8 Directing the Court --

9 THE COURT: I'm sorry, which is Court's 9.

10 MR. JALLEPALLI: So --

11 THE COURT: "The Science and Technology of
12 Acoustic Gunshot Technology."

13 MR. JALLEPALLI: Correct. The presentation by
14 Dr. Calhoun. And just to direct the Court at
15 Judge Kennedy's ruling on page 4064 --

16 THE COURT: Yes?

17 MR. JALLEPALLI: -- he notes that there were
18 references to the presentation but that it was not
19 admitted into evidence itself.

20 THE COURT: I see.

21 MR. JALLEPALLI: So just to clarify the record
22 on that point.

23 THE COURT: Thank you.

24 But what was not before Judge Kennedy were the
25 articles that had been presented to this Court
26 including -- well, I believe the patents were before
27 Judge Kennedy. But the thesis provided by the Naval
28 Postgraduate School which I noted I did not find it

1 tremendously helpful, although what is premised within
2 that article is a clear acceptance of the reliability of
3 the ShotSpotter technology.

4 Although the thesis was focused on a
5 comparison of the functional concept of battlespace
6 awareness versus the concept of power to the edge,
7 meaning a distribution of power, as opposed to a
8 hierarchical structure in power which is very typical in
9 military operations, necessitated by the advances in
10 technology and focusing on ShotSpotter as the impetus to
11 changing the very structure of how the battlefields
12 might be run in the future based on this trend in
13 technology with very realtime information being provided
14 to the troops so immediately.

15 So despite the fact that that thesis really
16 wasn't an analysis of the accuracy of the ShotSpotter
17 technology, it was clearly an acceptance in the
18 scientific community or the relevant community of the
19 validity of the ShotSpotter technology.

20 Moreover, Court's Exhibit 17, the "Distributed
21 Radar Network for Realtime Tracking of Bullet
22 Trajectory," is, for me, yet another article which
23 evidences the acceptance and analysis by peers of the
24 relevant technology as being not only acceptable but
25 reliable.

26 And the Court's 10, "Distributed Radar Network
27 Realtime Tracking of Bullet Trajectory," again an
28 article that does not solely focus on ShotSpotter but

1 the related technologies that use similar technology as
2 being accepted within the community.

3 And finally Court's 12, "Technological
4 Approaches to Controlling Random Gunfire."

5 So what was largely missing with regard to
6 Judge Kennedy's ruling has been amply filled here.

7 The peer review which also includes the
8 ShotSpotter experts -- and I will note that I found
9 Mr. Dunham to be highly qualified and proficient in
10 understanding his technology, working with the
11 technology and presenting it to the Court.

12 What wasn't presented are any conflicting
13 theories in the scientific community. And I did ask a
14 few questions of Mr. Dunham and the expert with regard
15 to the practicality of the system and the problems of
16 the system, meaning that would there be any what
17 I characterize as false positives, something that would
18 be gunshots that were heard by the audio that didn't
19 exist, phantom gunshots, and that basically was -- I was
20 assured was impossible, which I think for basic science
21 or basic acoustic science would agree with that.

22 There haven't been any new studies presented
23 to the Court that pose new challenges to any of these
24 assumptions, so no conflicting theories from the
25 scientific community were presented to the Court. The
26 technique has been peer-reviewed and all of the reviews
27 are positive and support the accuracy of the technology.

28 Moreover, I am noting that some portion of the

1 technology requires human interaction. The
2 interpretation of the audio clips, there may be, as
3 Mr. Brown noted, a margin of error, but that is an area
4 that's ripe for cross-examination, not an area which
5 would exclude the technology.

6 I would also note that the notion of a
7 decrease in a number of shootings needing to -- being
8 needed to validate the technology itself is not
9 necessary. The accuracy or reliability of the
10 technology does not hinge upon the result of less
11 shootings. It actually hinges on the result of noting
12 where the shootings occurred.

13 I'm looking at prong two and prong three,
14 although it was really the first prong of Kelly-Frye
15 that was challenged. In prong two was the expert
16 qualified to test about the technique. I found that
17 both Mr. Dunham as well as Mr. Beegle were both amply
18 qualified as experts in their area of expertise. The
19 experts both had the proper foundation to testify about
20 the technique.

21 And finally prong three was whether or not
22 correct scientific procedures were used in this case.
23 There was no evidence with regard to any problems with
24 the system. I appreciate the fact that there was
25 different topography in San Pablo, but it appears to be
26 addressed by the number of sensors. And once again, the
27 only deficit or problem would be they would miss
28 gunshots, and, in fact, I believe one of them was missed

1 on the Spotter. There were 15 shell casings found and
2 14 gunshots heard. And that again is an area that's
3 ripe for cross-examination, not ripe for admissibility.

4 So with that said, I am finding that all three
5 prongs of Kelly-Frye have been met and that the
6 ShotSpotter technology is admissible and is accepted in
7 the scientific community -- generally accepted in the
8 relevant scientific community, and therefore I will deny
9 the motion to exclude it.

10 So with that, I wanted to check with Mr. Brown
11 and see if there are any further motions in limine or
12 should we just talk about planning for trial?

13 MR. BROWN: Was the Court going to hear the
14 argument on it being cumulative?

15 THE COURT: Oh, I'm sorry. On the second part
16 of it, with it being redundant as well as --

17 MR. BROWN: Cumulative.

18 THE COURT: Cumulative, thank you. Please --
19 excuse me -- relevant and cumulative. Please proceed.

20 MR. BROWN: Thank you, Judge.

21 In regards to the cumulative issue, I'd like
22 to begin.

23 THE COURT: Please proceed.

24 MR. BROWN: With that, the People have a slew
25 of witnesses to testify in this case. They will be
26 testifying, be it police officers or witnesses at the
27 scene, testifying as to the fact that shots were fired,
28 the victim was killed. There will be people called who,

Exhibit 8

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF FRESNO

CENTRAL DIVISION

Before the Honorable John F. Vogt, Judge

Department 60

-o0o-

THE PEOPLE OF THE STATE)
OF CALIFORNIA,)

Plaintiff,)

vs.)

ZACHERY GOODWIN,)

Defendant.)

Case No. F16900408

REPORTER'S TRANSCRIPT

Fresno, California

April 9, 2019

-o0o-

A P P E A R A N C E S:

FOR THE PEOPLE: LISA A. SMITTCAMP, District Attorney
of the County of Fresno
BY: RYAN WELLS
Deputy District Attorney

FOR THE DEFENDANT: MICHAEL MCKNEELY
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2300 Tulare Street, Suite 115
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REPORTED BY:

VERONICA ESPINOZA, C.S.R.
Certificate No. 8456

**CERTIFIED
TRANSCRIPT**

1 the People will present. Any attacks on the evidence or the
2 foundation is an attack on the weight of the evidence, not
3 the admissibility, therefore, I believe this evidence via
4 Mr. Greene about ShotSpotter, the location, and the amount of
5 shots should be admitted.

6 THE COURT: Okay. Is the matter submitted then?

7 MR. WELLS: Yes.

8 MR. MCKNEELY: Yes, Your Honor.

9 THE COURT: All right. Well, you know, when we started
10 this process I wasn't necessarily clear on whether this was a
11 challenge to this particular offer of evidence or whether it
12 was a more comprehensive objection based on the Kelly rule.
13 Based on your concluding comments, I took it to be
14 essentially both. And looking at it from the standpoint of
15 the Kelly rule I have gone back over the pretty long history
16 of the application of the Kelly rule here in California and
17 just noted that essentially within the State of California,
18 California courts through the direction of our Supreme Court
19 still basically applies the Kelly rule as opposed to other
20 federal rules and federal rules of evidence. And the Kelly
21 rule is applied to an assessment of new scientific techniques
22 or processes. It's a three-part process, a three-part test
23 that requires that the reliability of the method be
24 established usually through expert testimony, that the
25 witness furnishing such testimony must be properly qualified
26 as an expert to give an opinion on the subject and the

1 proponent of the evidence must demonstrate that the correct
2 scientific procedures were used in the particular case.

3 Now, there are a number of ways to go about this and I'm
4 certainly not trying to short circuit the process in any way,
5 but I'm certainly satisfied that Mr. Greene is qualified to
6 testify as to the essential design and operational qualities
7 of the ShotSpotter system and I'm certainly satisfied that he
8 is capable of offering an opinion on the subject that can be
9 properly examined in front of the jury and his opinions be
10 evaluated in an objective way.

11 He also -- well, first of all, I -- second of all, I
12 would point out that I'm more than satisfied that the People
13 have established that it is probative, so we don't have to go
14 back to -- to that issue. But the criticisms that you raise,
15 Mr. McKneely, are things that I believe ultimately go to the
16 weight of the evidence, not the admissibility. There's
17 nothing really new or controversial about the mechanics and
18 the design of the system used in ShotSpotter. All of those
19 concepts are accepted within the public understanding of many
20 of our conveniences. GPS is not a mystery to people. It's
21 something that can be discussed in open terms without really
22 obtuse scientific discussion. Microphones and
23 multi-directional microphones are not controversial in any
24 way in the scientific field.

25 The mathematical principles that are utilized by the
26 system to -- the term was multi, to perform tasks of

1 multilateration, which is more points of reference and
2 triangulation as we discussed in the testimony, but those are
3 all calculated and performed on basic mathematical formulas
4 that are accepted without controversy. The question comes
5 down to the specific placement of the sensing devices that
6 were used in this particular case. And in this particular
7 case the testimony in voir dire in this motion here was that
8 there were four particular sensors essentially within a
9 defined geographical area that were utilized. That the
10 process of the ShotSpotter system creates a level of
11 detection and initial analysis at the server system itself,
12 which is then transmitted to the location servers and
13 reanalyzed essentially to rule out false positive reports,
14 and it is then passed on to the ultimate user interface.
15 None of those processes are, I think, novel or controversial
16 in a scientific way at all.

17 So getting down to this, I think we're talking about
18 fairly recognizable technologies that apply accepted and time
19 honored mathematical calculations. And I'm satisfied that
20 the witness was able to establish, both through his testimony
21 and through discovery provided in preparation for this
22 particular case, that the system was properly operational and
23 properly administered during the period in time in which it
24 was called into play here.

25 So from a Kelly standpoint I'm really not sure that it
26 requires a Kelly analysis, but to the extent that we're

1 looking at it from that standpoint, that's my analysis. You
2 know, I don't -- I don't see anything to exclude this type of
3 testimony from the trier of fact in this case.

4 Now, as far as the challenge to the general acceptance
5 of the technology and testimony about it in courts, the law
6 is very clear that I can take judicial notice of the fact
7 that he's qualified as an expert in other courts, that the
8 subject matter has been testified to in other courts. I do
9 accept the fact that you were able to document and confront
10 the witness with a situation in a court in Rochester, which I
11 take it to be New York.

12 MR. MCKNEELY: Yes, Your Honor.

13 THE COURT: And, you know, without commenting about the
14 differences between New York and California courts,
15 obviously, a state court ruling in Rochester is not binding
16 on us in any way. But to be more complete in looking at
17 that, I don't know what the basis was for that court
18 excluding testimony. I'm not aware of whether it was a total
19 denial of allowing evidence under a Kelly type analysis or
20 whether it was a failure to qualify a witness as a particular
21 expert. I don't know.

22 What the witness did testify to is that he has qualified
23 in approximately two-thirds of the 80 cases, approximately 80
24 cases he's testified in, and I understood that to be beyond
25 the jurisdiction of California. So, again, I don't have a
26 lot of details on that, but clearly he has testified in other

1 courts on the operations of ShotSpotter technology.

2 Now, as far as the issues that you raised, I believe
3 that, you know, I was a little concerned, Mr. McKneely, about
4 some of the questions about the contractual arrangements and
5 the protocol for confidentiality between ShotSpotter and
6 ultimate users, which in this case would be the Fresno Police
7 Department; ShotSpotter and contractual relations with
8 private parties who agree to allow the technology to be
9 mounted in their physical premises. There are a number of
10 things that I'm, quite frankly, uncomfortable with discussing
11 in front of the jury, and I'm not going to -- it doesn't have
12 any affect ultimately on what my ruling is today, but it
13 seems to me that the concerns that you brought, and the point
14 I'm trying to make is, the concerns you brought up ultimately
15 don't dissuade me from thinking that the testimony should be
16 disqualified from the jury's hearing.

17 There are things that the jury can consider, for
18 example, you know, when we asked -- when we ask a witness if
19 they're being compensated for their testimony. That's fair
20 game. I'm sure that a ShotSpotter is a for-profit
21 corporation. They make money off of this, I'm sure, and they
22 have reasons to be very protective of their various
23 contractual relationships. And I think, you know, to some
24 extend that's all fair game for the jury to understand, but
25 none of that disqualifies the essential technical testimony
26 that this witness would provide.

1 So, all told, I'm satisfied that Mr. Greene was more
2 than capable of testifying to the operations of ShotSpotter
3 technology, to the specific application of it in this
4 particular case, and he seems mature enough to be able to
5 answer your questions as honestly as he can without betraying
6 the trust placed in him. So what I'm saying is you have a
7 number of things that I think are fair game. I will caution
8 you, though, that references to specific briefs from specific
9 interested parties in other litigation, for example, the
10 Innocence Project, that should not be brought up in front of
11 the jury.

12 MR. MCKNEELY: Understood, Your Honor.

13 THE COURT: But otherwise I think that everything that
14 he talked about and the things that you cross-examined him on
15 are fair game and the jury may consider those things, okay.
16 So I think I covered what I needed to in analyzing this
17 particular subject.

18 Mr. Wells, is there anything else that you think the
19 record should address?

20 MR. WELLS: No.

21 THE COURT: Mr. McKneely, is there anything else you
22 want to put on the record about this?

23 MR. MCKNEELY: No, Your Honor. Thank you.

24 THE COURT: All right. So from what I wrote down
25 yesterday I believe we have covered things that were in our
26 motions in limine.

Exhibit 9

57 N.E.3d 899 (Table)
Unpublished Disposition
Court of Appeals of Indiana.

Isaiah SAMELTON,
Appellant–Defendant,
v.
STATE of Indiana, Appellee–Plaintiff.

No. 71A03–1509–CR–1589.

|
June 16, 2016.

Appeal from the St. Joseph Superior Court; The
Honorable [Jane Woodward Miller](#), Judge; Trial
Court Cause No. 71D01–1407–F1–2.

Attorneys and Law Firms

[Charles W. Lahey](#), South Bend, IN, Attorney
for Appellant.

[Gregory F. Zoeller](#), Attorney General of
Indiana, [Eric P. Babbs](#), Deputy Attorney
General, Indianapolis, IN, Attorneys for
Appellee.

MEMORANDUM DECISION

[RILEY](#), Judge.

STATEMENT OF THE CASE

*1 [1] Appellant–Defendant, Isaiah Samelton (Samelton), appeals his conviction for attempted murder, a Level A felony, [Ind.Code §§ 35–42–1–1](#); –41–5–1; and aggravated battery, a Level 3 felony, [I.C. § 35–42–2–1.5\(2\)](#).

[2] We affirm.

ISSUES

[3] Samelton raises two issues on appeal, which we restate as follows:

- (1) Whether the trial court abused its discretion in admitting certain evidence; and
- (2) Whether the trial court abused its discretion by not instructing the jury on Samelton's proposed jury instruction offering attempted voluntary manslaughter as a lesser included offense to the attempted murder charge.

FACTS AND PROCEDURAL HISTORY

[4] During the evening hours of July 9, 2014, Antonio Garcia (Garcia) was working as a cashier at the Phillips 66 gas station located at the corner of Western Avenue and Falcon Street in South Bend, Indiana. Willie Menyard (Menyard), a patron at the store, was prepaying for his gas. At about that time, a red sedan drove into the pump area and, without stopping, drove to the front of the store entrance. An individual inside the car pointed a gun out of the driver's side window and began firing. As Menyard was exiting the store, a bullet struck him in his back and exited out of his right arm. The red sedan then turned around, drove back into the pump area where the customer vehicles remained parked, and fired more shots. The vehicle circled around the pump area

before speeding off. The patrons outside the gas station ran for cover.

[5] Garcia called the police. Also, the Shot-Spotter system—a gunshot detection, alert and analysis tool that incorporates sensors to detect, locate, and alert law enforcement agencies of illegal gunfire incidents in real time—notified the police. Four bullet fragments and seventeen fired casings were left at the scene. Officer Greg Howard (Officer Howard) of the South Bend Police Department got the description of the red car and its suspects after reviewing the store surveillance videos and started searching the surrounding area. Driving on Meade Street, Officer Howard located the suspected red sedan parked on the sidewalk. After watching the car for a couple of minutes, he saw two male individuals enter the vehicle, and drive south on Meade Street toward Western Avenue. When the red sedan crossed Western Avenue, Officer Howard initiated a traffic stop. Samelton was identified as the driver. A male, later identified as Juwan Jones (Jones), exited the vehicle from the passenger's side and ran through an alley. During the foot pursuit, Officer Howard saw an object, later identified as a semiautomatic handgun, fall from Jones' person. The handgun contained a loaded magazine. The following day, a K-9 officer found another semiautomatic handgun along the route where Jones had fled. A magazine was also found nearby. Each of the semiautomatic handguns matched the casings and the bullet fragments left at the gas station. The fired casings were both on the west and east sides of the gas station's property. Garcia's car, which was parked on the west side parking lot, sustained damage from three bullet holes. Also, a gas pump and a dumpster sustained bullet damage.

*2 [6] On July 11, 2014, the State filed an Information, charging Samelton with Count I, attempted murder, a Level 1 felony; and Count II, aggravated battery, a Level 3 felony. Samelton's jury trial commenced on August 25, 2015. Among the evidence introduced and admitted were the two semiautomatic firearms, bullet fragments, and casings recovered from the gas station, the gas station's surveillance videos¹, and Exhibit 101, a map image showing the approximate location of each of the twenty-three shots fired at the gas station. Exhibit 101 also included a large circle representing a twenty-five meter margin of error. Samelton argued, in part, that the margin of error would essentially place each gunshot anywhere in the circled area, and consequently “have no assurance that shot number 1 wasn't really taken from location number 22 or that 21 was taken from location number 2[.]” (Transcript p. 273). After hearing Samelton's arguments, and the testimony on how the Shot-Spotter system works, the trial court overruled Samelton's objection and admitted Exhibit 101 into evidence.

¹ The record shows that the surveillance videos were admitted as Exhibit 2, however, they were submitted with Jones' appeal, and therefore were unavailable for Samelton's appeal.

[7] At the close of the evidence, Samelton requested the trial court to instruct the jury on attempted voluntary manslaughter as a lesser included offense of attempted murder. The trial court refused to tender the instruction, finding that there was no appreciable evidence of sudden heat. At the close of trial, the jury found Samelton guilty as charged. On September 23, 2015, the trial court sentenced Samelton to concurrent sentences of thirty years for his

attempted murder conviction and nine years for his aggravated battery conviction.

[8] Samelton now appeals. Additional facts will be provided as necessary.

DISCUSSION AND DECISION

I. Admission of Evidence

[9] We review the admission of evidence for an abuse of discretion. [Wilson v. State, 765 N.E.2d 1265, 1272 \(Ind.2002\)](#). An abuse of discretion occurs “where the decision is clearly against the logic and effect of the facts and circumstances.” [Smith v. State, 754 N.E.2d 502, 504 \(Ind.2001\)](#). [Indiana Evidence Rule 702](#) governs the admissibility of testimony by expert witnesses. It provides that:

(a) A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand or to determine a fact in issue.

(b) Expert scientific testimony is admissible only if the court is satisfied that the expert testimony rests upon reliable scientific principles.

[10] The trial court acts as a gatekeeper when determining the admissibility of opinion evidence under [Rule 702](#). [Estate of Borgwald v. Old Nat'l Bank, 12 N.E.3d 252, 257 \(Ind.Ct.App.2014\)](#). “The proponent of expert testimony bears the burden of establishing

the foundation and reliability of the scientific principles.” [Doolin v. State, 970 N.E.2d 785, 787 \(Ind.Ct.App.2012\)](#). “In determining whether scientific evidence is reliable, the trial court must determine whether the evidence appears sufficiently valid, or, in other words, trustworthy, to assist the trier of fact.” [Id. at 788](#).

*3 [11] Samelton seems to challenge the accuracy of Exhibit 101, arguing that because there was a twenty-five meter margin of error using the Shot-Spotter system, there was no way of decoding the accurate location of each of the twenty-three bullets fired at the gas station.

[12] Paul Greene (Greene), the lead forensic analyst at SST Inc.—the company that developed and manufactures the Shot-Spotter system—testified that he had written close to 600 forensic reports on shooting incidents and given testimony in court thirty-six times. He stated that the purpose of the Shot-Spotter system is to “simply provide law enforcement agencies, rapid notification that a weapon has been fired within their jurisdiction, or at least within the sensory area.” (Tr. p. 255). Greene explained the science behind the Shot-Spotter system stating, in relevant part:

The [Shot-Spotter] system is an acoustic gunshot detection system. It is comprised of three separate parts. The first being the sensors. [] It has a processor board. It has a memory. It has a GPS receiver, and it also has a radio modem that allows network communication back to the location of the server. The location server is the second part of the system, and it's a software application that gathers all of the information that is

sent [] by different sensors. It matches pulses from different sensors and then is able to locate the origin of a gunshot incident, whether single shot or multiple shots. It then reports that information to the user interface. The user interface is the third portion of it. We call that the [] investigator portal or the alert console which resides on the operator's desktop or laptop computer. It is where they receive the alerts.

(Tr. pp. 243–44). Greene testified that the Shot–Spotter system notifies law enforcement agencies within sixty seconds of any gunfire, and “they get a dot on the map indicating the latitude and longitude of where that incident happened, and they also get a street address.” (Tr. p. 256). There are sixty-five sensors installed in South Bend, and six of those sensors detected the gunfire. Greene identified Exhibit 101 as an aerial map of the gas station with twenty-three superimposed bullseye-type graphics reflecting the estimated location of each of the gunshots fired on July 9, 2014. The map also had a large circle representing a twenty-five meter margin of error, centered from the first shot fired. Greene explained that all twenty-three shots were within the twenty-five meter radius circle, and so “shot number 12 could have easily have been shot number 17 within the margin of error.” (Tr. p. 266).

[13] Samelton objected to the admission of Exhibit 101 by arguing, in part:

Our objection is to the attempt to extrapolate back the precise time of each shot and most particularly the location of each shot, because by doing so we have such a great margin of error in the scientific evaluation that it creates a situation where literally each of the gunshots is within the same area, and

the margin of error essentially would place each gunshot anywhere within that circled area, and consequently we have no assurance that shot number 1 wasn't really taken from location number 22 or that 21 was taken from location number 2.

*4 So I think [] that's the problem right there. I think the [S]tate has failed to demonstrated that that process ... meets scientific standards In essence, we're telling the jury we have an expert telling the jury that this is where the shots occurred, when in fact, he is not. He's saying, within this margin of error, any of these shots could have been taken from the location....

[14] (Tr. pp. 273–74). After hearing Samelton's arguments and Greene's testimony regarding the Shot–Spotter system, the trial court overruled Samelton's objection to Exhibit 101, by stating, in part:

Looking at [Rule 702](#) just on the face of the rule, [] scientific, technical, or other specialized knowledge would assist the tier of fact to understand the evidence or to determine fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of opinion or otherwise.

I think we have established that this witness has that kind of technical and specialized knowledge that he has accrued only in his current job [] and he certainly seems to have deep knowledge of science and math that I don't share but certainly explains it in a way that I feel that I'm understanding....

I am satisfied with the scientific principles upon which the expert testimony based as reliable....

And I think that the State's Exhibit 101 does provide the jury with the understanding that this is not a perfect science in the sense that, and maybe I'm using the word science wrong and maybe the system would be more accurate, and they cannot with a hundred percent accuracy to the centimeter determine the location of a shot when it has been fired, but I think this coupled with other evidence that's presented certainly tells me, one, that there is enough scientific principles to allow it, and two, that the prejudice of this information does not outweigh its probative value So I'm overruling the objections to both Exhibits 101, and 102.

(Tr. pp. 281–83).

[15] We find Samelton's argument insufficient to establish an abuse of the trial court's discretion in admitting Exhibit 101. In determining whether scientific evidence is reliable, the trial court must determine whether the evidence appears sufficiently valid, or, in other words, trustworthy, to assist the trier of fact. [Doolin, 970 N.E.2d at 788](#). The trial court evaluated Greene's testimony at length, and it determined that the scientific principle or workings of the Shot–Spotter system were reliable in presenting evidence of a shooting at the gas station. The jury could have readily understood from Greene's testimony that all twenty-three shots were fired in the area roughly corresponding to the gas station's property. Accordingly, the jury was not presented with inaccurate information, but instead with a margin of error that allowed

them to judge and weigh the persuasiveness of Exhibit 101.

[16] The State argues that, under the circumstances, however, any error in the admission of Exhibit 101 is harmless. It is well recognized that any error in admitting evidence will be found harmless where the evidence is merely cumulative. [Fuller v. State, 674 N.E.2d 576, 578 \(Ind.Ct.App.1996\)](#). We note that the import of Exhibit 101 only corroborated that a shooting had occurred, and was merely cumulative to the following evidence: Garcia, the gas station attendant, testified that he saw the gunshots coming from the red sedan; Menyard was struck twice by bullets; the bullets and casing recovered at the gas station matched the firearms recovered during the police investigation; and the gas station's surveillance video displayed the shooting. In light of the foregoing, we conclude that trial court did not abuse its discretion in admitting Exhibit 101.

II. *Attempted Voluntary Manslaughter Instruction*

*5 [17] Lastly, Samelton argues that the trial court abused its discretion when it denied his proposed jury instruction offering attempted voluntary manslaughter as a lesser included offense to the attempted murder charge. In response to Samelton's assertion, the State argues that the trial court correctly determined that the evidence did not support the tendering of the instruction because there was no appreciable evidence of sudden heat.

[18] In general, a trial court has complete discretion in matters pertaining to jury instructions. [*Driver v. State*, 760 N.E.2d 611, 612 \(Ind.2002\)](#). In reviewing whether a trial court has abused its discretion by refusing to include a party's jury instruction, this court considers: (1) whether the instruction correctly states the law; (2) whether the evidence supports giving the instruction; and (3) whether any other instructions cover the same substance as the excluded instruction. *Id.*

[19] In [*Wright v. State*, 658 N.E.2d 563, 566–67 \(Ind.1995\)](#), our supreme court held that a trial court must give a tendered lesser included offense instruction if the alleged lesser included offense is either inherently or factually included in the crime charged and there is a serious evidentiary dispute about the element or elements distinguishing the greater from the lesser offense such that a jury could conclude that the lesser offense was committed but the greater was not. Voluntary manslaughter is an inherently included offense of murder because it requires proof of the same material elements as murder. See [*Champlain v. State*, 681 N.E.2d 696, 701–02 \(Ind.1997\)](#). This is true because voluntary manslaughter is murder with the mitigating factor that it was committed while acting under sudden heat. *Id.* For the same reasons, attempted voluntary manslaughter is an inherently included offense of attempted murder.

[20] Sudden heat has been defined as “sufficient provocation to excite in the mind of the defendant such emotions as anger, rage, sudden resentment, or terror, and that such excited emotions may be sufficient to obscure the reason of an ordinary man.” [*Fox*](#)

[*v. State*, 506 N.E.2d 1090, 1093 \(Ind.1987\)](#). Sudden heat is not an element of voluntary manslaughter. See [*Boesch v. State*, 778 N.E.2d 1276, 1279 \(Ind.2002\)](#). Rather, it is that which distinguishes voluntary manslaughter from murder.

[21] Here, the question is whether there was appreciable evidence of sudden heat, and from the record, we find that there was no evidence of sufficient provocation nor was there any evidence that Samelton was in such a state of terror or rage that he became incapable of cool reflection. At the hearing, Garcia, the gas station attendant, testified that a red sedan drove into the pump area and without stopping, drove to front of the store entrance, and an individual inside the car pointed a gun out of the driver's side window and began firing. As Menyard walked out of the store, he was struck by gunfire. Soon after, Garcia called 911, and while still on the phone, Garcia saw the red vehicle circle around the parking lot, drive back through the pumps, and over to west side of the store. Multiple shots were fired in sequence. As the red vehicle sped away from the scene, the patrons outside the gas station ran for cover. After the police arrived, Garcia showed them the surveillance videos which documented the shooting. In addition, the State published the gas station's surveillance videos to the jury. Furthermore, Greene, the forensic analyst, testified that the first shot was fired at 10:41:33 p.m. and the twenty-third shot was fired at 10:42:12 p.m. The incident lasted thirty-nine seconds.

*6 [22] We find that the numerous shots, fired in rapid succession, revealed a deliberate attack on the persons at the gas station.

Accordingly, we find that the evidence was not susceptible of an inference that Samelton was rendered incapable of cool reflection and deliberation. Because there was no evidence of sudden heat and no serious evidentiary dispute, the trial court did not abuse its discretion when it refused to tender Samelton's tendered instruction of attempted voluntary manslaughter.

[23] Moreover, we note that Samelton's attempted voluntary manslaughter instruction incorrectly stated the law. The purpose of jury instructions is to inform the jury of the law applicable to the facts without misleading the jury and to enable it to comprehend the case clearly and arrive at a just, fair, and correct verdict. [Munford v. State, 923 N.E.2d 11, 14 \(Ind.Ct.App.2010\)](#). A trial court does not err by refusing an instruction that incorrectly states the law. See [McEwen v. State, 695 N.E.2d 79, 84, n. 1 \(Ind.1998\)](#).

[24] Sudden heat has been defined as “*sufficient provocation* to excite in the mind of the defendant such emotions as anger, rage, sudden resentment, or terror, and that such excited emotions may be sufficient to obscure the reason of an ordinary man.” [Fox, 506 N.E.2d at 1093](#). (emphasis added). Samelton's proposed instruction, by contrast, gave a definition of sudden heat without any reference to sufficient provocation. The State argues that

by “failing to link the anger, rage, sudden resentment or jealousy to any action that constitutes provocation, the instruction could have confused the jury into thinking that any time a person acts out of such emotions, there is sudden heat even though there may not be any provocation.” (Appellee's Br. p. 15) (quotation marks omitted). We agree. This court has held that “words alone will not constitute sufficient provocation.” See [Supernant v. State, 925 N.E.2d 1280, 184 \(Ind.Ct.App.2010\)](#), *trans. denied*. Because Samelton's tendered instruction used an incorrect definition of sudden heat, the trial court did not err in refusing it.

CONCLUSION

[25] Based on the foregoing, we conclude that the trial court did not abuse its discretion by admitting Exhibit 101, or for refusing to instruct the jury on Samelton's proposed attempted voluntary manslaughter instruction.

[26] Affirmed.

[27] [KIRSCH](#), J. and [PYLE](#), J. concur.

All Citations

57 N.E.3d 899 (Table), 2016 WL 3364769

Exhibit 10

STATE OF MINNESOTA

DISTRICT COURT

COUNTY OF HENNEPIN

FOURTH JUDICIAL DISTRICT

State of Minnesota,

Case Type: Criminal
Judge Carolina A. Lamas

Plaintiff,

Court File No. 27-CR-14-11992

v.

Talia Donalee Brooks,

**ORDER DENYING
DEFENDANT'S MOTION TO
EXCLUDE**

Defendant.

The above-entitled matter came before the Honorable Carolina Lamas on October 7, 2016 at the Hennepin County Government Center for a Frye-Mack Hearing.

APPEARANCES

Peter Mason, Assistant Hennepin County Attorney, appeared on behalf of the State of Minnesota. Jeffrey Benson, Assistant Hennepin County Public Defender, appeared on behalf of Talia Donalee Brooks, who was present. Following the hearing, the parties submitted memoranda to the Court in support and opposition to the Defendant's Motion to Exclude Evidence.

Based upon the testimony adduced, the arguments and briefs of counsel, and all files, records, and proceedings herein, the Court orders the following:

1. Defendant's Motion to Exclude is **DENIED**.

By the Court:

Date: 12/15/16

Honorable Carolina A. Lamas
Judge of District Court

INTRODUCTION

The State has charged Defendant with (1) Terroristic Threats-Reckless Disregard Risk, (2) Dangerous Weapons-Reckless Discharge of Firearm within a Municipality, and (3) Possess Pistol/ Assault Weapon-Conviction or Adjudicated Delinquent for a Crime of Violence. Defendant brought a motion to exclude any ShotSpotter evidence regarding the location and time of shots fired on March 15, 2014.

FACTS ALLEDGED

1. On March 15, 2014, Officers Grout and Doran of the Minneapolis Police Department were dispatched on a report of gunshots fired.
2. Officers were alerted of the gunshots because the ShotSpotter system detected potential gunshot sounds.
3. The ShotSpotter report indicates that there were two occurrences of a "Single Gunshot" type of incident. Ex. 1¹ Incident #84457 occurred on March 15, 2014 at 19:20 (7:20 p.m.), listing an address of 912 23rd Ave. N. *Id.* Incident #84456 occurred on March 15, 2014 at 19:19 (7:19 p.m.), listing an address of 914 23rd Ave. N. *Id.*
4. The alleged victim told Officer Grout that Defendant arrived at her apartment, yelled at her, and shot at her house.
5. Officers located a single spent shell casing near the mouth of the alley, located behind the alleged victim's house.

FINDINGS OF FACT

1. On October 7, 2016, Paul Greene, Manager of Forensic Services for SST, Inc. testified on behalf of the State. SST, Inc. is the company that manufactures and operates the ShotSpotter system.
2. The ShotSpotter process has three primary components: (1) the sensor array, (2) the location server, and (3) the human operator review.
3. The sensor array consists of an array of self-calibrating, microphone and GPS-enabled sensors installed in a geographic location. These sensors listen for impulsive noises. A

¹ This exhibit was labeled as Exhibit 1 when offered by the State and received at the hearing, and labeled as Exhibit B in the attached exhibits to the Defendant's Memorandum in Support of Motion to Exclude.

sensor timestamps and sends data to the location server when it detects a sound consistent with its criteria for a potential gunshot. For a single gunshot to be detected and reported, four sensors must detect the noise.

4. Sensors communicate with the location server every thirty to sixty seconds, sending the status of its power and health indicators.
5. Minneapolis has 5.4 square miles of ShotSpotter coverage, over two coverage areas. The present case occurred in the north side coverage system, where there are fifty-seven sensors.
6. The array is designed so that if twenty to thirty percent of the sensors become inoperable, the remaining sensors could accurately maintain operation of the ShotSpotter system.
7. The sensors are placed above the roofline, in an effort to avoid obstacles that would hinder sound from reaching the sensors.
8. The second component of the system is the location server which coordinates the pulses that are received from sensors. If the location server's criteria are met for a sound to be deemed a gunshot, it will attempt to locate the geographic location of the pulse.
9. The location server is where the scientific and mathematical operation of ShotSpotter occurs.
10. The operation that the location server uses to locate a pulse is called multilateration. Multilateration plots hyperbolas between known geographic points to locate an unknown geographic point.
11. The third component of the ShotSpotter system is the human operator review. If the location server's criteria are met, the audio clip of the impulsive noise and pictures of the audio waveform are sent to the human operator. Human operators cannot create or alter events. Human operators review the data, and if consistent with a gunshot publish the data to the ShotSpotter customer.
12. The human reviewers tend to be former law enforcement, EMS dispatchers, and former military. Human reviewers receive on the job training.
13. Mr. Greene, or another forensic analyst, may then review the data and create a forensic report. These reviews are done to check on the accuracy of the location and the number of shots fired.

14. In the present case, Mr. Greene created a forensic report. Mr. Greene found no erroneously located pulses and performed no corrections.
15. ShotSpotter performs redundant calculations and error correction routines on its system.
16. ShotSpotter also monitors temperature and weather conditions.

CONCLUSIONS OF LAW

Defendant moves the Court to exclude the ShotSpotter evidence, arguing that the State has failed to meet its burden under the *Frye-Mack* test. The *Frye-Mack* standard requires the Court to “determine whether [the scientific evidence] is generally accepted in the relevant scientific community. In addition, the particular scientific evidence in each case must be shown to have foundational reliability. Foundational reliability requires the proponent of a *** test [to] establish that the test itself is reliable and that its administration in the particular instance conformed to the procedure necessary to ensure reliability.” *Goeb v. Tharaldson*, 615 N.W.2d 800, 814 (Minn. 2000) (citations omitted). The *Frye-Mack* standard puts the burden on the proponent of the novel scientific evidence to demonstrate the sufficiency of both prongs of the *Frye-Mack* test: (1) that the scientific evidence is generally accepted in the relevant scientific community, and (2) the particular scientific evidence in the case at hand has foundational reliability. *Doe v. Archdiocese of St. Paul*, 817 N.W.2d 150, 165 (Minn. 2012). The State contends that it met its burden under the *Frye-Mack* test. State’s Reply Mem. at 2. The Court will address each prong of the *Frye-Mack* test in turn.

A. The Scientific Evidence Offered is Generally Accepted in the Relevant Scientific Community

In *State v. Mack*, Minnesota adopted the *Frye* rule which requires, “the thing from which the [expert testimony] deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.” *State v. Fenney*, 448 N.W.2d 54, 57 (Minn. 1989) (quoting *State v. Mack*, 292 N.W.2d 764, 767 (Minn. 1980)). “The results of mechanical or scientific testing are not admissible unless the testing has developed or improved to the point where experts in the field *widely share* the view that the results are scientifically reliable as accurate.... The scientific technique on which expert testimony is based must be scientifically reliable and broadly accepted *in its field*. The test, then, requires neither unanimity nor acceptance outside its particular field.” *Id.* at 57–58 (internal citations omitted). Scientific evidence that is not “novel” need not be assessed under the first prong of the *Frye-Mack* test.

Evidence obtained from “a new scientific method that the [Minnesota Supreme Court] has never before considered” and is “sufficiently different” from previously generally accepted methods, is novel scientific evidence. *State v. Roman Nose*, 649 N.W.2d 815, 821 (Minn. 2002).

Sound multilateration is the mathematical operation that is the basis for the geographic locating component of the ShotSpotter system. Transcript at 44. The State contends that it adequately demonstrated that sound multilateration evidence is generally accepted in the relevant scientific community. State’s Mem. Opp’n at 3. Defendant concedes that sound multilateration is generally accepted, but argues that ShotSpotter technology specifically is not. Def.’s Mem. at 5. Defendant specifically asserts that “Shotspotter combines sound multilateration principles with the complex, real world environment and a human interprets that data. This combination takes ShotSpotter outside of the general acceptance of sound multilateration, and the state has not satisfied their burden under the first prong of *Frye-Mack*.” Def.’s Mem. at 6.

The State presented expert testimony from Mr. Greene from SST, Inc. Defendant highlights that “Mr. Greene holds no college degrees, and he never attended a course in engineering, acoustics, acoustical engineering, or sound propagation.” *Id.* at 2. Mr. Greene has worked for SST, Inc. for nine and a half years. Tr. at 5. He currently serves as a manager of forensic services, which primarily deals with forensic analysis. *Id.* Mr. Greene is a former U.S. Marine. *Id.* at 7. During his eight years in the Marines, Mr. Greene shot several years on rifle and pistol teams and was trained as a machine gunner. *Id.* He has worked in the field, performing live fire tests against Shotspotter, military, and public safety systems. *Id.* Mr. Greene became aware of the technology used by ShotSpotter in 2004, when he was employed by the U.S. Joint Forces Command, which conducted battlefield sensor testing and integration. *Id.* Mr. Greene also was employed by the New Mexico Institute of Mining Technology at the Playas Training and Research Center where he was the command and control manager, tasked with operating test ranges for military hardware clients to test their systems. *Id.* at 8. Since working for ShotSpotter, Mr. Greene has conducted over 600 forensic analyses of gunfire incidents and has analyzed audio of thousands of gunshot incidents. *Id.* at 9. He has testified fifty-five times in court and has been certified as an expert in gunshot sound detection and location technology each time. *Id.* at 10.

The State offered Mr. Greene as an expert in “gunshot sound detection and location technology.” *Id.* at 10. Defendant did not object to Mr. Greene being offered as such an expert and the Court accordingly certified Mr. Greene as such an expert. *Id.* Defendant questions the application of multilateration within the ShotSpotter system and the human interpretation of the data. Def.’s Mem. at 6. The area of gunshot detection and location technology falls within the relevant scientific community in question. Therefore, Mr. Greene’s expert testimony weighs heavily in favor of the State.

Mr. Greene testified at length about the processing system for the ShotSpotter. ShotSpotter has three primary components to its process. Tr. at 15. Put simply, the first component is a sensory array, which is an array of microphone and GPS-enabled sensors that are installed in a geographic area. *Id.* The sensors “listen constantly for the sound of impulsive noises, anything that does bang, boom, or pop” and if such a noise is detected, it timestamps it and sends the data related to the impulsive noise to the location server. *Id.* at 15–16.

The second component is the location server which coordinates the pulses that are received from sensors and attempts to match them, and if there is a match within a specific time period the location server attempts to locate the pulse. *Id.* at 16. Mr. Greene testified that ShotSpotter “uses a mathematical system called multilateration to locate -- or, or to determine a geographic location of the source of that impulsive noise.” *Id.* at 15. If certain characteristics are met, then the location and data is sent to a human operator, which is component three. *Id.* The human operator listens to the audio clip they receive and reviews pictures of the corresponding audio waveform and makes a “judgment call” whether or not they believe it is gunfire. *Id.* at 33. The reviewer can add notes to the incident report but cannot create or alter an incident. *Id.* at 33, 36. Reviewers receive on-the-job training and tend to be former law enforcement, dispatchers or military. *Id.* at 35. The reviewer will send an alert or dismiss the event as a gunshot within one minute. *Id.* at 41. If deemed to be a gunshot, the result will then be published to the customer (i.e., law enforcement). *Id.* at 31. A forensic analyst, such as Mr. Greene, may ultimately conduct a forensic analysis and draft a report, in an effort to confirm the accuracy of particular incidents. *Id.* at 43.

Multilateration has had practical applications starting over one hundred years ago. Tr. at 44. The use of multilateration to locate sound has been utilized in earlier forms in World War I and subsequent military involvement, including applications to the use of sonar by the Navy.

Id. at 48. Multilateration is used in locating submarines underwater, in plane navigation, and by seismologists in determining the epicenter of earthquakes. *Id.*

Law enforcement's utilization of a scientific technique or practice is not dispositive of whether the technique is generally accepted, but may be relevant evidence as to whether the technique has gained general acceptance in the relevant scientific community. *Roman Nose*, 649 N.W.2d at 821. The first installation of ShotSpotter was in 1996 in Redwood City, California. Tr. 6. ShotSpotter operates in about one hundred cities, including Minneapolis. *Id.* Minneapolis has used ShotSpotter since 2007. State's Mem. Opp'n at 4.

"The decisions of other appellate courts may be relevant evidence at an evidentiary hearing on the general acceptance of a scientific technique within the relevant scientific community." *Id.* at 820. The Supreme Court of Nebraska considered a challenge to the ShotSpotter system in *State v. Hill*, 851 Neb. 767 (2014). In *Hill*, the Defendant did not challenge the "underlying GPS triangulation methodology upon which the ShotSpotter location is based." *Id.* at 793. Instead, the Defendant made three arguments, "(1) that 'blind' tests of the system have never been performed; (2) that Greene did not know what percent capacity of the Omaha ShotSpotter system was operating at on [the date in question]; and (3) that the SST employees at the incident review center 'are ultimately just people using their own subjective opinions about whether particular sound files are consistent with gunfire.'" *Id.* The Nebraska Supreme Court found that the lower court's conclusion that absence of blind testing and Mr. Greene's inability to identify the percent capacity of the Omaha ShotSpotter system did not seriously undermine the reliability of the ShotSpotter technology was a reasonable conclusion. *Id.* at 794. The Nebraska Supreme Court also disagreed with Hill's assertion that the SST, Inc. employees were unqualified to characterize sounds as being consistent with gunshots due to the employees' training and the system's recognition of potential gunshots prior to the data being sent to the review staff. *Id.* While Nebraska follows the *Daubert/Schafersman* jurisprudence, the Court takes this case into consideration as an example of acceptance and utilization of the ShotSpotter system and its underlying mathematical and scientific approach. *Id.* at 792.

The scientific and mathematical technique used by ShotSpotter is sound multilateration. The other components to ShotSpotter are tools to collect and record data for the multilateration process, and to check the accuracy of the system's decision to qualify a noise as a gunshot. The State has demonstrated that sound multilateration is a scientific practice that is generally

accepted in the relevant scientific community. The Court will analyze the foundational reliability of ShotSpotter's application of sound multilateration. Defendant's concerns regarding the accuracy of the system based on the environmental elements as well as the human operator involvement will be addressed under the reliability prong of the *Frye-Mack* analysis. See *State v. Traylor*, 656 N.W.2d 885, 893 (Minn. 2003) (determining that the science of PCR-STR DNA testing was generally accepted, and concerns over the utilized testing kits and procedures dealt more with reliability).

B. The Scientific Evidence Has Foundational Reliability

The second prong of the *Frye-Mack* test requires that the State show that the scientific evidence in the case at hand has foundational reliability. *Doe*, 817 N.W.2d at 165. The proponent of scientific evidence has the burden to establish the proper foundation for the admissibility of the test by showing that the methodology used is reliable and in the particular instance produced reliable results. *Goeb*, 615 N.W.2d at 816. Sound multilateration, as applied through the ShotSpotter system, in the matter at hand has foundational reliability.

1. The methodology used is reliable.

At each stage of the ShotSpotter system, ShotSpotter has built in redundancy and safeguards to better ensure the accuracy of its results. First, the sensors pick up an impulsive event. The array of sensors are installed in such a manner that if twenty to thirty percent of the sensors became inoperable, the remaining sensors could accurately maintain operation of the ShotSpotter system. Tr. at 22. Each sensor communicates with the location server every thirty to sixty seconds, sending the status of its power and health indicators. *Id.* at 27. The "health" of the sensors is constantly monitored. *Id.* The sensors are self-calibrating; a sensor will either record or not record. *Id.* at 28. For a single gunshot to be detected and reported, four sensors must actively participate in detecting the gunshot. *Id.* at 44. The location of the sensors is known based on their installation but also through the GPS receiver on the sensors which communicates with GPS satellites. *Id.* at 28. Only if the event meets between twenty-eight and thirty-two criteria will the event data be sent to the location server. *Id.* at 32-33.

The location server also has its own set of criteria for which the sound is evaluated. *Id.* at 31. If the criteria are met an alert is created and a request is sent back to the participating sensors to transmit the audio clip. *Id.* at 31-32. The audio clip and the pictures of the audio waveform are then reviewed by a human operator at the review center, who cannot alter the event. *Id.* at

33. If the human operator believes it is a gunshot, then they publish the data. *Id.* at 38. If they believe it is something other than gunfire, the alert is dismissed. *Id.* The human operator acts a check on the system in an effort to make sure only likely gunfire is being published. Mr. Greene testified that the main reason there are human reviewers is to verify that the sound is a gunshot and not another sound that is similar. *Id.* at 65. Mr. Greene or another forensic analyst may then perform a forensic analysis and create a detailed forensic report. *Id.* at 43. The chief function of the forensic analyst when writing the report is to confirm the accuracy of the location and the number of shots fired. *Id.*

With regards to the utilization of multilateration, Shotspotter uses the time that each sensor detects the pulse, measuring that sensor's detection of the pulse against another sensor's detection of the pulse against the speed of sound, to generate curves called hyperbolas. *Id.* at 45–46. As Mr. Greene described it, for example, if there are three sensors, “[ShotSpotter] take[s] the time differences between sensor A, sensor B, then sensor A and then C, and then sensor B and C and it gives [ShotSpotter] three different measurements... three different curves.” *Id.* at 46. Where the hyperbolas intersect is where the source of the impulsive noise, or gunshot, is located. *Id.* Because of ShotSpotters' use of GPS, ShotSpotter knows the exact latitude and longitude of the starting points to plot out the hyperbolas and find the point of intersection. *Id.* at 46–47.

Defendant specifically questions the utilization of human operators. Human involvement in this system acts as an additional check on the processes that have already occurred. The Supreme Court of Minnesota has held the human involvement in a protocol designed to develop or identify evidence, and specifically non-scientist human involvement, does not make that evidence inadmissible. *See State v. Klawitter*, 518 N.W.2d 577 (Minn. 1994). In *Klawitter*, the Minnesota Supreme Court reasoned that following a specified protocol for drug recognition, including nystagmus testing, did not involve “any significant scientific skill or training on the part of the [police] officer. Drug recognition training is intended to refine and enhance the skill of acute observation which is the hallmark of any good police officer and to focus that power of observation on a particular situation.” *Id.* at 585. The *Klawitter* Court put it another way, “the protocol, in the main, dresses in scientific garb that which is not particularly scientific.” *Id.*

Similarly, the Court here finds that the human operators are not required to engage in particularly scientific processes. The human reviewers tend to be former law enforcement, EMS dispatchers, and former military. Tr. at 35. They generally “have more than a passing familiarity with real gunfire.” *Id.* When someone is hired, they receive on the job training, where an experienced operator or shift leader, sits with the new operator for one to two weeks, and coaches them through the process of determining what is and is not gunfire. *Id.* In determining if a noise is a gunshot, the reviewer listens to the audio clip and views a picture of the audio waveform. *Id.* at 33. Reviewers cannot create a gunshot incident, or alter the times or locations of a gunshot incident. *Id.* at 36. In the aforementioned *State v. Hill*, the Nebraska Supreme Court agreed that the ShotSpotter employees were not unqualified to characterize sound as consistent or inconsistent with gunshots, based on their training and the fact that the system recognizes the potential gunshot before it is sent to the reviewer. *Hill*, 851 Neb. at 794.

Defendant also raises concerns over the environmental elements of the urban city of Minneapolis affecting the accuracy and reliability of ShotSpotter. Def’s Mem. at 6. Factors like temperature, background noise, buildings, and trees may affect the soundwaves and ultimately location accuracy. Tr. at 62–70. ShotSpotter performs “redundant calculations” and “error correction routines” to ensure that results are accurate. *Id.* at 79. ShotSpotter monitors temperature and weather. *Id.* at 62. ShotSpotter installs “as many sensors as [they] do in an array because [they] know that there are going to be environmental facts that [they] cannot account for.” *Id.* at 78. The sensors are placed above what SST, Inc. calls the “acoustic horizon,” meaning that they try to place sensors high enough above the roofline that there are few obstacles that would hinder sound from reaching the sensors. *Id.* at 17–18. Further, Mr. Greene testified that even if there are refraction and diffusion issues, they are “usually in the millisecond range, a thousandth of a second... even if [they] had half the sensors with a couple milliseconds of diffraction error, it may only change the location of the gunshot, ultimately, by a couple of feet.” *Id.* at 78. Taking into consideration the efforts of ShotSpotter to ensure accuracy, the Court finds that the methodology used has foundational reliability.

2. In this particular instance, the methodology used produced reliable results.

The methodology described above yielded reliable results in the case at hand. Minneapolis has 5.4 square miles of ShotSpotter coverage. *Id.* at 17. There are two separate ShotSpotter systems in two coverage areas, the north of the city and the south. *Id.* In this case,

the data in question comes from the north side system. *Id.* There are fifty-seven sensors in the north side array. *Id.* at 56. There are two types of sensors in the Minneapolis system, each with two to four microphones, a processor board with a GPS antenna and receiver, a certain amount of memory, and a cellular based communication device. *Id.* at 18–19.

In the present case, the ShotSpotter report indicates that there were two occurrences of a “Single Gunshot” type of incident. Ex. 1. On March 15, 2014 ShotSpotter detected two impulsive events. Tr. at 54. Both incidents were detected by five sensors. *Id.* at 56. Mr. Greene created a forensic report on the reported incidents. *Id.* at 54; *see* Ex. 2. To create this report, Mr. Greene reviewed the audio and the location that the system created. Tr. at 56. Mr. Greene found no error, specifically relocating one shot by less than one yard. *Id.* Mr. Greene testified that he confirmed the locations of the incidents, and saw no erroneously located pulses and performed no corrections. *Id.* at 58. Mr. Greene believes that both incidents were gunfire. *Id.* at 56. The ShotSpotter’s detection of gunshots is further bolstered in this case by the recovery of a shell casing found at the mouth of an alley located behind the victim’s house, very close to the locations listed in the ShotSpotter report.² Therefore, the Court finds that in the present case, the methodology used produced reliable results.

CONCLUSION

Both prongs of the *Frye-Mack* test have been sufficiently demonstrated. Multilateration is a generally accepted mathematical and scientific technique for locating a geographic point from other known geographic points. The other components of ShotSpotter are tools for the collection of data for the sound multilateration process, and checks on the process as a whole. The methodology utilized has foundational reliability. Further, the methodology as used in the present case produced reliable results.

Based on the foregoing the Defendant’s motion to exclude is denied.

CAL

² The police report, attached to Defendant’s Memorandum as Exhibit A, lists the “Incident Details... Address,” “Victim... Residence,” and “Witness... Residence” as “2303 Bryant AV N Apt. UPPER Minneapolis, MN 55411”. Def’s Mem., Ex. A. This Bryant address is 213 feet or a one minute walk from 912 23rd Ave N (the address listed in the ShotSpotter report for Incident # 84457) and 285 feet or a one minute walk from 914 23rd Ave N (the address listed in the ShotSpotter report for Incident # 84456). Ex. 2; GOOGLE MAPS, <https://www.google.com/maps>.

Exhibit 11

MEMORANDUM DECISION

Pursuant to Ind. Appellate Rule 65(D), this Memorandum Decision shall not be regarded as precedent or cited before any court except for the purpose of establishing the defense of res judicata, collateral estoppel, or the law of the case.



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IN THE COURT OF APPEALS OF INDIANA

Bryant Johnson,
Appellant-Defendant,

v.

State of Indiana,
Appellee-Plaintiff.

November 22, 2016

Court of Appeals Case No.
71A03-1603-CR-672

Appeal from the St. Joseph
Superior Court

The Honorable Elizabeth C.
Hurley, Judge

Trial Court Cause No.
71D08-1508-MR-10

Robb, Judge.

Case Summary and Issue

- [1] Following a jury trial, Bryant Johnson was convicted of murder, attempted murder, and battery. Johnson appeals his convictions, raising the sole issue of whether the trial court abused its discretion in admitting certain evidence. Concluding the trial court did not abuse its discretion, we affirm.

Facts and Procedural History

- [2] In the early morning hours of August 1, 2015, Justin Sharpe and Marcus Harris were passengers in a green SUV driven by Stephen Johnson (“Stephen”). Around 2:30 a.m., Stephen pulled out of a gas station and proceeded toward an intersection near 301 North Lafayette Street in South Bend, Indiana. While stopped at the intersection, a champagne-colored Chevrolet Tahoe pulled up to right of the green SUV and a white vehicle pulled up behind the green SUV. Stephen recognized the driver of the Tahoe as Johnson. Johnson then pulled out a revolver and fired four bullets in the direction of the green SUV. One of the bullets struck Stephen in the shoulder and at least one bullet struck Sharpe. As Stephen attempted to drive away, an individual in the white vehicle also fired at least three bullets in the direction of the green SUV.
- [3] South Bend Police Officer John Cox heard the gunshots, but did not know where the sound was coming from until he received a ShotSpotter alert

notifying him the shots were fired near 301 North Lafayette Street.¹ Upon arrival at that address, police officers observed multiple bullet holes in the green SUV's front passenger-side window and door; Sharpe was pronounced dead at the scene from multiple gunshot wounds. Police officers then collected fragments of ammunition from the street and the green SUV indicating at least one of the guns used was either a .38 caliber special or a 357 magnum revolver. Some of these fragments recovered from the scene matched the fragments removed from Sharpe's body during an autopsy. On August 5, 2015, the State charged Johnson with murder, a felony; attempted murder as a Level 1 felony; and battery as a Level 5 felony.

[4] At trial, the State elicited testimony pertaining to ShotSpotter technology from Paul Greene, the lead forensic analyst and lead customer service support engineer for SST Inc., the manufacturer of ShotSpotter. Greene testified ShotSpotter is an acoustic gunshot detection and location system and its purpose is to provide law enforcement with rapid notification of when and where local gunfire occurs. The system uses microphone sensors with GPS antennas to detect gunshots by recording nearly twenty acoustic measurements and a location server that measures the latitude and longitude of the gunshots recorded. The system then plots the location of gunshots on a map and reports the location of gunshots to police departments. SST Inc. guarantees

¹ Evidence pertaining to ShotSpotter is the sole issue on appeal, which we discuss in detail below.

ShotSpotter will detect and locate at least 80 percent of all outdoor detectable gunfire and will locate that gunfire to within 25 meters of where the weapon was actually fired. So you take where the weapon is fired, draw a 25 meter line out, draw a big single [sic] and we guarantee that at least 80 percent of the time that gunfire will have originated within that 25 meter or 50 meter diameter circle, actually, which actually comes out to about 150 feet diameter, 160 feet diameter or so.

Transcript at 267. Greene explained the more sensors that record a gunshot, the more precise the system can be. For example, if at least five sensors record a gunshot, then it is likely the system will pinpoint a location on the map within ten meters of the gunshot's location. *Id.* at 267-69.

- [5] The State then moved to admit State's Exhibit 180, a detailed ShotSpotter forensic report of the August 1 incident. Specifically, the report includes a map showing the location of the shooting; a map showing the number of microphone sensors that recorded the shooting; and a table showing the exact time the gunshots were recorded and the strength and sharpness of the recordings. Johnson objected on the ground the report was cumulative. Specifically, Johnson expressed concern that one page of the report merely gave "a description about ShotSpotter" *Id.* at 271. The trial court agreed the one page was cumulative of Greene's previous testimony, but noted the remaining pages, which include the maps and tables, would assist the jurors in understanding Greene's testimony. Johnson objected again, this time arguing the remainder of the report was scientific evidence lacking proper foundation pursuant to Indiana Evidence Rule 702. Specifically, he expressed concern as

to how much ShotSpotter has been tested and whether it has been subjected to peer review. The trial court disagreed and overruled the objection as to the remainder of the report, noting, “I would find it to be . . . more of a weight issue than an admissible evidence issue and [an] argument that you could make, [Defense Counsel], should you choose to do so.” *Id.* at 274.

- [6] The jury found Johnson guilty as charged. At the sentencing hearing, the trial court entered judgment of conviction and ordered Johnson to serve an aggregate sentence of eighty-five years executed in the Indiana Department of Correction. This appeal ensued.

Discussion and Decision

I. Standard of Review

- [7] The trial court has broad discretion in ruling on the admissibility of evidence. *Washington v. State*, 784 N.E.2d 584, 587 (Ind. Ct. App. 2003). This court will reverse the trial court’s ruling only if it abused that discretion. *Id.* An abuse of discretion involves a decision that is clearly against the logic and effect of the facts and circumstances before the court. *Huffines v. State*, 739 N.E.2d 1093, 1095 (Ind. Ct. App. 2000) (citation omitted), *trans. denied*.

II. ShotSpotter Evidence

[8] Johnson argues the trial court abused its discretion in admitting State's Exhibit 180.² Specifically, he contends the trial court failed to assess the reliability of the ShotSpotter technology pursuant to Rule 702(b). We disagree.

[9] Rule 702(b) states, "Expert scientific testimony is admissible only if the court is satisfied that the expert testimony rests upon reliable scientific principles." Stated differently, "expert scientific testimony is admissible only if reliability is demonstrated to the trial court." *Doolin v. State*, 970 N.E.2d 785, 787 (Ind. Ct. App. 2012), *trans. denied*.

The proponent of expert testimony bears the burden of establishing the foundation and reliability of the scientific principles. There is no specific test that must be considered in order to satisfy Rule 702(b). Rather, reliability may be established by judicial notice or, in its absence, by sufficient foundation to convince the trial court that the relevant scientific principles are reliable. In determining whether scientific evidence is reliable, the trial court must determine whether the evidence appears sufficiently valid, or, in other words, trustworthy, to assist the trier of fact.

Id. at 787-88 (citations and internal quotation marks omitted).

[10] Prior to admission of Exhibit 180, the State elicited extensive testimony from Greene. Our review of Greene's testimony indicates he explained how the

² Johnson does not challenge Greene's testimony or any other exhibits the State admitted that contained evidence pertaining to ShotSpotter.

ShotSpotter system operates to inform local law enforcement of any shots fired in their jurisdiction. Specifically, he explained how the system generates reports pinpointing the location of gunshots within twenty-five meters. As noted above, Exhibit 180 is a ShotSpotter report prepared by Greene with regard to the August 1 incident and it is clear by the trial court's own words it determined Exhibit 180 would "help" and "assist" the jurors "in understanding the testimony." Tr. at 272. Therefore, contrary to Johnson's assertion, the trial court properly assessed the reliability of the ShotSpotter evidence prior to the admission of Exhibit 180.

[11] In addition, we note "Rule 702 is not intended to interpose an unnecessarily burdensome procedure or methodology for trial courts." *Turner v. State*, 953 N.E.2d 1039, 1050 (Ind. 2011) (citation and internal quotation marks omitted). Rather, the intent of Rule 702 is to liberalize the admission of reliable scientific evidence and therefore the evidence need not be conclusive to be admissible. *Id.* In the event shaky—but reliable—scientific evidence is admitted, the appropriate means of attacking such evidence is by "[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof" *Id.* (alteration in original) (citation omitted). For example, by cross-examining the witness, the opposing party has the opportunity to expose the differences between the actual evidence and the scientific theory. *Id.* at 1051. "The dissimilarities go to the weight rather to the admissibility of the evidence." *Id.* To the extent Johnson argues the evidence lacked reliability, the trial court concluded the evidence was reliable and would

assist the jury in understanding Greene’s testimony. Even assuming the evidence was “shaky,” the trial court correctly noted Johnson’s reliability concerns went to the weight of the evidence, not its admissibility. Johnson had a full opportunity to attack the credibility of the evidence in an attempt to diminish any weight it carried with the jury. We conclude the trial court did not err in admitting Exhibit 180.

[12] Further, and assuming the trial court erred, we conclude any error was harmless. *See Barnhart v. State*, 15 N.E.3d 138, 143 (Ind. Ct. App. 2014) (“Errors in the admission or exclusion of evidence are to be disregarded as harmless error unless they affect the substantial rights of a party.”) (citation omitted). Exhibit 180 merely shows a shooting occurred near 301 North Lafayette Street, and at trial, the State admitted numerous other ShotSpotter exhibits also showing a shooting occurred near 301 North Lafayette Street; Johnson does not challenge the admission of these other exhibits on appeal. In addition, many witnesses testified they heard a shooting occur, Stephen testified Johnson shot him, the green SUV had numerous bullet holes, and Sharpe was killed by a gunshot. This evidence undoubtedly indicates a shooting occurred. Exhibit 180 is no different and its admission did not prejudice Johnson.

Conclusion

[13] The trial court did not abuse its discretion in admitting evidence. Accordingly, we affirm Johnson’s convictions.

[14] Affirmed.

Mathias, J., and Brown, J., concur.

Exhibit 12

SUPERIOR COURT OF CALIFORNIA

COUNTY OF SAN FRANCISCO

BEFORE THE HONORABLE LINDA H. COLFAX, JUDGE PRESIDING

DEPARTMENT NUMBER 26

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PEOPLE OF THE STATE OF CALIFORNIA,)	
)	
Plaintiff,)	SCN 226661
)	Court No. 16015117
vs.)	
)	<u>402 HEARING</u>
MICHAEL D. REED,)	
)	
Defendant.)	
_____)	

Reporter's Transcript of Proceedings

Monday, June 5, 2017

APPEARANCES OF COUNSEL:

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BY: **CHRISTOPHER ULRICH**, Assistant District Attorney

For Defendant:

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555 Seventh Street - Suite 205
San Francisco, California 94103
BY: **MICHELLE TONG**, Deputy Public Defender

Reported by: Teanna L. Ward, CSR No. 11918, RPR

I N D E X

Monday, June 5, 2018

PEOPLE'S WITNESS

PAGE VOL.

GREENE, PAUL

Cross-Examination by Ms. Tong

6 1

E X H I B I T S

EXHIBITS

DESCRIPTION

IDEN

EVID

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Enlargement of the
visual wave lengths
for audio clip 41334

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Enlargement of page
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1 Monday, June 5, 2017, 1:47 p.m.

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3 **THE COURT:** Let's go back on the record in our trial matter,
4 People vs. Michael Reed.

5 Counsel are present. Mr. Reed is present.

6 I have had an opportunity to review your pleadings, as well
7 as the testimony in the ShotSpotter 402, as well as arguments by
8 counsel. And the motion to exclude the testimony is denied.

9 Mr. Greene will be permitted to testify in the trial.

10 (Whereupon, the ShotSpotter 402 hearing was concluded.)

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Exhibit 13

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SUPERIOR COURT OF CALIFORNIA

COUNTY OF SACRAMENTO

HONORABLE ERNEST W. SAWTELLE, JUDGE, DEPARTMENT 19

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THE PEOPLE OF THE STATE OF CALIFORNIA,)	
)	
Plaintiff,)	
)	
-vs-)	No. 17FE007924
)	
RICKEONEICO KEGAN WILLIAMS,)	
)	
Defendant.)	
_____)	

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WEDNESDAY, APRIL 4, 2018

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REPORTER'S TRANSCRIPT OF

KELLY-FRYE HEARING AND COURT RULING

---o0o---

APPEARANCES:

For the People:

ANNE MARIE SCHUBERT, District Attorney for the
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By: SYDNE CHRISTENSEN,
Deputy District Attorney

For the Defendant:

PAULINO G. DURAN, Public Defender for the
County of Sacramento, State of California,
By: GREG FOSTER,
Assistant Public Defender

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I N D E X

Page Ref.

WEDNESDAY, APRIL 4, 2018

1

Kelly-Frye Hearing

1

PAUL GREENE, People's Witness;

Direct examination by Ms. Christensen

16

Cross-examination by Mr. Foster

52

Redirect examination by Ms. Christensen

93

Recross-examination by Mr. Foster

95

Argument by Ms. Christensen

98

Argument by Mr. Foster

102

Court's ruling on Kelly-Frye hearing

104

Court denies motion

105

Court Reporter's Certificate

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1 MS. CHRISTENSEN: Yes.

2 MR. FOSTER: Yes.

3 THE COURT: All right. The Court has listened to this
4 witnessed in both direct and cross.

5 And as I mentioned earlier, I had also read the
6 transcript of this same witness's testimony in San Francisco
7 Superior Court back in June of 2017. And in fact he was
8 cited in that Nebraska Supreme Court case for his testimony
9 related to that case.

10 In addition, there were other experts that testified
11 in Contra Costa County, that was in Exhibit Number 2 I
12 think, from 2016 dealing with similar issues, just not
13 the -- it wasn't this witness.

14 But when you listen to it all, I'm not sure I really
15 needed to hear all the testimony I did today. Nothing I
16 heard on direct or cross, either one, radically altered the
17 Court's information that the Court had already from reading
18 the other transcript.

19 And that is that when it comes down to it, you know,
20 there is really nothing new here. You know, speed of sound
21 is not new. Acoustics are not new. Acoustic location is
22 not new. Audio recordings sure is heck aren't new.
23 Microphones, multi-lateration is not new.

24 And I mean, cell phones use this, a lot of the same
25 technology all the time. We have a Third DCA case, I
26 can't -- escapes me at -- name of it at the moment but
27 recently published the Third DCA indicating there is no
28 Kelly-Frye issue with regard to cell phone triangulation.

1 And -- and we're -- we're doing something similar to this
2 in -- in here.

3 So I think it seems clear to the Court that this is
4 not new or novel scientific procedures being used in this
5 case with the ShotSpotter technology.

6 It's -- it's perhaps a -- a -- they put a lot of old
7 knowledge, old tech -- information together in one clever
8 application. But -- but I don't think that its component
9 parts can by any stretch of the imagination be considered
10 new or novel. They're clearly accepted in the -- in the
11 community. I think the -- in the scientific community that
12 is.

13 The -- the witness is more than qualified to give an
14 expert opinion in this case and he did. I didn't think he
15 was -- there were any questions really that he was
16 particularly stumped on that I heard.

17 I know that there were some questions about
18 questioning his mathematical background and there were a
19 couple questions that were asked that he did not know the
20 answer to. But I do not think that that was -- would
21 suggest that he didn't understand, wasn't qualified as an
22 expert in this system and in the various component parts
23 that make up the system. So I think he was properly
24 qualified.

25 And -- and I think his testimony bears out that all of
26 the correct procedures were used in this case so the motion
27 to exclude this is denied.

28 And that least was what, you still plan on calling

1 this witness as a witness, correct --

2 MS. CHRISTENSEN: Yes.

3 THE COURT: -- at trial?

4 So is there any issue that we still have outstanding?

5 MS. CHRISTENSEN: I do not believe so, your Honor.

6 THE COURT: Mr. Foster?

7 MR. FOSTER: The only thing that I brought to the
8 Court's attention Monday was my client stipulation to --

9 THE COURT: Yes.

10 MR. FOSTER: -- the felony element of the 29800
11 charge. I do still need a couple minutes to chat with him.

12 THE COURT: Okay.

13 MR. FOSTER: I think we could probably still get
14 through voir dire and I think we could probably just
15 characterize it as unlawful possession of a firearm or -- or
16 in some generic fashion if we're not able to handle that --

17 THE COURT: For the 29800 violation in Count 5, right?

18 MR. FOSTER: Yes.

19 THE COURT: So normally, well, the jury would always
20 know that he's convicted of a felony, right?

21 MR. FOSTER: Correct.

22 THE COURT: You would just stipulate to the type or
23 the -- in the CALCRIMS the parties stipulated or he was
24 convicted of a felony.

25 So I can't remember how we -- so what you're saying is
26 your client is willing -- so that the People don't have to
27 prove that, your client is willing to admit that he was
28 convicted of a felony in the past.

Exhibit 14

1 IN THE CIRCUIT COURT OF THE
2 FOURTH JUDICIAL CIRCUIT, IN
AND FOR DUVAL COUNTY, FLORIDA.

3 CASE NO.: 16-2017-CF-8075-AXXX

4 DIVISION: CR-A

5

6 STATE OF FLORIDA

7 -vs-

8 RONALD DIQUAN BOST,

9 Defendant.

10

11 STATE OF FLORIDA)

12 COUNTY OF DUVAL)

13

14 PROCEEDINGS before the Honorable ADRIAN G. SOUD,
15 Judge of the Circuit Court, Division CR-A, as cause in
16 this matter came to be heard at 2:00 p.m., on the 16th
17 of January, 2020, before Colleen S. David, Court
18 Reporter and a Notary Public in and for the State of
19 Florida at Large.

20

21

22

23

24 OFFICIAL REPORTERS, INC.
421 WEST CHURCH STREET, SUITE 703
JACKSONVILLE, FL 32202
25 (904) 358-2090

1 not there's a degree of acceptance. He indicated
2 that he has testified in other areas and has been
3 qualified as an expert in other areas, but not in
4 Florida. He indicated this was the first time in
5 Florida.

6 What we're saying is that based on all these
7 things we feel that the Court should grant our
8 motion in limine to prevent the presentation of the
9 ShotSpotter in this case.

10 THE COURT: All right, thank you.

11 The Court has had an opportunity to consider
12 the testimony presented for purposes of
13 determination of the Daubert motions. For the
14 reasons that the Court will in a moment recite for
15 purposes of the record, the Court is going to deny
16 the amended motion in limine to limit the scope of
17 testimony of the expert and witnesses, to wit,
18 ShotSpotter System.

19 The reason is because, and it's important to
20 note at the outset that the Court's function at a
21 Daubert hearing is really more of a gatekeeping
22 function, and the Court must conclude based upon
23 the testimony and evidence presented at the hearing
24 that the State of Florida in this case has met its
25 burden to establish by the preponderance of the

1 evidence that the testimony offered as it pertains
2 to ShotSpotter is the product of reliable
3 principles and methods.

4 Specifically in performing the gatekeeping
5 function that is not meant to be a basis for a
6 conclusion that certain matters argued by defense
7 counsel may form the basis at trial for
8 cross-examination for the jury's ultimate
9 determination as to the weight to be afforded any
10 particular evidence.

11 In performing the gatekeeping function, first
12 the Court concludes that Walter Collier, III, is
13 qualified and competent to offer expert testimony
14 or opinion testimony as to the ShotSpotter system
15 and what was determined or what is found as a
16 result of ShotSpotter's involvement in this
17 particular case. Certainly the Court notes, my
18 recollection and my notes, as well as my
19 recollection is that he began his employment there
20 in 2014, that is confirmed in the State's Exhibit
21 No. 1, which is his curriculum vitae, where he
22 indicates he has been employed since August of 2014
23 as the senior technical support engineer, and for
24 the background he testified to as a law enforcement
25 officer, and for other pertinent background as set

1 forth in his CV, the Court determines he is
2 competent to testify, and apparently he has, in
3 fact, testified as an expert in some 50 cases.

4 Further the Court determines that each of the
5 three necessary elements have been established for
6 the admission of the testimony, and specifically
7 that is that the testimony is based upon sufficient
8 facts or data, that the testimony is the product of
9 reliable principles and methods, and that in this
10 case Mr. Collier has applied the principles and
11 methods reliably to the facts of this particular
12 case.

13 Certainly the method, the mathematics, things
14 of that sort as argued by counsel for the State of
15 Florida, and frankly as set forth in precedence
16 provided by the State of Florida, including Johnson
17 v. State, 68 Northeastern 3d 623 from the Court of
18 Appeals in Indiana in 2016, as well as the United
19 States versus Godinez, G-O-D-I-N-E-Z, found at 2019
20 Westlaw 4857745 from the northern district of
21 Illinois in 2019.

22 The principles at the core of this
23 ShotSpotter system, while perhaps comparatively new
24 in its application for law enforcement purposes,
25 the underlying principles are actually somewhat old

1 and certainly are well established. But certainly
2 the Court concludes, based upon the matters
3 presented, that the testimony is based upon
4 sufficient facts or data.

5 Mr. Collier made very clear that the
6 ShotSpotter system is fully capable and it is
7 designed to detect impulsive sounds, sounds which
8 are, I believe the word he used was sharp, in the
9 emergence of the frequency of the sound, as well as
10 the dissipation of that sound, and that when that
11 sound is detected by the system that sound that
12 sound then is sent, it is recorded but it is sent
13 to location services server for the server's
14 analysis and consideration, and of course this was
15 set out in his testimony, but it's also set out in
16 page 2 of State's Exhibit No. 2, that once the
17 acoustic sensors are activated by that which is
18 believed to be gunshot, the location server
19 application then utilizes GPS and multilateration
20 algorithms for the determination of a longitude and
21 latitude location from whence the shots were fired.
22 And that determination, as he testified to and as
23 is set out in the report, certainly establishes for
24 the Court that the testimony is not only based on
25 sufficient facts or data, but the testimony is the

1 product of reliable principles and methods that are
2 reliably applied to the facts of this particular
3 case. And that which I just stated, of course, are
4 the second on third necessary requirements for the
5 testimony to be admissible under 90.702.

6 Because of the acoustic sensors reliably
7 involved there is a safety feature, the Court's
8 word safety feature, that if a sensor is
9 malfunctioning that is reported and the sensor is
10 then not utilized for purposes of the location
11 determination.

12 But for the involvement of four sensors in
13 this particular case transmitting that information
14 to servers, perhaps both servers, one on each coast
15 of the continental United States, that the
16 information transmitted via those servers
17 accurately, reliably for purposes of the finding of
18 the Court, reliably pinpoints the location of the
19 three gunshots in this particular case.

20 The Court has certainly endeavored to
21 articulate in summary form its findings based on
22 the Court's understanding and appreciation of the
23 testimony, appreciation not affinity, but
24 appreciation and understanding, if you will, of
25 Mr. Collier's testimony. The Court in summary form

1 is determining its conclusions, but certainly it's
2 set out specifically in State's Exhibit No. 2 as to
3 not only the acoustic sensors but the manner in
4 which the location is determined.

5 For those reason the Court determines that
6 the motion in limine is due to be denied, and the
7 testimony concerning ShotSpotter and its
8 involvement in this case will be permitted by the
9 Court, though not permitted via Skype, it's going
10 to have to be in person.

11 MS. MAKAROWSKI: Absolutely, Your Honor.

12 THE COURT: The technological difficulties
13 courts can navigate that for purposes of Daubert,
14 but I'm not going to impose that on the jury, and I
15 know the State apparently is willing and prepared
16 for that.

17 Madam Clerk, I am returning to your custody
18 and care State's Exhibits 1 and 2.

19 With that being said, let me, if I can, get
20 back to the Court's calendar so that we can discuss
21 the next court date. Do we have a trial date?

22 MS. BUNCOME: We do not, Your Honor.

23 THE COURT: Are we ready to reset the case for
24 trial?

25 MS. MAKAROWSKI: I believe we are, Your Honor.

1 MS. BUNCOME: Yes, Your Honor.

2 MS. MAKAROWSKI: The State has two remaining
3 defense witnesses that we have a depo scheduled
4 early February. The State is requesting a trial
5 date of May 18. I have not discussed that with
6 defense counsel.

7 THE COURT: What's your availability,
8 Ms. Buncome?

9 MS. BUNCOME: Your Honor, I am available that
10 week.

11 THE COURT: Okay. May 18th of 2020.
12 It is Bost?

13 THE DEFENDANT: Bost.

14 THE COURT: Bost, my apologies for
15 mispronouncing your name, Mr. Bost. Your trial
16 date is going to be May 18th of 2020. The final
17 pretrial conference will be the preceding Tuesday,
18 May 12th of 2020.

19 Following the depositions referenced by the
20 State, Ms. Buncome, are you, as far as the progress
21 of depositions that the defendant wishes to take,
22 are you close to the conclusion of those
23 depositions? Would a pretrial conference shortly
24 after the State's deposition be appropriate in your
25 estimation?

1 MS. BUNCOME: Yes, Your Honor. That would be
2 fine.

3 THE COURT: February 20, are you each
4 available that day, that's a Thursday? It needs to
5 be the 20th.

6 MS. MAKAROWSKI: Yes, Your Honor.

7 THE COURT: Or I can go to another week, I
8 should say.

9 MS. BUNCOME: The 20th is fine, Your Honor.

10 THE COURT: February 20th will be your next
11 court date for an intervening pretrial conference.
12 That is after the depositions, is it not?

13 MS. MAKAROWSKI: It is, Your Honor.

14 MS. BUNCOME: Yes, Your Honor.

15 THE COURT: All right. They'll bring you back
16 to the courthouse on February 20th. Thank you very
17 much.

18 (Proceedings concluded at 4:00 p.m.)

19 - - -

20

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25

1 C E R T I F I C A T E

2 STATE OF FLORIDA)

3 COUNTY OF DUVAL)

4 I, Colleen S. David, Court Reporter, certify
5 that I was authorized to and did stenographically
6 report the foregoing proceedings and that the
7 transcript is a true and complete record of my
8 stenographic notes.

9 DATED this 12th day of April, 2021.

10

11

12

13 /s/ Colleen S. David
14 Colleen S. David
15 Court Reporter

16

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Exhibit 15

1
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3
4
5 IN THE SUPERIOR COURT
6 STATE OF CALIFORNIA, COUNTY OF ALAMEDA
7 BEFORE THE HONORABLE C. DON CLAY, JUDGE
8 DEPARTMENT NUMBER 6

9 ---oOo---

10 THE PEOPLE OF THE STATE OF CALIFORNIA,)
11)
12 Plaintiff,) No. 19-CR-016277
13 vs.)
14 FRED BATES,)
15 Defendant.)
_____)

16 FELONY JURY TRIAL - TESTIMONY OF PAUL GREENE

17 WEDNESDAY, JULY 7, 2021

18 RENE C. DAVIDSON COURTHOUSE
19 OAKLAND, CALIFORNIA

20 A P P E A R A N C E S

21
22 FOR THE PEOPLE: SEAN FLYNN
23 Deputy District Attorney

24 FOR THE DEFENDANT: ANDREW DOSA
25 Attorney at Law

26
27
28 REPORTED BY: Danielle A. DeWarns, CSR #9743

1 Court might order that for the following Tuesday.

2 THE COURT: You're ordered back for the 20th of --
3 July 20th.

4 MR. FLYNN: Is it the 21st?

5 MR. DOSA: No, the 20th.

6 THE COURT: 19th is the Monday. The 20th is the
7 Tuesday.

8 MR. FLYNN: Appreciate it.

9 THE COURT: Okay. All right. You're ordered
10 back.

11 THE WITNESS: I do have a subpoena for that.

12 THE COURT: All right. Great. Thank you.

13 Any further witnesses?

14 MR. FLYNN: No, your Honor.

15 THE COURT: All right.

16 Mr. Dosa, any witnesses?

17 MR. DOSA: No, your Honor.

18 THE COURT: All right. Do you parties want to be
19 heard?

20 MR. FLYNN: I'll reserve.

21 THE COURT: Mr. Dosa?

22 MR. DOSA: Well --

23 THE COURT: You know, the reason you have Kelly-Frye
24 is to make sure -- the Court is basically a gatekeeper so you
25 don't have a bunch of fake sort of dubious-type of science
26 coming up in front of everybody to make this so the jury --
27 you don't have the jury prejudiced one way or the other.
28 That's what it is. It's a gatekeeping responsibility. For

1 the purposes of these proceedings, the question is whether or
2 not it's a legitimate technology. Or, one, is it a technology
3 and method? I'm not certain this is -- this is a new method
4 because I've been dealing with this when I was a defense
5 lawyer. We had them way back when. And so it's not really
6 new. The question is whether or not there is a scientific
7 community that deals with this particular type of technology.
8 I mean, it's -- I don't think it's dubious. It's not
9 experimental anymore because it's been around. They've been
10 around since 1995, and I know in 1995, '96, when all of the
11 murders were going on in Oakland, it was starting to come out.

12 You know they didn't have it here, per se, but we
13 were hearing. People were talking about it, and I guess in
14 2006 Oakland really adopted it.

15 So it's not that -- it's not that issue in terms of
16 the technology itself. My gatekeeper responsibilities is to
17 make sure it's nothing to mislead the jurors, and I think
18 based upon this testimony by this expert in this particular
19 case, it's -- he's clearly shown this Court his expertise. I
20 believe there's enough evidence that backs the technology from
21 the standpoint of his company being involved in this area.
22 And, as I say, I don't think it's really a new scientific
23 technology.

24 But that being said, my gatekeeper responsibility,
25 there's nothing misleading that would come out of this
26 testimony as it relates to the ShotSpotter technology from
27 this company. It addresses all the issues that I think is
28 important when you conduct a Kelly-Frye in the sense that in

1 this particular case, the technology is being offered to prove
2 or dispute a potentially disputed fact based upon what you all
3 are telling me, whether or not there's shots at that time or
4 if there weren't any shots. It's going to aid both of you,
5 quite frankly, in your cases as it relates to the shooting or
6 the shots being fired, and it's relevant. And the testimony
7 by this expert clearly, I believe, is admissible.

8 He's testified to the reliability, the testing of
9 the stuff itself, the fact that he's been deemed an expert 117
10 times, at least. I know he's been here in this courthouse
11 testifying before. And the mere fact that he's been an expert
12 in one of my other colleagues' courts doesn't mean I would
13 take him as an expert, but clearly his testimony supports his
14 expertise. He knows and he's knowledgeable in the subject
15 matter. He's involved initially in the whole sounding issue
16 through the federal government and finally becoming part of
17 the ShotSpotter company itself.

18 I think he's qualified properly, and I think, as I
19 said, the procedure itself is -- is a valid technology and
20 it's being used so frequently. And the fact that he's --
21 it's interesting, in the Court of Appeals and don't let me get
22 started about, you know, in Hardy whether or not those judges
23 did a lot of trials, but the trial judges have seen this stuff
24 all the time. And they said there's only been two reported
25 cases, when they came to issue this. The mere fact that
26 there's only two reported appellate cases doesn't mean that
27 people aren't using this in terms of finding that the
28 technology itself is not new because that's why it's being

1 used, and that's why you're getting it all over this state. I
2 mean, I've talked to other judges that have used it in their
3 courtroom in these murders especially in the gang cases where
4 they're going to the scene.

5 So I don't think it's a new technology, and I think
6 it just hasn't gotten to the Court of Appeals. Nobody has
7 tested it, and as I say the issue in Hardy is totally
8 different because the D.A. made a statement about his
9 reliability and wasn't offered for the truth of the matter
10 asserted to support this evidence that somebody shot six times
11 plus make it an automatic versus a handgun. But here we're
12 really talking about someone coming in. You talk about the
13 equipment, how it's set up between the recorders, the people
14 who reviewed, their reviews that he goes on and does for the
15 purposes of making determination. As he said, there were
16 three phases of this, as I remember.

17 We had the sensor, the microphones that are put up,
18 the location of the servers that get the information. We have
19 the review center that tells -- makes sure that it's a
20 shooting and then goes in and they record it.

21 Interesting enough, you got -- this stuff, they have
22 a historical, a storage of all this stuff. I mean, you can go
23 back and check the accuracy, and I don't think -- if that was
24 a problem here, you would definitely have some postings from
25 defense lawyers.

26 I think under the circumstances in this case, he'll
27 be allowed to testify to the subject matter of this trial, and
28 you'll be able to present him, and both of you will be able to

1 use him in court.

2 I'll find that this technology is valid and not just
3 dubious, and it's relevant to the subject matter and it will
4 help the trier of fact, the lawyers, the layman person in
5 this case. Although, I think, all the people in this
6 community, they know ShotSpotter. They hear so much now.
7 They all expect it. I mean you find that -- it's very
8 interesting, you know, since everybody expects you to have
9 DNA, which you don't, and I try to explain to the jury, the
10 shooting stuff they're hearing. It's all in the news every
11 time. The ShotSpotter is going off and people kind of expect
12 that, but he'll be allowed to use that.

13 MR. FLYNN: Thank you.

14 THE COURT: All right. Gentlemen, so our next thing
15 is, we're going to see you and get the questionnaires and do
16 what you do, and I'm not going to be letting out any marginal
17 people unless somebody is really bad and you guys say that
18 somebody is so, so prejudice and out of line, you guys -- we
19 got about 70-plus jurors. We're going to use those to pick
20 this jury. And, you know, really depending on what you get,
21 you might get a jury even quicker than -- I mean, they're
22 coming in Tuesday -- Monday. Monday, excuse me. Tuesday was
23 to -- this was the holiday. They're coming in Monday. You
24 could have a jury late Monday, definitely Tuesday morning, and
25 that gives you all some time to be ready for your opening and
26 evidence. So I don't know how much evidence you're going to
27 have because you're going to get to Tuesday with him. He
28 could be --

Exhibit 16



C L A R E L O C K E

L L P

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August 16, 2021

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Re: Retraction Demand: “Police Are Telling ShotSpotter to Alter Evidence from Gunshot-Detecting AI” (July 26, 2021)

Dear Messrs. Berkovits, Koebler, and Feathers:

Our firm is defamation counsel to ShotSpotter, Inc.

On July 26, 2021, Vice Media LLC published – and heavily promoted on its media platforms and social media accounts – a feature-length investigative story by Todd Feathers titled “Police Are Telling ShotSpotter to Alter Evidence from Gunshot-Detecting AI” (the “Article”). The Article falsely alleges, both directly and by clear implication that: (1) ShotSpotter has falsified and manufactured evidence for use in criminal trials; (2) ShotSpotter’s technology is flawed and



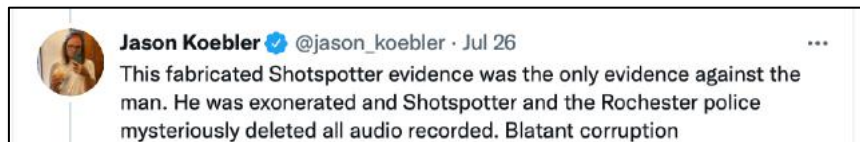
unreliable and, as such, prosecutors and ShotSpotter have sought to shield the technology from any sort of pressure-testing or challenge to its admissibility in court proceedings; and (3) ShotSpotter has misrepresented its product to customers and the public in its marketing material. With respect to each of these false assertions, Vice recklessly disregarded—and deliberately hid from its readers—critical facts that were either apparent from the Article’s source material, provided to Mr. Feathers prior to publication, or otherwise apparent to Vice and Mr. Feather’s, but did not fit their preconceived narrative.

A. The Article Falsely States and Implies That ShotSpotter Has Falsified and Manufactured Evidence for Use in Criminal Trials

In support of its false narrative, the Article makes the following false and defamatory statements:

- The headline: “Police Are Telling ShotSpotter to Alter Evidence From Gunshot-Detecting AI.”
- “Motherboard’s review of court documents from the Williams case and other trials in Chicago and New York State, including testimony from ShotSpotter’s favored expert witness, suggests that the company’s analysts frequently modify alerts at the request of police departments—some of which appear to be grasping for evidence that supports their narrative of events.”
- The section heading: “A pattern of alterations.”
- “Initially, the company’s sensors didn’t detect any gunshots, and the algorithms ruled that the sounds came from helicopter rotors.”
- “Greene ... was involved in another altered report in Chicago, in 2018[.]”
- Overall, the Article’s one-sided reporting on the *Simmons*, *Godinez*, *Williams*, and *Reed* cases rely on cherry-picked quotes and facts to create a false narrative about evidence tampering, which fails to *accurately* convey the substance, outcome, parties’ positions, or testimony from these proceedings.
- These promotional tweets from Motherboard’s Editor-in-Chief, Jason Koebler:





These outrageous falsehoods charge my client with criminal obstruction of justice, evidence tampering, and corruption, and they impair its reputation in its trade or profession. As such, they are defamatory *per se*.

ShotSpotter never “modif[ies] alerts,” as the Article claims. Rather, ShotSpotter offers two distinct services. First, it provides real-time notifications to police when ShotSpotter detects gunfire. This gunfire detection involves successive levels of computer and human review to determine whether a given sound is a gunshot. An alert is never “modified”; it is analyzed in two steps to determine whether there has been a gunshot *before alerting law enforcement*, and the whole process is completed in less than sixty seconds. Second, on request, ShotSpotter employees can re-review the preliminary real-time findings and audio to determine whether any recorded sounds were overlooked or misclassified when generating the real-time alerts and/or to prepare a detailed forensic analysis for use as evidence in court. Those analyses take up to eight hours per incident—far more time than the initial alert. Again, this is not a modification of the real-time alert. It is an additional level of review designed to ensure accuracy and provide more detailed information than that which can be gleaned from the initial 60-second analysis. Throughout all these processes, each layer of review’s conclusion is preserved by ShotSpotter’s software to ensure that the process is transparent and can be audited. Thus, nothing in the record is ever “modified,” and nothing in this process results in altered alerts or evidence. Indeed, the multi-level review process is designed to ensure that audio is reliably interpreted.

Nor can your assertions be grounded in Mr. Greene’s testimony. Although he testified that “on a semi-regular basis” police “ask[] [ShotSpotter] to search for—essentially, search for additional audio clips,” this is a far cry from your claims that on a semi-regular basis “Police Are Telling ShotSpotter to Alter Evidence” or “ask [ShotSpotter] to invent gunshots where they do not exist.” In this regard, Vice’s representations are outright lies. And it seems clear that you reviewed—at most—filings from four cases (*Godinez*, *Williams*, *Simmons*, and *Reed*) among the hundreds in which ShotSpotter evidence has been used. Those four cases could not conceivably serve as the basis for making findings regarding the “frequency” with which ShotSpotter does anything, let alone “modif[ies] alerts” or alters evidence (which ShotSpotter *never* does, as explained above, and which none of them found).



Finally, your narrative that ShotSpotter would make these changes to cater to police or prosecutors is patently false. ShotSpotter evidence is used by both the defense and the prosecution in criminal cases. One example is *United States v. King*, 439 F. Supp. 3d 1051 (N.D. Ill. 2020)—a case out of Chicago that would have been included in your “review” of cases from that jurisdiction. There, a court suppressed evidence found during a stop-and-frisk of Mr. King, which police had justified based on an anonymous report of shots fired. But ShotSpotter records—introduced by the defense—showed no gunshots in the area, and the court held that the uncorroborated anonymous tip could not by itself justify the stop when ShotSpotter had no record of gunshots in the area. And in *Arizona v. Bryan Wayne Hulsey*, CR-2007-111655-001 (Maricopa Cty. Super. Ct.), Mr. Greene testified for the defense in a high-profile capital case involving the murder of a police officer.¹

ShotSpotter never alters evidence, and your claims of corruption are patently false.

B. False Claims of a “Pattern” of Inadmissibility, Withdrawal by Prosecutors, or Shielding ShotSpotter from Scrutiny

Several of the Article’s false statements suggest that ShotSpotter evidence is facing a pattern of frequent inadmissibility or withdrawal and that prosecutors and authorities are shielding ShotSpotter from scrutiny:

- “Prosecutors in Chicago are being forced to withdraw evidence generated by the technology...”
- Claims that Chicago prosecutors withdrew the evidence rather than face a *Frye* hearing and that “[t]he case isn’t an anomaly, and the pattern it represents could have huge ramifications for ShotSpotter in Chicago,” and elsewhere.
- “‘The reliability of [ShotSpotter] technology has never been challenged in court and nobody is doing anything about it’ ‘Chicago is paying millions of dollars for their technology and then, in a way, preventing anybody from challenging it.’”
- The section heading: “Untested evidence.”
- “If a court ever agrees to examine the forensic viability of ShotSpotter, or if prosecutors continue to drop the evidence when challenged, it could have massive ramifications.”

¹ See *Arizona v. Hulsey*, 408 P.3d 408, 416 (Ariz. 2018).

Defendants also introduced ShotSpotter evidence in *Massachusetts v. Pina*, 81 N.E.3d 824 (Mass. App. 2017), *United States v. Gregory Hale*, No. 2015 CF2 7728 (D.C. Super. Ct. Oct. 8, 2015), and *California v. Tavon Foster*, No. 17-CR-007803 (Alameda Cty. Super. Ct. Jan. 24, 2019).



These claims are false and impair ShotSpotter's reputation in its trade or profession. As such, they are defamatory per se.

First, ShotSpotter evidence is widely considered admissible. It has been used in over 190 court cases in 20 states. It has overcome 13 *Frye* challenges and 1 *Daubert* challenge, which are proceedings in which the defense challenges the reliability of and the science behind ShotSpotter (or any expert, scientific, or technical evidence for that matter).²

And, as noted above, it appears you reviewed filings from only four cases among hundreds—a review of such limited scope that it could not conceivably serve as the basis for making any findings regarding “anomol[ies]” or “pattern[s]” in courts’ decisions. Even if it *were* possible to form broad-based conclusions based on just four cases, these four cases did not support your conclusion:

(A) In *United States v. Godinez*, the defense filed a motion to exclude challenging the reliability of acoustic triangulation but failed to persuade the trial judge that the technology was unsound.³

(B) In *Illinois v. Michael Williams*, No. 20 CR 0899601 (Cook Cty.), prosecutors declined to litigate the admissibility issue, but that likely occurred because they were discontinuing the prosecution of Mr. Williams altogether. Cook County records show that prosecutors informed the court of their intention to *nolle pros* the case on July 23, 2021 (before the Article ran).

(C) The Article also mentions Silvon Simmons’ civil lawsuit against the City of Rochester and ShotSpotter, which resulted from the reversal of Mr. Simmons’ conviction on weapons charges. But, in that case, the court admitted the ShotSpotter evidence, finding it sufficiently reliable to be admitted for consideration on the question of whether Mr. Simmons had fired a weapon at police.⁴ The jury found Mr. Simmons not guilty of those charges and instead found him guilty of only a gun possession charge. That conviction was then vacated because the jury’s split verdict (which suggested that jurors had not credited a police officer’s testimony about Mr. Simmons’ actions) left ShotSpotter as the sole piece of evidence supporting his conviction. But the sound of a gunshot, standing alone, was simply not enough to put a gun in Mr. Simmons’ hand.

² *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 589-595 (1993) (holding that “under the [Evidence] Rules the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable” and outlining relevant considerations); *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923) (holding that to be admissible “the [science] from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs”).

³ Def.’s Reply in Support of Motion to Exclude at 1, *United States v. Godinez*, No. 18-CR-278 (N.D. Ill. May 24, 2019), ECF No. 75 (“At issue in regard to the use of ShotSpotter data, which the government seeks to introduce as evidence, is how the laws of physics control the manner in which audio sounds are transmitted and captured. Instead, the government circumvents that issue of collection, and focuses only on how that data is interpreted by ShotSpotter once the sound has been transmitted and captured.”).

⁴ *People v. Simmons*, 71 N.Y.S.3d 924, 2017 WL 4782912 at *11 (N.Y. Monroe Cty. Ct. Apr. 13, 2017).



(D) The Article quotes Paul Greene’s testimony from a “2017 San Francisco” case, which is *People v. Michael D. Reed*, No. 16015117 (Cal. S.F. Super. Ct.). There, the ShotSpotter evidence was not only admitted but was unquestionably correct—the ShotSpotter alert was corroborated by video footage and the defendant’s own testimony, in which he admitted to firing at a passing car (but claimed self-defense).⁵

In sum, you reviewed four cases: two in which the evidence was successfully admitted; one in which it was successfully admitted, but the conviction was later vacated; and one in which prosecutors discontinued the charges. So, even when looking at the Article’s limited sample set, its conclusions regarding “patterns” of withdrawal or inadmissibility are plainly false. Rather, the only conclusion that can be drawn is that ShotSpotter’s technology and science are in fact reliable and admissible in criminal proceedings.

Second, the assertion that ShotSpotter is untested is wholly untrue because, as noted, ShotSpotter evidence has been subjected to and prevailed over 13 *Frye* challenges and 1 *Daubert* challenge.⁶ Although courts sometimes forgo a formal evidentiary hearing prior to making an admissibility determination under *Frye* or *Daubert*, and instead opt to resolve the matter based on the parties’ submissions or oral argument, that does not render ShotSpotter evidence untested or unchallenged. Resolving a motion on the papers it is simply a different procedural mechanism for the challenge. Further, the Article’s claim that, in *United States v. Godinez*, “[p]rior to the trial, the judge ruled that Godinez could not contest ShotSpotter’s accuracy or Greene’s qualifications as an expert witness,” offered in furtherance of the false narrative, is wrong. A *Daubert* motion is the mechanism by which the accuracy of ShotSpotter’s technology and its witness’s qualifications can be challenged (it is not a bar to launching such challenges). And, even though the evidence was admitted, Mr. Godinez was permitted to contest ShotSpotter’s accuracy and Greene’s qualifications as an expert witness on cross examination for the jury.⁷ But, after considering all of Mr. Greene’s testimony, including this cross-examination, the jury returned a guilty verdict.⁸

Because ShotSpotter has been challenged extensively and frequently admitted, your claims are patently false.

⁵ *People v. Reed*, No. A155280, 2021 WL 1207376, *1 (Cal. App. 1st Dist. Mar. 30, 2021), review denied (Jun. 30, 2021).

⁶ See, e.g., *State v. Hill*, 288 Neb. 767 (Neb., 2014); *Allen v. State*, 68 N.E.3d 623 (Ind. App. 2016); *California v. Stephan Joseph*, No. 15000843 (S.F. Super. Ct. 2015); *Missouri v. Edward Roach* (St. Louis 2010); *California v. Zachery Goodwin*, No. F16900408 (Fresno Super. Ct. Apr. 12, 2019).

⁷ May 29, 2019 Hearing Tr. at 9:19-24, *United States v. Godinez*, No. 18-CR-278 (N.D. Ill.), ECF No. 131 (“THE COURT: You can certainly cross-examine Mr. Greene but, I mean, the principles that he’s espousing, it’s not a question where he’s pulling this out of the air. You might disagree with it and might ~ you know, the principles, I think, are valid. Whether or not they’ve been properly utilized, of course, is subject to cross-examination”).

⁸ See Verdict, *United States v. Godinez*, No. 18-CR-278 (N.D. Ill.), ECF No. 93.



C. Claims That ShotSpotter Misrepresented Its Product to Customers and the Public in Its Marketing Material

Several of the Article's false statements suggest that ShotSpotter lies about its accuracy:

- “Over the years, ShotSpotter’s claims about its accuracy have increased, from 80 percent accurate to 90 percent accurate to 97 percent accurate. According to Greene, those numbers aren’t actually calculated by engineers, though. ‘Our guarantee was put together by our sales and marketing department, not our engineers,’ Greene told a San Francisco court in 2017. ‘We need to give them [customers] a number ... We have to tell them something. ... It’s not perfect. The dot on the map is simply a starting point.’”
- “The company has not allowed any independent testing of its algorithms, and there’s evidence that the claims it makes in marketing materials about accuracy may not be entirely scientific.”
- “In May, the MacArthur Justice Center analyzed ShotSpotter data and found that over a 21-month period 89 percent of the alerts the technology generated in Chicago led to no evidence of a gun crime and 86 percent of the alerts led to no evidence a crime had been committed at all.”
- This promotional tweet from Motherboard’s Editor-in-Chief, Jason Koebler:



These false claims impair ShotSpotter’s reputation in its trade or profession. As such, they are defamatory per se.

First, the Article’s claims about changing efficacy rates falsely conflates two distinct statistics to fit its false narrative that ShotSpotter is lying about its accuracy. In its customer contracts, ShotSpotter warrants a minimum level of accuracy and, if it is not met, the customer’s fees are reduced. Over the years, ShotSpotter has indeed increased the minimum level of accuracy promised to its customers from 80 percent to 90 percent (the level promised today). Although ShotSpotter currently promises at least 90 percent accuracy, the system over-delivers. In 2019 and 2020, the ShotSpotter system delivered a 97% accuracy rate for real-time detections across all customers, a figure derived directly from police department feedback regarding performance. So, the Article’s contention that “ShotSpotter’s claims about its accuracy have increased, from 80 percent accurate



to 90 percent accurate to 97 percent accurate” is a deliberate falsification based on an obvious apples-to-oranges comparison.

Second, the Article falsely twists the words of ShotSpotter forensic expert Paul Greene to suggest that the company’s 97 percent accuracy rate is the product of the marketing or sales departments. Mr. Greene testified that the *minimum accuracy guarantee* (the level below which customers receive a discount) is put together by marketing but not the *actual accuracy rate*:

2	Q. Okay. So let me understand those percentages. The	
3	guarantee is that the 80 percent is to pick up the pulses.	
4	A. The guarantee is -- again, let me state this. The	
5	ShotSpotter limited performance guarantee states that the	
6	ShotSpotter system will detect, locate and report at least	
7	80 percent of all outdoor, detectable, unsuppressed gunfire.	
8	And we've defined accurately as to locating that gunshot to	
9	within 25 meters -- a circle whose radius equals 25 meters.	
10	Now, that statement, admittedly, is -- was put together by	
11	our marketing department. It is overly broad. It is an example	
12	of under-promising and over-delivering.	
13	If we take into account the feedback that we get from our	
14	customers, as far as reported misses versus the detections, then	
15	what we normally come up with is a detection rate of 90 percent	
16	or better in most cases. And, certainly, in the San Francisco	
17	Bay Area, the systems regularly perform at 90 percent or better	
18	detection accuracy.	

Third, the ShotSpotter system has been tested to ensure that ShotSpotter correctly conveys the system’s efficacy to customers. In addition, ShotSpotter rigorously trains, tests, and continuously monitors the performance of every individual reviewing real-time gunfire incidents at the company to ensure they perform at a level consistent with the company’s quality objectives.

To assail ShotSpotter’s accuracy the Article heavily relies on a purported “study” by the MacArthur Justice Center (“MJC”), which is far from a neutral or independent source. MJC is an advocacy organization whose stated mission is (among other things) to end the use of so-called “surveillance technology” in policing. The MJC approached its “study” with a preconceived result in mind, borne of its advocacy mission—a bias that the Article fails to disclose.



In fact, ShotSpotter obtained two independent analyses from Edgeworth Analytics (which are hereby incorporated into this letter by reference and are attached for your review⁹) that refute the Article's core assertions. Edgeworth is a data science firm comprised of PhD economists who regularly serve as expert witnesses in court. In the first report, Edgeworth conducted an independent analysis and concluded that the MJC study's conclusions were misleading because they flowed from a failure to provide a rigorous, balanced, and thorough assessment of ShotSpotter's use in Chicago. Specifically, Edgeworth found the MJC study drew conclusions based on data that are an incomplete information source that cannot, on its own, be used to assess ShotSpotter's efficacy. Further, in its assessment that ShotSpotter imposes a discriminatory burden on communities of color in Chicago, the MJC study omitted crucial context about how and where Chicago deploys ShotSpotter sensors, ignoring historical data about homicide and gun crimes in the city.¹⁰

The second Edgeworth report provides an independent audit of ShotSpotter's claims regarding its accuracy in gunshot reporting. Specifically, Edgeworth examined ShotSpotter's representation that its system has an aggregate 97 percent accuracy rate, which includes a 0.5 percent false positive rate—the rate at which an alert is issued to a client, but no gunshot occurred—across all customers for 2019 and 2020. Edgeworth's review confirmed that (1) ShotSpotter's claims are consistent with data based on actual customer feedback from a broad range of ShotSpotter clients, and (2) despite variation in the intensity of reporting potential errors across clients, ShotSpotter's accuracy rate is not sensitive to differences in clients' propensity to report potential errors.

* * *

I am sure you appreciate the seriousness of these issues. ShotSpotter has worked hard to earn its reputation as a responsible and ethical company devoted to reducing gun violence and saving lives in the communities in which its technology is employed. It was reckless and irresponsible for Vice to damage that reputation with provably false allegations and implications that ShotSpotter falsified evidence for use in criminal prosecutions, that ShotSpotter is an inherently unreliable technology that must be shielded from legal scrutiny, and that the company lied to the public and its customers about the efficacy of its products and services. These allegations are defamatory *per se*.

⁹ The Reports are also publicly available online. See Edgeworth Analytics, *Independent Analysis of the MacArthur Justice Center Study on ShotSpotter in Chicago* (July 22, 2021), <https://edgeworthanalytics.com/wp-content/uploads/2021/07/Shotspotter-MJC-Analysis.pdf>; see also Edgeworth Analytics, *Independent Audit of the ShotSpotter Accuracy* (July 22, 2021), <https://edgeworthanalytics.com/wp-content/uploads/2021/07/Shotspotter-Accuracy-Study.pdf>.

¹⁰ We also note that no empirical evidence supports the notion that ShotSpotter's presence in communities contributes to over-policing. Rather, ShotSpotter saves lives. For example, in 2020 alone ShotSpotter alerts led Oakland authorities to 123 shooting victims before a 911 call notified police of the incident. Of those victims, 101 survived, some reportedly because ShotSpotter alerts can significantly reduce emergency response times, allowing Oakland police and emergency medical services to respond in as little as two minutes of ShotSpotter activation. See Memorandum from Trevelyan Jones, Captain, Ceasefire Section, Oakland Police Dep't to LeRonne Armstrong, Oakland Chief of Police, at p.2 (Jun. 7, 2021), <https://cao-94612.s3.amazonaws.com/documents/Special-Meeting-Packet.pdf>.



They have caused—and will continue to cause—serious economic and reputational harm to ShotSpotter.

To mitigate the harm to ShotSpotter, we demand that Vice and Mr. Feathers each immediately retract the Article or, at a minimum, retract the specific false statements from the Article identified in this letter. Further, Vice, its staff, and Mr. Feathers must take down any social media posts repeating or elaborating upon these patently false claims. For avoidance of doubt, this constitutes ShotSpotter's formal demand for a retraction pursuant to Cal. Civ. Code § 48a or similar retraction-demand provisions that may apply in a legal proceeding arising from the publication of defamatory falsehoods in the Article.

Given the seriousness of the Article's false allegations and the likelihood that litigation will result from its defamatory claims, Vice and Mr. Feathers must immediately retain—and direct all other persons involved in any way in the research, drafting, editing, fact-checking, or publication of the Article to retain—all documents, electronically stored information, and other materials relating in any way to ShotSpotter and the Article, including without limitation all electronic communications, hard-copy documents, text messages, photographs, phone records, emails, social media posts, internet search histories, drafts, markups, and communications with sources. These retention requirements apply with equal force to communications and materials stored or transmitted on personal or professional devices, servers, or accounts.

Further, this is not intended to be a complete statement of ShotSpotter's rights and remedies, all of which are expressly reserved. Our review of Vice's ShotSpotter coverage remains ongoing, and we will address the falsehoods from subsequent articles, including the doubling-down on falsehoods in the initial article, in future correspondence.

Please confirm receipt of this letter and that you intend to adhere to our request to retain documents as set forth above. We look forward to your prompt response, no later than August 30.

Very truly yours,

Thomas A. Clare, P.C.

Appendix of Edgeworth Analytics Reports

<u>Independent Analysis of the MacArthur Justice Center Study on ShotSpotter in Chicago</u>	<u>A.1</u>
<u>Independent Audit of the ShotSpotter Accuracy</u>	<u>A.14</u>

Independent Analysis of the MacArthur Justice Center Study on ShotSpotter in Chicago

July 22, 2021

Prepared by:
Edgeworth Analytics

Prepared for:
ShotSpotter

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I. EXECUTIVE SUMMARY

ShotSpotter commissioned Edgeworth Analytics (“Edgeworth”) to review a study by the MacArthur Justice Center (“MJC”) published May 2021 and provide an independent evaluation of the claims contained in it. Based on our analysis, Edgeworth concludes that the MJC study fails to provide a rigorous, balanced, and objective assessment of the use of ShotSpotter in Chicago and is, at best, misleading because of the inappropriate data source used for the study, the selective choice of data and a fundamental lack of understanding as to where ShotSpotter was deployed relative to the highest homicide rate areas of Chicago.

Specifically, we conclude the following:

1. *The OEMC data that was the primary data source used to support the MJC study’s conclusions regarding “unfounded” CPD deployments is an inappropriate source on its own to determine the ultimate outcome of an individual incident and, therefore, is not a reliable measure of ShotSpotter’s efficacy. The MJC study’s interpretation is misleading because the data obtained from the OEMC is not designed to capture and account for any subsequent police action resulting from an initial ShotSpotter alert. The conclusion that the lack of a police report is a measure of ShotSpotter’s accuracy is baseless and misleading.*
2. *The MJC study mischaracterizes the placement of ShotSpotter technology as unduly burdening Black and Latinx communities. Specifically, it omits important context – that the placement is based upon areas of need across Chicago as measured by incidents of homicide and gun crime.*

In addition to this analysis, Edgeworth has conducted an independent review of ShotSpotter’s claims regarding accuracy in gunshot reporting and false positives—sending an alert of gunfire when none occurred. Specifically, Edgeworth examined ShotSpotter’s representation that its system has an aggregated 97 percent accuracy rate that includes a 0.5 percent false positive rate across all customers over the last two years. Our review confirmed that (1) these claims are valid and based on actual customer feedback from a broad range of ShotSpotter customers and (2) despite substantial variation in the intensity of reporting potential errors across clients, ShotSpotter’s accuracy rate does not appear to be sensitive to differences in clients’ propensity to report potential errors. The details of this analysis are provided in a separate report.

II. MACARTHUR JUSTICE CENTER REPORT

The MacArthur Justice Center (“MJC”) obtained Office of Emergency Management and Communications (“OEMC”) data on Chicago Police Department (“CPD”) deployments between July 1, 2019 and April 14, 2021 and prepared a study of calls for service (“CFS”) initiated by ShotSpotter alerts and 9-1-1 calls based on these data¹. The study’s findings were posted on an MJC-created website and included in an amicus brief filed

¹ Edgeworth notes that the MJC study focused on a period of time (July 1, 2019 through April 14, 2021) that included frequent and long-term protests, unprecedented gun-related violence in Chicago, and the global pandemic. Notably, the MJC study did not acknowledge that this period is not representative of the typical deployment period, and it did not attempt to demonstrate how this period differs from others. Interestingly, Edgeworth found that, while the raw number of ShotSpotter-initiated dispatches spiked during parts of this period, the rate of dispatches resulting in a crime or gun report remained relatively stable, casting some doubt on MJC’s raw number conclusions as being indicative of any credible conclusion outside of this tumultuous time period.

on May 3, 2021 in Cook County Circuit Court (the “Amicus Brief”). The study’s primary conclusions were that: (1) ShotSpotter-initiated alerts resulted in CPD finding no evidence of a gun-related crime or any crime the majority of the time during the period of study; (2) there were more than 40,000 “unfounded” deployments of CPD; and (3) these “unfounded” deployments were disproportionately in Black and Latinx neighborhoods where ShotSpotter is deployed.

III. EDGEWORTH ANALYTICS REVIEW

ShotSpotter commissioned Edgeworth Analytics to review the MJC study and provide an independent evaluation of the analysis contained in it.^[2] For our analysis, we reviewed: (1) the MJC study and an Amicus Brief that describes it in detail; (2) the same publicly-available OEMC data MJC used to draw its conclusions, which was provided to ShotSpotter by the CPD, (3) the academic literature; (4) publicly available CPD data; and (5) analyses conducted by ShotSpotter.

IV. WHAT IS SHOTSPOTTER?

According to a report from the Brookings Institution, 88 percent of gunshot incidents go unreported to police.² ShotSpotter intends to help solve that issue. According to ShotSpotter, the company offers law enforcement agencies an acoustic gunshot detection service that detects, locates, and alerts police to gunfire enabling a precise and rapid response to incidents that likely would have gone unreported to police. The system uses wireless sensors throughout a coverage area to capture loud, impulsive sounds that may be gunfire. The data are transmitted to a central cloud service that classifies each incident with a gunfire probability percentage along with a location determined by triangulation enabled by multiple sensors. Then, specially-trained ShotSpotter employees called “reviewers” located across two ShotSpotter Incident Review Centers listen to the recorded pulses from the sensors that detected the incident audio with playback tools, visually analyze the audio waveforms to see if they match the typical pattern of gunfire, assess the grouping of sensors that participated, and either publish the incident as gunfire or dismiss it as non-gunfire. ShotSpotter said the entire process typically occurs in less than 60 seconds from the time of the gunfire to the time law enforcement is alerted to allow for a timely law enforcement response. The gunfire alerts that are sent to ShotSpotter customers, including the CPD, have three recorded audio snippets that patrol officers can listen to before they arrive on the scene.

Below are examples of gunshot and non-gunshot audio provided by ShotSpotter that were captured by ShotSpotter sensors from various locations nationwide. Each example of gunshots includes the date of the event, the rounds fired, the audio that was shared with the local police department, and a redacted Investigative Lead Summary (ILS) report for the event. For non-gunshot events, each example includes the

² <https://www.brookings.edu/research/the-geography-incidence-and-underreporting-of-gun-violence-new-evidence-using-shotspotter-data/>

date of the event, the type of event, and the audio that was shared with the local police department (ILS reports are not generated for non-gunshot events.)

EXAMPLE AUDIO OF GUNSHOTS CAPTURED BY SHOTSPOTTER SENSORS

Date: July 13, 2021

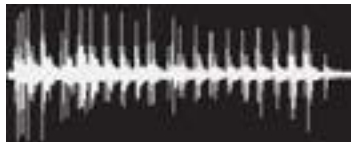
Rounds fired: 13



[Investigative Lead Summary](#)

Date: July 20, 2021

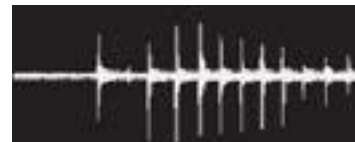
Rounds fired: 15



[Investigative Lead Summary](#)

Date: July 14, 2021

Rounds fired: 10



[Investigative Lead Summary](#)

EXAMPLE AUDIO OF NON-GUNSHOTS CAPTURED BY SHOTSPOTTER SENSORS

Date: July 18, 2022

Rounds fired: 13



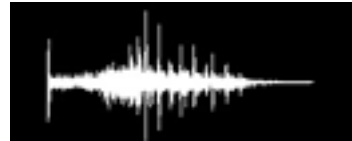
Date: July 20, 2021

Rounds fired: 15



Date: July 14, 2021

Rounds fired: 10



V. EDGEWORTH CONCLUSION: OEMC DATA CANNOT BE USED TO DETERMINE IF A SHOTSPOTTER ALERT IS IN FACT A GUNFIRE INCIDENT

At the outset, it is important to recognize that the OEMC is not an arm of the CPD, but instead a distinct office within the government of the City of Chicago. OEMC manages several functions, including 9-1-1 call intake and dispatch in addition to emergency management, traffic management, and other areas, according to OEMC's website.³ Consequently, OEMC data do not reflect the ultimate outcomes following subsequent investigations or reports that are created in the hours, days, weeks, and months after a CFS occurs. Only CPD's own police reports are able to capture the entire outcome of an investigation. This is a misapprehension at the heart of the MJC study as it used OEMC data for its analysis of police deployments based solely on ShotSpotter alerts. The MJC study erroneously interpreted its results to mean that "the ShotSpotter system generates nearly two-thousand alerts every month that turn up absolutely no evidence of gun crime—or any crime at all."⁴ The MJC study concluded that ShotSpotter alerts in Chicago during this time period are

³ OEMC website: <https://www.chicago.gov/city/en/depts/oem.html>

⁴ Motion for Leave to File Brief as Amici Curiae in Support of Defendant's Motion for a Frye Hearing, *The State of Illinois v. Michael*

“dead ends” that “reinforce[s] racial disparities in policing.”⁵

1. Disposition Codes Are Not a Reliable Measure of ShotSpotter’s Efficacy

To identify the outcome of a CFS, the MJC study relied on the “final disposition” code that law enforcement officers enter into the OEMC system when recording their findings at the scene of the reported event. The MJC study identified “unfounded” deployments as those where police assign a final disposition code of “Miscellaneous Incident,” which primarily corresponds to “Other Police Service” or “No Person Can Be Found.”⁶ However, as noted above, OEMC data is not designed to contain complete or updated information about any investigations about a potential criminal event and so may only contain a small part of a larger case file.

The MJC study said a Miscellaneous Incident code “did not even prompt police to file a case report.”⁷ However, this code does not provide information on whether a police report was filed or whether a criminal event occurred. Instead, it indicates the initial response to a CFS, and that is all. If a report is later filed or if there is follow-up to the initial event, there is no update to the disposition code. A possible scenario of such an instance might include police arriving at the scene of a reported “person shot,” but the injured person may have left the scene to seek medical attention. A disposition code of Miscellaneous Incident may be reported to OEMC for the CFS, but a police report may be subsequently filed at a local hospital by officers responding to a call from the hospital. Similarly, police may arrive at the scene of a “shots fired” CFS and find no person of interest or shell casings, but the next day a citizen may report property damage from a gunshot. As these examples illustrate, relying solely on OEMC final disposition data can result in incorrect interpretations of actual events and misleading conclusions about police responses to reports of gunfire.

Therefore, the disposition code alone is not a reliable measure of ShotSpotter’s efficacy, and we conclude the MJC study’s interpretation is misleading because the data obtained from OEMC does not appear to be designed to necessarily capture and account for any subsequent police actions as a result of an initial ShotSpotter alert.

To illustrate this issue, Edgeworth analyzed OEMC data on events where a call was made to 9-1-1 and a person was reported to have been shot in police districts both with and without ShotSpotter coverage. Between July 1, 2019 and April 14, 2021, there were 963 CFS for a “person shot” in police districts without ShotSpotter coverage.⁸ Of these, only 49 percent (469) included a final disposition code relating to a gun event.⁹ The same percentage of “person shot” CFS in police districts with ShotSpotter deployed included a final disposition code for a gun event -- 2,897 CFS for a person shot with 1,430 gun events, or 49 percent. This

Williams (20 CR 0899601), filed May 3, 2021 (“Amicus Brief”), Exhibit A, p. 2.

5 <https://www.macarthurjustice.org/shotspotter-generated-over-40000-dead-end-police-deployments-in-chicago-in-21-months-according-to-new-study/>

6 Miscellaneous Incidents are identified by final disposition codes beginning with “19.” See, Chicago Police Department, Miscellaneous Incident Reporting Table – CPD-11.484.

7 Amicus Brief, Exhibit A, p. 8.

8 Following the MJC’s approach as described in the Amicus Brief, throughout this report, the initial dispatch type coded for an OEMC dispatch record—whether it be an emergency 9-1-1 call or a ShotSpotter alert—is used to determine what initiated the deployment.

9 Note that the 51% of “unfounded” CFS for a person shot is not comparable to the MJC’s corresponding figure for ShotSpotter because it does not include other reports of gunfire, which constitute over 90% of the relevant CFS.

occurs because the final disposition code reported to OEMC at the scene of a reported event is not necessarily the end of the story. Using the MJC's flawed logic, one would conclude that CPD responses to 51 percent of the 9-1-1 calls from the public reporting that a person was shot were "unfounded" and generated "dangerous, unnecessary, and wasteful deployments."¹⁰

While the OEMC data can potentially provide useful information on initial responses, a Miscellaneous Incident code in the OEMC data is not sufficient to support the conclusion that a deployment was unfounded or that no crime occurred. The OEMC data, which report information on deployments, are not a substitute for case files and police reports that include details not only on the initial response, but also on any subsequent investigation.

2. Subsequent Identified Criminal Activity Is Unlikely to Be Connected Back to Police Deployment

Information on the time spent on CFS that is contained in the OEMC data help to illustrate why subsequently identified criminal activity is unlikely to be connected back to a police deployment.

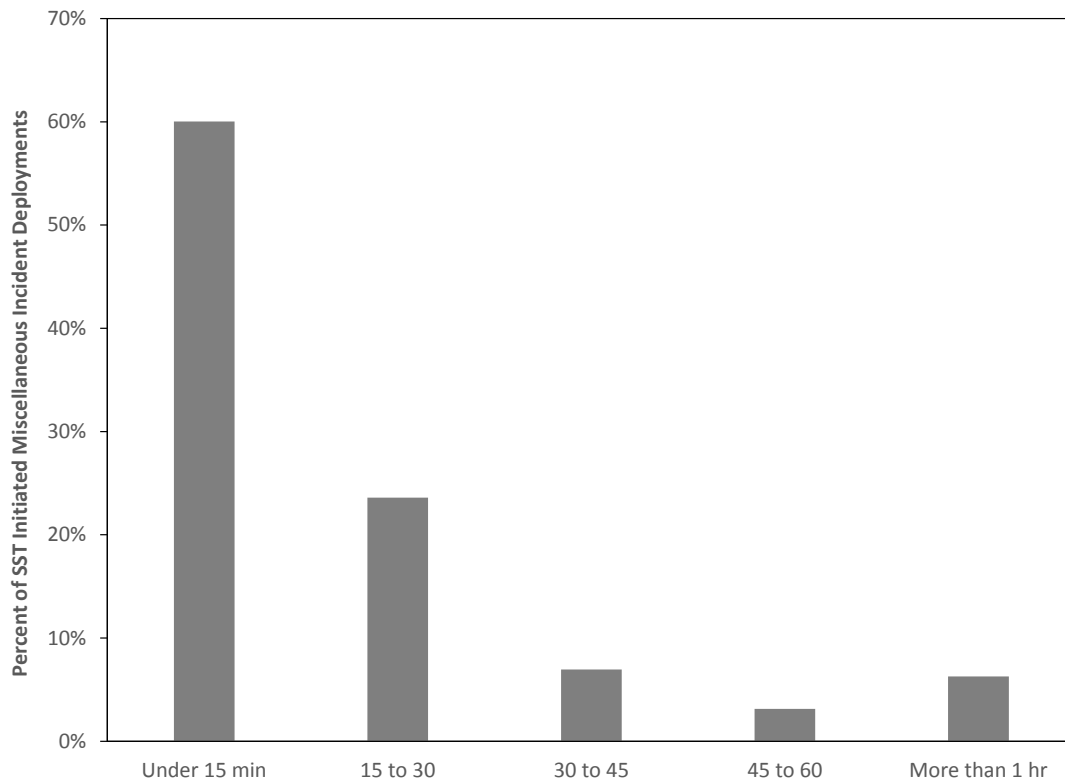
Specifically, an OEMC dispatch record captures: (1) the time when the deployment was initiated; (2) the location to which the deployment was made; (3) the reason for the deployment; (4) what was immediately found at the scene; and (5) the time when the deployment was closed. When the deployment is "closed," what was found (e.g., evidence, a victim, a perpetrator) is reported and the deployment is likely ended.

A core function of OEMC is to deploy an emergency response to an event. Therefore, deployments that do not require an immediate emergency response and result in Miscellaneous Incident reports, where no evidence of a crime is found at the time, are typically short-duration events, regardless of whether ShotSpotter or 9-1-1 calls reporting gunfire initiated the deployment. In both cases, the median duration of the deployment is 12 minutes, including the time for police to travel to the location. Figure 1 below shows the distribution of durations for ShotSpotter-initiated deployments recorded as Miscellaneous Incidents. The short duration of these deployments suggests that Miscellaneous Incidents in the OEMC data are typically concluded in a relatively short period of time and do not track any subsequent investigations or reports.

As our analysis demonstrates, the MJC study's analysis is misleading as it relies solely on the OEMC data which, by itself, is insufficient to assess ShotSpotter's effectiveness.

¹⁰ Amicus Brief, Exhibit A, p. 3.

FIGURE 1
DURATION OF MISCELLANEOUS INCIDENTS IN MINUTES
FOR OEMC DISPATCHES INITIATED BY SHOTSPOTTER
JULY 1, 2019 - APRIL 14, 2021



Source: Chicago OEMC dispatch data.

VI. EDGEWORTH CONCLUSION: THE MJC STUDY MISCHARACTERIZES THE DEPLOYMENT OF SHOTSPOTTER TECHNOLOGY

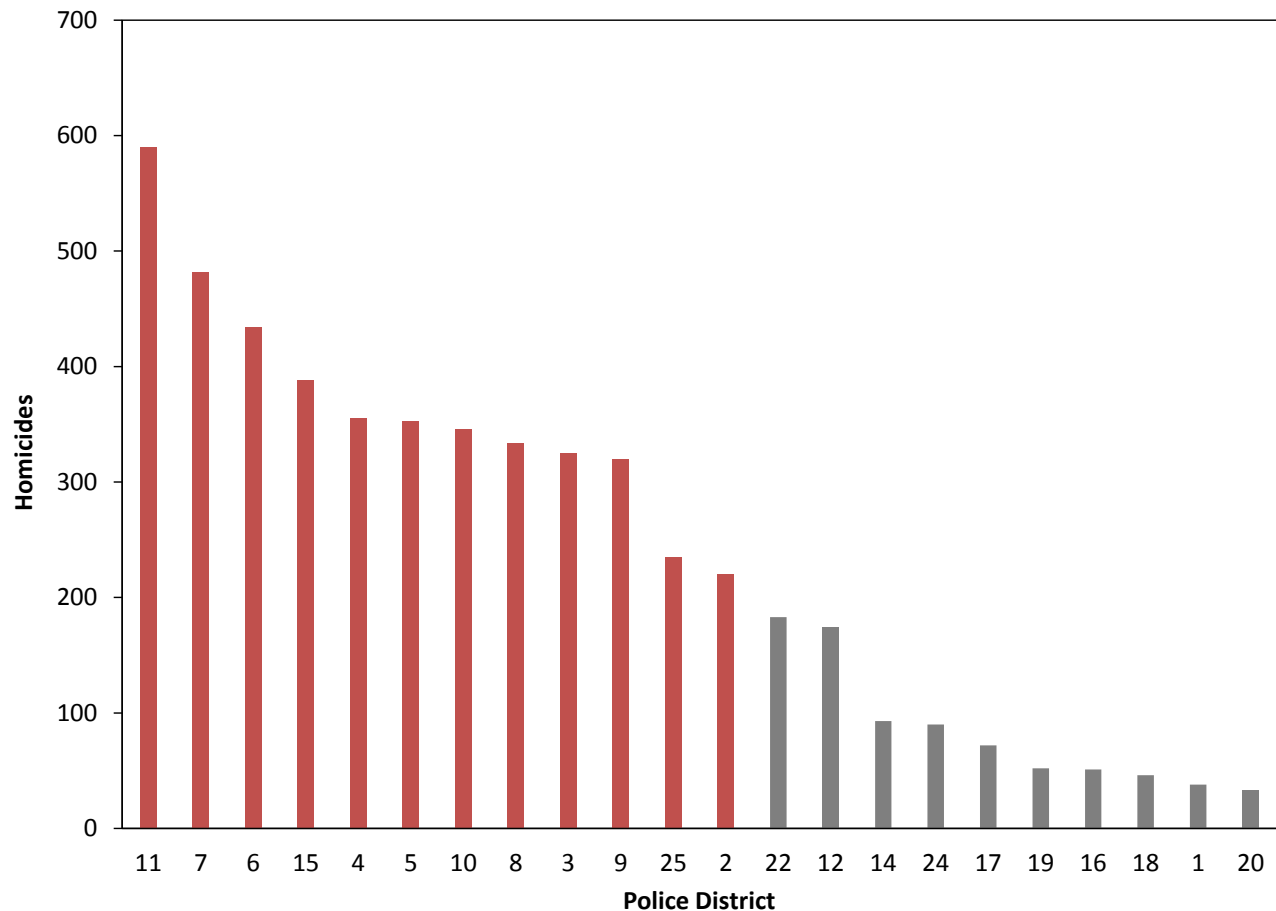
The MJC study claimed that ShotSpotter's pattern of deployment in Chicago is in predominately Black and Latinx neighborhoods and that the "unfounded ShotSpotter alerts...can create a false 'techwash' justification for racialized and oppressive patterns of policing in communities of color."¹² This claim appears to be entirely premised on the MJC study's improper conclusions addressed above.

ShotSpotter claims that coverage areas are typically determined by law enforcement and elected leadership using objective, historical data that prioritize areas of a city that experience the most gun violence. Edgeworth has confirmed that ShotSpotter deployments are indeed in the Chicago police districts where violent crime is disproportionately greater. For example, as shown in Figure 2, CPD homicide data show that the 12 police districts where ShotSpotter is deployed are the 12 police districts with the highest number of homicides between 2012 and 2021.

Similarly, applying OEMC data to 9-1-1 emergency calls (not including ShotSpotter alerts), the 12 police districts with ShotSpotter had more than 120 percent more deployments initiated by 9-1-1 emergency CFS for reports of gunfire (29,317) than the 10 other police districts (13,269) between July 1, 2019, and April 14, 2021.

¹² <https://endpolicesurveillance.com/burden-on-communities-of-color/>

FIGURE 2
HOMICIDES BY POLICE DISTRICT
DISTRICTS WITH SHOTSPOTTER COVERAGE AREAS HIGHLIGHTED IN RED
JANUARY 2012 TO APRIL 2021



Note: Police districts where ShotSpotter is deployed are in red and the remaining police districts are in gray. The shares of crime reports involving guns are proportionally the same as homicides by police district over the same period. Therefore, a graph of crime reports involving guns would be very similar to the above graph showing homicides.

Source: City of Chicago Data Portal, <https://data.cityofchicago.org/browse?category=Public%20Safety>.

VII. CONCLUSION

Edgeworth's analysis of the OEMC data used by the MJC and the conclusions it drew based on those data demonstrates that the MJC study is severely flawed. The OEMC data simply cannot be used to support the MJC's conclusions about whether gunfire or a gun-related crime occurred because they are an incomplete source of information. The unsupported conclusion that no police report of a crime for a deployment recorded in the OEMC data means no gunshot occurred can lead to incorrect interpretations of actual events and misleading conclusions about police responses to reports of gunfire. Indeed, the MJC's deeply flawed approach would implicate the 9-1-1 system—a critical, trusted tool for communities and law enforcement across the nation—as generating unnecessary police deployments 51 percent of the time when a person is reported as shot. Finally, the MJC's assertions regarding the deployment of ShotSpotter in predominantly Black and Latinx neighborhoods fail to consider that the deployment is consistent with an objective, data-based approach of using the ShotSpotter system where homicide and gun crime is most prevalent.

About Edgeworth Analytics

Through consulting and education, Edgeworth Analytics empowers professionals and organizations to unlock data's potential. Data is the lifeblood of every organization. But the amount and complexity of data grows every day. Using proven methods for gathering, structuring, analyzing, and applying data, we help companies transform their data from a source of anxiety to a consistent driver of stronger operational and competitive performance. Our unique approach to data analytics consulting is rooted in the expertise and real-world experience of our sister company Edgeworth Economics, a firm of PhD economists who rigorously apply economic principles and hard data to high-stakes litigation, regulatory, and other challenges.

Edgeworth Analytics makes data analysis accessible and easy to understand for practitioners across a range of business services—including human resources, sales, operations, strategy, and finance—as well as for those looking to better understand the effects of a proposed or existing policy, investment, or regulation on industries, local markets, regional economies or the global economy. In our consulting service, our team works closely with clients to deliver key insights and targeted recommendations, while providing a working understanding of sound data analysis long after the project ends. Our teaching program equips professionals to become comfortable with data and to better understand their KPIs and dashboards.

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Independent Audit of the ShotSpotter Accuracy

July 22, 2021

Prepared by:
Edgeworth Analytics

Prepared for:
ShotSpotter

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I. EXECUTIVE SUMMARY

According to a report from the Brookings Institution, 88 percent of gunshot incidents go unreported to police.¹ The ShotSpotter system is an acoustic gunshot detection service that detects, locates, and alerts police to gunfire, including those incidents that otherwise would have gone unreported. ShotSpotter enables law enforcement agencies to provide a precise and rapid response to detected incidents. The system uses wireless sensors throughout a coverage area to capture loud, impulsive sounds that may be gunfire. The data are transmitted to a central cloud service that classifies each incident with a gunfire probability percentage along with a location determined by triangulation enabled by sensors. ShotSpotter employees, located across two ShotSpotter Incident Review Centers, listen to the pulses from the sensors that detected the incident audio with playback tools, analyze the visual waveforms to see if they match the typical pattern of gunfire, and either publish the incident as gunfire or dismiss it as non-gunfire. The entire process is intended to take less than 60 seconds from the time of the gunfire to the time law enforcement is alerted to allow for a timely law enforcement response.

ShotSpotter claims that its system is 97% accurate and has a false positive rate—the rate at which gunfire is detected when none occurred—of 0.5%. To determine the accuracy rate for its system, ShotSpotter analyzes information from clients on possible errors, determines whether an error occurred, and catalogs any errors found. ShotSpotter commissioned Edgeworth Analytics to conduct an audit of the data and analyses that it uses to support its claims. Our audit has yielded 4 important insights:

- ShotSpotter published 146,804 and 233,966 gunfire alerts to clients in 2019 and 2020, respectively.² For these years across all clients, our audit confirmed that based on client reports ShotSpotter correctly detected gunfire with 97.59% accuracy.
- Across 2019 and 2020, the ShotSpotter system published alerts of gunfire when clients indicated that none occurred 0.41% of the time.
- Despite substantial variation in the intensity of reporting of potential errors across clients, ShotSpotter's accuracy rate does not appear to be sensitive to differences in clients' propensity to report potential errors.
- No single client exerts a disproportionate effect on ShotSpotter's overall error reporting rate such that the accuracy rate would change significantly.

This report discusses Edgeworth Analytics' approach to auditing ShotSpotter's data and analysis and our additional testing intended to ensure the validity of our results.

¹ <https://www.brookings.edu/research/the-geography-incidence-and-underreporting-of-gun-violence-new-evidence-using-shotspotter-data/>

² A small number of ShotSpotter accounts—six in 2019 and 12 in 2020—are for clients for which feedback was not expected. These included new clients, pilot programs, and clients who terminated their service, as well as some low volume clients. Excluding these accounts, there are 144,739 alerts in 2019 and 229,359 alerts in 2020 with an accuracy rate of 97.56% on average across the years.

II. SHOTSPOTTER DATA SOURCES

Edgeworth Analytics obtained data from ShotSpotter for 2019 and 2020. We discussed the data available and ShotSpotter's error tracking and reporting process with ShotSpotter personnel. Based on our discussions with ShotSpotter personnel, we requested the following data:

- The number of published incidents sent to clients, by location;
- Potential errors identified by clients for investigation and ShotSpotter's conclusions regarding those potential errors; and
- A sample of "Scorecards," which are documents sent to clients summarizing the activity detected and the error rates.

ShotSpotter data on published incidents are tracked in ShotSpotter's own systems. However, information on potential errors relies on clients reporting those potential errors to ShotSpotter. When an error report comes in from a client, ShotSpotter creates a ticket and the incident is reviewed. The conclusion of the review may result in one of several outcomes:

- A gunfire incident did not occur, but ShotSpotter published an alert for one—this is referred to as a "false positive";
- A gunfire incident occurred and ShotSpotter detected it, but an alert was not published for gunfire—this is referred to as a "false negative";
- A gunfire incident occurred and was not detected by ShotSpotter—this is referred to as a "missed" incident;
- ShotSpotter failed to identify the location of the gunfire to within 25 meters of the actual location—this is referred to as a "mislocated" incident; or
- The error report was incorrect, or the incident was one that ShotSpotter is not intended to detect, such as gunfire outside the coverage area, indoors, or of a small caliber weapon (i.e., less than 25mm).

We used these data to conduct our audit.

II. EDGEWORTH ANALYTICS AUDIT RESULTS AND ROBUSTNESS CHECKS

First, Edgeworth conducted an analysis to ensure that the data were complete and accurate. Specifically, we compared the published incidents and errors detected in the Scorecards to those in the underlying data we received. Our analysis confirmed that the data appeared to be complete and accurate.

Once the data were validated, we reviewed the data and consolidated it into a format suitable for our analysis. This involved combining reporting of events across data sources and reviewing data fields and the possible outcomes of error reports. Using these data, we independently calculated the accuracy across the categories ShotSpotter uses for its reporting. Our analysis confirmed that the accuracy rate across all

ShotSpotter clients for 2019 and 2020 was 97.42% and 97.70%, respectively. Having audited and validated ShotSpotter's claims, we conducted additional analyses to confirm that these results are robust.

Since accuracy reporting depends on clients informing ShotSpotter of potential errors, we tested whether differences in the intensity of reporting may have unduly influenced the reported accuracy. For example, if a client with a relatively high level of incidents rarely reports potential errors, then the reported accuracy rate may be higher than the actual rate. To test for this issue, we identified the areas where the intensity of reporting potential errors was at or below the 5th and 10th percentile of client reporting intensity. As shown in Table 1 below, if these clients are removed from the data entirely—an extreme test—then the overall accuracy would decrease by less than 1%. Alternatively, assuming these clients with low reporting intensity all had the reporting intensity of the 5th or 10th percentile client and that all additional reports were erroneous ShotSpotter alerts, the overall accuracy rate would again decrease by less than 1%. These accuracy rates are not statistically significantly different from the overall accuracy rate for all ShotSpotter clients.

FIGURE 1
SHOTSPOTTER ACCURACY RATES
BY EXCLUSION THRESHOLD
2019 AND 2020

ShotSpotter Alerts [a]	Year [b]	Client Feedback Rate Threshold		
		All Data [c]	>5th Percentile [d]	>10th Percentile [e]
Excluding Selected Accounts	2019	97.39%	97.03%	96.65%
	2020	97.66%	97.26%	96.96%
All Data	2019	97.42%	97.40%	96.81%
	2020	97.70%	97.68%	97.68%

Note: Excluded accounts include new, pilot program, and service terminated clients as well as clients from which feedback was not expected.

Source: ShotSpotter.

About Edgeworth Analytics

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Edgeworth Analytics makes data analysis accessible and easy to understand for practitioners across a range of business services—including human resources, sales, operations, strategy, and finance—as well as for those looking to better understand the effects of a proposed or existing policy, investment, or regulation on industries, local markets, regional economies or the global economy. In our consulting service, our team works closely with clients to deliver key insights and targeted recommendations, while providing a working understanding of sound data analysis long after the project ends. Our teaching program equips professionals to become comfortable with data and to better understand their KPIs and dashboards.

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Exhibit 17



C L A R E L O C K E

L L P

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August 23, 2021

Via Email

Rachel Strom
Davis Wright Tremaine LLP
1251 Avenue of the Americas, 21st Floor
New York, NY 10020
Email: rachelstrom@dwt.com

Re: Retraction Demand: “More Cities Are Moving to Drop Automated Gunshot-Detection Tech” (August 3, 2021)

Dear Ms. Strom:

I write again on behalf of my client, ShotSpotter, Inc. On August 3, 2021, Vice Media LLC, Jason Koebler, and Todd Feathers published a story by Todd Feathers titled “More Cities Are Moving to Drop Automated Gunshot-Detection Tech” (the “August 3 Article”),¹ which contains additional false and defamatory statements and reiterates some of Vice’s prior false and defamatory statements that were discussed in my letter dated August 16.

First, the title “More Cities Are Moving to Drop Automated Gunshot-Detection Tech” is false and defamatory. Neither of the two cities discussed in the article (Chicago and San Diego) have “mov[ed]” to cancel ShotSpotter contracts. In fact, Chicago’s contract was just renewed. Further, the headline falsely implies that ShotSpotter was experiencing a wave of contract cancellations prior to Vice’s false and defamatory articles. That is not the case.

¹ Todd Feathers, *More Cities Are Moving to Drop Automated Gunshot-Detection Tech*, Vice (Aug. 3, 2021), <https://www.vice.com/en/article/88nekp/more-cities-are-moving-to-drop-automated-gunshot-detection-tech>.



Second, the August 3 Article features the sub-title: “Experts say ShotSpotter is unreliable and disproportionately calls armed police into Black and brown neighborhoods.” The article does not cite a single “expert” who has determined that ShotSpotter is unreliable; rather it cites the McArthur Justice Center’s so-called “study” that was prepared by *law students*—not statisticians. Rather, Edgeworth Analytics—the only outside expert involved—concluded ShotSpotter’s published 97% accuracy rate is sound.

Third, the August 3 Article states that “[r]ecent Motherboard investigations found ... that ShotSpotter analysts who prepare forensic reports for criminal trials have changed the system’s original findings about the number and location of gunshots—sometimes in ways that support police narratives that aren’t backed by any physical evidence” [sic]. This representation is false for the reasons discussed in my August 16 letter.

Finally, the August 3 Article again cites the “study” from the McArthur Justice Center,² without disclosing the organization’s anti-police-technology advocacy mission and its corresponding heavy bias, as discussed in my August 16 letter.

* * * * *

To mitigate the harm to ShotSpotter, we demand that Vice and Mr. Feathers each immediately retract the August 3 Article or, at a minimum, retract the specific false statements from the August 3 Article identified in this letter and any social media posts repeating or elaborating upon these patently false claims. For avoidance of doubt, this constitutes ShotSpotter’s formal demand for a retraction pursuant to Cal. Civ. Code § 48a or similar retraction-demand provisions that may apply in a legal proceeding arising from the publication of defamatory falsehoods in the August 3 Article.

Given the seriousness of the August 3 Article’s false allegations and the likelihood that litigation will result from its defamatory claims, Vice and Mr. Feathers must immediately retain—and direct all other persons involved in any way in the research, drafting, editing, fact-checking, or publication of the August 3 Article to retain—all documents, electronically stored information, and other materials relating in any way to ShotSpotter and the August 3 Article, including without limitation all electronic communications, hard-copy documents, text messages, photographs, phone records, emails, social media posts, internet search histories, drafts, markups, and communications with sources. These retention requirements apply with equal force to communications and materials stored or transmitted on personal or professional devices, servers, or accounts.

This is not intended to be a complete statement of ShotSpotter’s rights and remedies, all of which are expressly reserved. Our review of Vice’s ShotSpotter coverage remains ongoing, and we will address the falsehoods from subsequent articles in future correspondence. Please confirm

² “In Chicago, the MacArthur Justice Center recently released a study that found police did not file a report of a crime in 86 percent of the cases initiated by a ShotSpotter alert.”



receipt of this letter and that you intend to adhere to our request to retain documents as set forth above. We look forward to your prompt response, no later than September 6.

Very truly yours,



Thomas A. Clare, P.C.

Exhibit 18

From: Kayla Cardoza kayla@clarelocke.com 
Subject: Time-Sensitive Legal Correspondence regarding ShotSpotter, Inc.
Date: September 21, 2021 at 9:43 PM
To: rachelstrom@dwt.com
Cc: Tom Clare tom@clarelocke.com, Megan Meier megan@clarelocke.com, Amy Roller Amy@clarelocke.com

Ms. Strom,

Please see the attached correspondence from Tom Clare and Megan Meier. Due to their size and format, the referenced attachments are available for download here:

<https://clarelocke.box.com/s/thz5lnsqh5nlj39rc71wor3zkpoxi8k1>.

Please let me know if you have any trouble accessing these documents.

Sincerely,

Kayla Cardoza | Case Manager
C L A R E L O C K E L L P
10 Prince Street | Alexandria, Virginia 22314
(202) 899-3873 - direct
kayla@clarelocke.com | www.clarelocke.com

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September 21, 2021

Via Email

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**Re: Retraction Demand for July 29, 2021 Episode of VICE's "CYBER" Podcast
And Supplement to Our August 16 Retraction Demand**

Dear Ms. Strom:

We write once again on behalf of our client, ShotSpotter, Inc.

On September 7, 2021, ShotSpotter discovered that an episode of VICE's "CYBER" podcast contains false and defamatory statements. VICE published the episode, titled "Gig Work Sucks, Just Ask Uber and Lyft Drivers," on July 29, 2021.¹ In the podcast, beginning around the 00:20:00 mark, VICE employees Ben Makuch and Lorenzo Franceschi-Bicchierai make the following false and defamatory statements about ShotSpotter:

Franceschi-Bicchierai: ... And [ShotSpotter is] designed to detect when a gunshot goes off; the technology relies on algorithms. There's also some human review, which is not automatic. I think it just comes into play if there's some [00:20:00] issue. And this is the story here centers around the case in Chicago, where a 60 year old man is accused of murdering a 25 year old; the accused claims that he wasn't, it was

¹ Matthew Gault, *Gig Work Sucks, Just Ask Uber and Lyft Drivers*, VICE (July 30, 2021), <https://www.vice.com/en/article/g5gkvy/gig-work-sucks-just-ask-uber-and-lyft-drivers>.



the other man was shot in a drive by shooting, and you just picked him up and brought him to the hospital.

And the key evidence in the case is a report from ShotSpotter that places the shooting at [00:20:30] a certain location, but it turns out that the shooting was a little bit further. And the defendant's lawyer essentially is arguing that this technology is not reliable, should not be entered into the case. And it's completely moot. And what's interesting here is that the prosecutor that essentially said, you know what, we're not going to use this evidence anymore. Let's drop the evidence, which, some of the experts interviewed in the piece essentially argue that [00:21:00] this is a clear sign, that the police does not want to talk about how this technology works, does not want to really get into how it was used in this case, because if this was entered into evidence, then the defense would have the right to really see all the nitty and gritty of how this worked. And to Motherboard and CYBER listeners, these may sound familiar. Years ago, there were a lot of stories about stingrays, which are surveillance devices that the police uses to intercept [00:21:30] text messages and locate people using cell phones. And years ago, there were many cases where the police also dropped this kind of evidence in an attempt not to disclose how the technology actually worked.

Makuch: And I want to highlight something very specific from this story too that I thought was really interesting. It's not just that they backed away from in this particular case that they backed away from using the evidence. It appears based on documents that the man's public defender was able to turn up, that someone had accessed the ShotSpotter data and altered it so that something that had been registered as a firework in the database was then called a gunshot later. And they had also moved, you said this, but specifically moved the location at which that shot was heard. And then as soon as someone called them on it, they abandoned it completely. So just think it's interesting when we [00:22:30] have these new technologies, especially with forensic science, where we have something that's that supposedly is going to tell us objectively really what's occurred and where we have to be very careful, especially when we're talking about sending people to jail for a very long time.

Franceschi-Bicchierai: And it's important to note that this is not the only case where evidence has been withdrawn and Todd, the author of the piece also delves into another case where a jury acquitted a defendant because you know, citing, ShotSpotter's unreliability. So there's a history of controversial use of this evidence.

As previously explained, VICE's defamatory accusations about ShotSpotter are false. ShotSpotter never fabricates evidence, and it does not alter its conclusions to cater to law enforcement or prosecutors. ShotSpotter simply presents the facts, regardless of whether those facts



lead to convictions or acquittals. Indeed, ShotSpotter evidence and expert testimony have repeatedly helped exonerate the innocent. ShotSpotter's technology has been used in over 200 court cases and survived scrutiny in at least 15 *Frye* or *Daubert* hearings, several transcripts of which are attached for your convenience. VICE's agents fundamentally misrepresented these and other court records in their defamatory reporting about ShotSpotter.

For example, VICE falsely claimed that ShotSpotter had "fabricated gunshots from thin air"² in the *Simmons* case, that "the ShotSpotter audio files that were the only evidence of the phantom fifth shot have disappeared,"³ and that "Shotspotter and the Rochester police mysteriously deleted all audio recorded. Blatant corruption."⁴ These statements are demonstrably false. No shots were "fabricated," nor did any recordings of shots disappear. ***Five separate audio recordings*** of the fifth shot exist, each captured by a different audio sensor. Those recordings were introduced as Exhibit 120 during Mr. Simmons's trial and played for the jury. Before publication, VICE knew or recklessly disregarded this fact, which is readily apparent from the *Simmons* court records that Feathers mischaracterized in the story and that Koebler mischaracterized in the tweets. We attach those audio recordings—and ShotSpotter's detailed forensic report for the *Simmons* case—for your convenience.

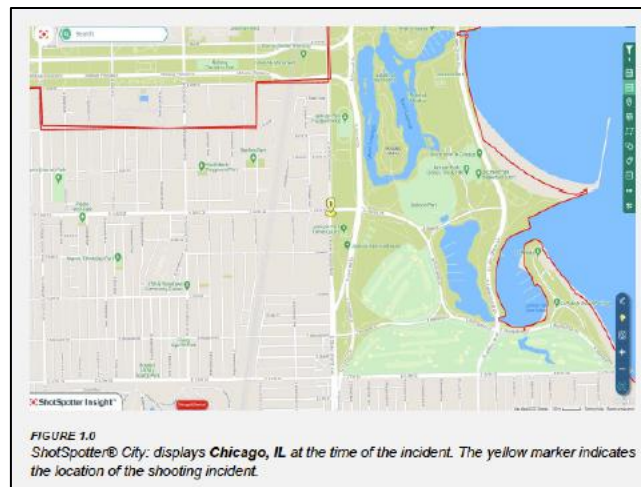
VICE likewise fundamentally misrepresented *Illinois v. Michael Williams*, No. 20 CR 0899601 (Cook Cty.). Specifically, VICE falsely claimed that ShotSpotter had changed the location of the gunfire by "more than a mile" in order to support the prosecutor's theory of the case.⁵ That is demonstrably false. ShotSpotter's real-time alert accurately geolocated the shots at longitudinal and latitudinal coordinates near South Stony Island Avenue and East 63rd Street, on the edge of a large park with an entrance with a street address of 5700 South Lake Shore Drive. This is explained and depicted in ShotSpotter's detailed forensic report of the incident:

² Jason Koebler (@jason_koebler), Twitter (July 26, 2021, 10:09 am), https://twitter.com/jason_koebler/status/1419661153278513157.

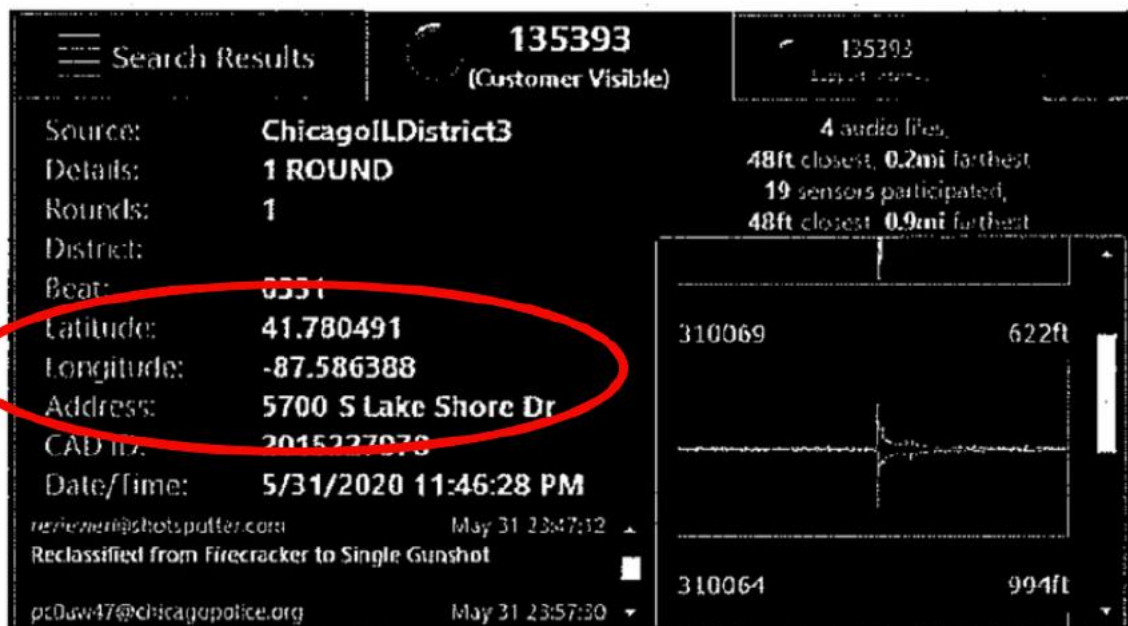
³ Todd Feathers, *Police Are Telling ShotSpotter to Alter Evidence From Gunshot-Detecting AI*, VICE: Motherboard (Jul. 26, 2021), <https://www.vice.com/en/article/qj8xbq/police-are-telling-shotspotter-to-alter-evidence-from-gunshot-detecting-ai>.

⁴ Jason Koebler (@jason_koebler), Twitter (July 26, 2021, 10:17 am), https://twitter.com/jason_koebler/status/1419663131853402113.

⁵ Specifically, VICE stated that "months later and after 'post-processing,' another ShotSpotter analyst changed the alert's coordinates to a location on South Stony Island Drive near where Williams' car was seen on camera."



Although the street address for the entrance to the park is approximately a mile away from the coordinates of the intersection where ShotSpotter geolocated the gunfire on the edge of the park, Feathers knew before publication that ShotSpotter did not change the location of the gunfire by “more than a mile,” but that ShotSpotter’s real-time alert had provided law enforcement with *both* the street address for the entrance to the park *and* specific latitudinal and longitudinal coordinates corresponding to the intersection on the edge of the park—as evidenced from the screenshot featured in the defamatory VICE article itself:



Moreover, after ShotSpotter learned that prosecutors sought to prove that Williams had shot the victim inside a car, ShotSpotter refused to provide expert testimony in the case because—as set forth in ShotSpotter’s contracts—ShotSpotter’s technology is only guaranteed to identify and locate



shots fired outdoors, not inside a car.⁶ That led prosecutors to nolle prose the case. In other words, ShotSpotter evidence was not withdrawn to avoid scrutiny of its technology as VICE falsely claimed, but because ShotSpotter exercises appropriate restraint in only offering expert conclusions that are supported to a reasonable degree of scientific certainty.

In light of the above and to mitigate the ongoing harm to ShotSpotter, we again demand that VICE retract its false and defamatory accusations about ShotSpotter. We remind VICE of its ongoing obligation to retain all materials relevant to these matters, including materials relating to the podcast we recently discovered and all of VICE's other publications about ShotSpotter.

This is not intended to be a complete statement of ShotSpotter's rights and remedies, all of which are expressly reserved. We look forward to your prompt response.

Very truly yours,


Thomas A. Clare, P.C.


Megan L. Meier

Enclosures

⁶ ShotSpotter's contract with Chicago explains that it is only accurate for "Detectable Gunfire," which is defined to mean "unsuppressed discharges of ballistic firearms which occur fully outdoors in free space (i.e. not in doorways, vestibules, windows, vehicles, etc.)." The detailed forensic report states that ShotSpotter can only detect "outdoor incidents" and notes that "[o]ther factors, such as ... weapon discharge in an enclosed space" can interfere with the sensors.

Appendix

1
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3
4
5 IN THE SUPERIOR COURT
6 STATE OF CALIFORNIA, COUNTY OF ALAMEDA
7 BEFORE THE HONORABLE C. DON CLAY, JUDGE
8 DEPARTMENT NUMBER 6

9 ---oOo---

10 THE PEOPLE OF THE STATE OF CALIFORNIA,)
11)
12 Plaintiff,) No. 19-CR-016277
13 vs.)
14 FRED BATES,)
15 Defendant.)
16

17 FELONY JURY TRIAL - TESTIMONY OF PAUL GREENE

18 WEDNESDAY, JULY 7, 2021

19 RENE C. DAVIDSON COURTHOUSE
20 OAKLAND, CALIFORNIA

21 A P P E A R A N C E S

22 FOR THE PEOPLE: SEAN FLYNN
23 Deputy District Attorney

24 FOR THE DEFENDANT: ANDREW DOSA
25 Attorney at Law

26
27
28 REPORTED BY: Danielle A. DeWarns, CSR #9743

1 WEDNESDAY, JULY 7, 2021

AFTERNOON SESSION

2
3 P R O C E E D I N G S

4
5 THE COURT: Good afternoon, counsel and Mr. Bates.

6 MR. FLYNN: Good afternoon.

7 THE DEFENDANT: Good afternoon, Judge.

8 THE COURT: So we have here a question on the 402 on
9 the issue of a Kelly-Frye regarding it's supposed to be a
10 scientific -- new scientific testing, or is this -- procedure,
11 or is this just for the purposes of establishing that they
12 heard some shots? I'm trying to figure out what you guys --
13 what the purpose of the ShotSpotter is here in these
14 proceedings because it's not going to identify -- the only
15 issue I see in front of the Court, at least what I heard from
16 you, gentlemen, is that -- whether or not somebody reacted to
17 hearing some particular shots. Nobody can say an association
18 of the sound to Mr. Bates. All it says is that we heard some
19 sounds that came off on our system as shots being fired at the
20 time that the shots were -- after we heard the sounds. It was
21 very close in time to when we believe that the witness says
22 she was shot. Is that it, or are you telling me something
23 else?

24 MR. FLYNN: More or less, your Honor. My
25 understanding from the PX, and just my conversations with
26 Mr. Dosa, is that there's going to be some question as to
27 whether this encounter between Ms. Stocker and the defendant
28 occurred in the area of 42nd and International or a few blocks

1 up the street on Bond Street.

2 There's also a defense witness under subpoena, Ms.
3 Lea, I believe, L-e-a, who, it's my understanding, will
4 testify that there was no shooting in the area of 42nd and
5 International. So this ShotSpotter evidence, I would seek to
6 admit it to corroborate Ms. Stocker just to the fact there was
7 a shooting where she says she was shot.

8 THE COURT: So -- I see. It is a little different.
9 Someone says there was no shots in the area. What you got was
10 an alert from the system saying there's shots in this
11 particular area. So you're going to bring in the evidence for
12 the purpose of saying that this is inconsistent, or at least
13 it supports what our theory is in that this may question her
14 credibility as to what she saw or, I mean, what she
15 perceived.

16 MR. FLYNN: Exactly.

17 THE COURT: That's the purpose of your admission,
18 you wanting the Court to review and Counsel have an
19 opportunity to cross to determine whether or not there's
20 foundation shown to bring this in for the purposes of its
21 ability to isolate.

22 MR. FLYNN: Yes, and the Hardy decision that I
23 referenced. It did call into question -- I think it is a
24 generally accepted scientific procedure. Mr. Greene will
25 testify that it's nothing particularly new or novel, but the
26 Court of Appeal did indicate that that was not shown in the
27 Hardy case.

28 THE COURT: Well, that case is a 2018 case. It

1 appears to me at the time they said there was only two cases
2 that had, in fact, cited the ShotSpotter technology in
3 California. It was a case in another jurisdiction where they
4 did have a 402 Kelly hearing to bring in testimony about the
5 science, what they did, what the -- the relationships to
6 sounds or technology. But, in that case, the idea was that
7 the prosecutor indicated he wasn't offering the information
8 for the truth of certain facts which in that case there was a
9 question of an officer doing some surveillance and saying that
10 he heard six or seven shots being fired, and that it could --
11 if a revolver could only shoot six or five and then that
12 became an issue because they were saying there were seven
13 shots fired, at least they heard in the Spotter, which would
14 make it an automatic versus a revolver which would put -- they
15 found the defendant in that case with an automatic. And so
16 it's consistent he was the one that shot, right?

17 MR. FLYNN: That's correct.

18 THE COURT: They were offering for the truth of the
19 matter that, in fact, yeah, that was true and that he was
20 shooting an automatic and would support and only corroborate
21 evidence of a potential automatic being used if you looked at
22 what the testimony was from that Officer Rosen, I think it
23 was --

24 MR. FLYNN: Correct.

25 THE COURT: -- which he said was six or seven shots.
26 And the prosecutor said he wasn't using it for those purposes
27 from the beginning, and then they end up saying that they were
28 using it in the closing statements. They asked for the

1 truth.

2 MR. FLYNN: That's correct, your Honor. I'm not
3 trying to do anything like that. I am simply introducing this
4 evidence to show that there was a gunshot recorded in this
5 general area --

6 THE COURT: Yeah.

7 MR. FLYNN: -- at this time.

8 THE COURT: Mr. Dosa? So go ahead, Mr. Dosa. That
9 apparently is -- that's what the focus of -- at least he's
10 going to bring his witness in to talk about the technology and
11 how -- how it operates, I assume, but it's a little different
12 than in the case that was cited and the Court reviewed out of
13 this jurisdiction, all right. So now I kind of understand.

14 Anything further you want -- I'm trying to
15 figure out what you guys were talking about. Now I'm getting
16 a little bit better from him.

17 MR. DOSA: Yeah. I'm kind of stuck in a tweeter
18 place. I'm not really sure exactly if I'm satisfied with what
19 I'm about to concede, but if we look at Hardy, the Court there
20 said I don't have to -- the Court of Appeals said we don't
21 have to determine that ShotSpotter has been accepted in the
22 scientific community. It can be used to explain that the
23 police officer responded with information that such-and-such
24 happened. And I suspect, your Honor, that realistically if
25 you were going to address that issue, I wouldn't be surprised
26 if you were inclined to say it's not offered for the truth.
27 It's offered for an explanation for why the officers went
28 there and they responded. And then in the context of that,

1 the jury can do what it wishes.

2 I mean, we -- the only way I think that we can say
3 the ShotSpotter is absolutely certainly correct as a -- as
4 identifying a shot there is if we go through and establish it
5 as a scientifically accepted technology. And so it's between
6 those two where we explain two officers going to the scene and
7 doing their investigation.

8 By the way, those two officers did bump into
9 Kimberly Lea who is a witness that I've subpoenaed. I will
10 subpoena her again because we have a new date.

11 THE COURT: Okay.

12 MR. DOSA: And her comments to them were, I heard
13 some shots over on the other side of Smart & Final or
14 something to that effect.

15 THE COURT: Okay.

16 MR. DOSA: There was no shot here.

17 THE COURT: Okay.

18 MR. DOSA: And I will say our -- my defense position
19 is that there's no evidence that Mr. Bates was at 42nd and
20 International other than Ms. Stocker. So the jury can believe
21 that or not. And-- and then I've got an alibi witness at
22 that time, at 3:17 a.m., three or four blocks away. So I
23 mean --

24 THE COURT: There's no question based upon what
25 you've both said and the testimony -- the prior testimony that
26 you cite. The reference is that there's no question she got
27 shot. The question is who shot her.

28 MR. DOSA: And where. But that's -- we may not be

1 able to answer that one.

2 THE COURT: She's the only one right now, as I see
3 it from you, except for the fact that they're saying -- I
4 mean, the ShotSpotter is only going to tell you, yeah, there's
5 shots fired. And it also is a range, so I don't know how that
6 range -- it's going to weight and the jury will decide, yeah,
7 it could be over here and it could be over here and you can
8 map it out, how does that fit with the testimony. So why
9 don't you go ahead and call your witness.

10 But -- absolutely you guys -- you, gentlemen, both
11 have arguments to both sides as it relates to this issue.

12 MR. FLYNN: I'll step outside.

13 MR. DOSA: So can I just ask, are you going to
14 present him with the idea of getting the Court to agree that
15 the ShotSpotter meets the Kelly-Frye requirements and should
16 be admitted?

17 MR. FLYNN: Yes. I'm seeking to admit the
18 ShotSpotter from 42nd and International for the truth of the
19 matter that there was a shot fired in that area at that
20 time.

21 MR. DOSA: Okay.

22 THE COURT: Okay.

23 MR. FLYNN: Your Honor, the People are going to call
24 Mr. Paul Greene.

25 THE COURT: Come on up, Mr. Greene.

26 THE CLERK: Please stand and raise your right hand.

27 PAUL GREENE

28 called as a witness by the People,

1 having been first duly sworn, was
2 examined and testified as follows:

3 THE CLERK: Please be seated. Please state and
4 spell your name for the record.

5 THE WITNESS: My name is Paul Greene spelled
6 P-a-u-l. G-r-e-e-n-e.

7 THE COURT: All right, Counsel.

8 DIRECT EXAMINATION

9 MR. FLYNN: Q. Good afternoon, Mr. Greene.

10 A. Afternoon, sir.

11 Q. Where are you currently employed?

12 A. I'm employed at ShotSpotter Incorporated.

13 Q. What is your current position with ShotSpotter
14 Incorporated?

15 A. I'm the forensic services manager at ShotSpotter.

16 Q. And what does that entail?

17 A. Um, my primary function is to still analyze gunshot
18 incidents as captured by the ShotSpotter system; produce
19 reports for evidentiary purposes; to testify as an expert
20 witness. But, additionally, I have a hand in policies and
21 procedures regarding how our forensics work. I also do a lot
22 of beta testing of software, training of prosecutors, training
23 of customers.

24 Q. Okay. Before we go any further, can you just in a
25 general sense tell us what ShotSpotter does?

26 A. Certainly. ShotSpotter is an acoustic gunshot
27 detection location system. We install a number of microphone
28 sensors in a geographic area that our customer has identified.

1 Those sensors listen specifically for the sound -- impulsive
2 noises, typically gunfire. Anything bang, boom or pop. When
3 they detect those impulsive noises, they report the times that
4 those sounds were detected back to a central server.

5 The central server then uses those times to
6 calculate the geographic location of where that impulsive
7 noise or gunshot originated. We then try to characterize it
8 or classify it as a type of incident being gunfire or
9 non-gunfire.

10 It gets sent to an incident review center where a
11 human reviewer listens to the audio clip of the incident, and
12 then it gets reported to our customers 911 center.

13 Q. Thank you. Can you describe any training or
14 educational background that you use as an employee at
15 ShotSpotter?

16 A. Nothing specific. I have a high school diploma. I
17 have some college worth -- working toward a computer science
18 degree but that's incomplete. Most of my training has been
19 on-the-job over 14 years.

20 Q. And that's 14 years at ShotSpotter?

21 A. 14 years at ShotSpotter.

22 Q. Can you briefly describe some of the on-the-job
23 training that you've received over your time there?

24 A. Certainly. Well, it's easier to describe some of the
25 functions that I've served at ShotSpotter. My first function
26 was as a -- essentially a military training technical writer
27 where I had to learn how ShotSpotter worked inside and out so
28 that we publish a military training and technical manuals.

1 At the time, the ShotSpotter was competing for
2 military contracts, so I used a lot of training experience
3 that I had gained through prior government contracts to
4 facilitate this. So after that, I went to work for the
5 customer support department in that -- supporting all of our
6 public safety customers, typically police departments, doing
7 their database administration, dealing with the location
8 server software, installations, being the front end and the
9 backend of live-fire testing. I spent a lot of time doing
10 live-fire research and development testing with ShotSpotter,
11 setting up ShotSpotter systems in the field and firing live
12 weapons against them. And then eventually working with our
13 company founders and chief engineers, I was instructed in
14 techniques and how to analyze these gunshot incidents using
15 our in-house software.

16 Q. Okay.

17 A. And since 2008, or so, I have been performing forensic
18 examinations of ShotSpotter events.

19 Q. So can you explain what the live-fire testing that you
20 referenced consists of?

21 A. Certainly. Well, in regards to the military testing,
22 it would entail taking a number of ShotSpotter sensors out
23 into a military testing range, setting them up, setting up the
24 software on portable computers, firing any number of rounds
25 against those systems and recording the results. Essentially
26 what we're trying to find is survey the location of where the
27 shooter actually stands and then compare the results of what
28 the system detects and locates.

1 We also do live-fire testing for all of our new
2 customers when we install a new ShotSpotter system. We have
3 the police department in that municipality, and they get with
4 us and they work with us and set up a 1, 2, 3 or more firing
5 points in the coverage area, inside the city. They set up a
6 bullet trap. They notify the general public in the area.
7 They fire anywhere from 10 to 30 rounds of ammunition per
8 firing point and we compare the results, where the shooter was
9 actually standing versus how many rounds were detected and how
10 close to the actual shooting location they were located.

11 Q. So it's essentially a police officer in the field
12 testing the accuracy of the sensors?

13 A. Yes.

14 Q. By firing a gun?

15 A. Yes, sir.

16 Q. And you mentioned you didn't have any formal
17 educational training, but prior to working in ShotSpotter, did
18 you have a background in law enforcement, or the military, or
19 something involving firearms?

20 A. Um, yes, sir. Military, primarily. I would -- I'm
21 not -- I don't have a law enforcement history, but I did serve
22 eight years in the United States Marine Corps. I shot
23 competition rifle and pistol, served in the first Gulf War.
24 Many different weapon types I've qualified within the Marine
25 Corps. I've been a life-long shooter.

26 The -- after leaving the Marine Corps. I went into
27 information technology. I spent about 10 years working in New
28 Mexico and Texas in various IT contracts as a database

1 administrator, as an installer, as a project manager.

2 And then after that I went to work for the United
3 States government for a company, a contractor, called
4 Battlespace Incorporated, working on a project called the
5 Joint Operational Test Beta System. This is a system where we
6 contracted with a number of -- a number of vendors,
7 ShotSpotter being one of them, to provide sensor systems,
8 different types of sensor systems which we would put into
9 military -- military exercises to evaluate the performance, to
10 integrate them into what we call a common operating picture.
11 Essentially, a system where a unit or an instant commander
12 could see all of the electronic assets that he had available
13 to him as well as the output of those assets. When they
14 alerted, he would click on the screen and see video or listen
15 to the result of that sensor being triggered.

16 After that I went to work for New Mexico Tech and --
17 for their Playas Training and Research Center facility in
18 Playas, New Mexico. There I performed a similar function as
19 the IT manager and the command and control supervisor where I
20 instrumented the testing and training ranges with vendor
21 technologies, different sensor types which we used military
22 and police exercises against and it recorded the results of
23 those.

24 Q. Okay. I think you mentioned this, 14 years ago, what
25 year did you start with ShotSpotter?

26 A. In 2007.

27 Q. You mentioned part of your current role is to prepare
28 forensic reports?

1 A. Yes, sir.

2 Q. Can you tell us what a forensic report consists of?

3 A. Certainly. There are a number of different report
4 types that ShotSpotter issues. Some are very basic. Most
5 have no human interaction. Essentially we push a button and
6 the system reads what's in the database and it spits out a
7 report on paper so that it can be handed out to an officer or
8 somebody else, an investigator. A detailed forensic report is
9 a report type required for court reviews. It's typically a
10 10-page or plus document that the first half of it will detail
11 the incident as it was reported to the customer, the results
12 as they were reported, along with the descriptive of how the
13 system works.

14 The second half of the report includes the results
15 of a review of the data -- of the audio data including the
16 exact time of discharge of weapon, the location, a reviewed
17 location of where that weapon was fired from, audio clips of
18 the incident, pictures of the -- pictures of the sound called
19 an audio waveform. So it's an actual graphic image of the
20 actual sound as essentially was viewed -- the waveform as
21 viewed by the computer as well as a graphic depiction of the
22 multilateration results, how the system performs its
23 location -- location calculation.

24 Q. Could you estimate how many forensic reports you've
25 prepared for ShotSpotter during your career?

26 A. Close to 2000.

27 Q. Have you ever testified in court as an expert on the
28 ShotSpotter system?

1 A. I have, sir.

2 Q. Do you know about how many times?

3 A. Um, as of last month 113.

4 Q. And do you know about how many of those were in
5 California?

6 A. Not offhand, but -- no, I couldn't guess offhand, but
7 there's a number of them. In fact, I've testified in eight
8 trials this year. All eight this year have been in
9 California.

10 Q. And have you ever testified as an expert witness on
11 ShotSpotter in a state besides California?

12 A. Yes, I have.

13 Q. And do you know roughly how many states you've
14 testified as an expert in?

15 A. In at least 17 other states.

16 Q. And do you recall if you've ever testified as an expert
17 here in Alameda County?

18 A. Yes, I have.

19 Q. I want to go back to how the ShotSpotter system works a
20 little bit more in depth. Can you describe the main
21 components of the ShotSpotter system?

22 A. Certainly. There are three main components --
23 actually, four if we count the reviewers. The first and most
24 important is the sensors themselves. These are microphone
25 sensors. They're placed on poles and buildings usually 20 to
26 40 feet off the ground, typically installed above the general
27 roofline of a neighborhood. The sensors have a -- have at
28 least two microphones onboard. They have an amount of memory.

1 They have a processing unit. They have a network device to
2 communicate back to the server, and they have -- each sensor
3 has its own GPS receiver and antenna.

4 All of the data from the sensors gets transmitted
5 directly to the ShotSpotter location server which is an
6 application that we developed in-house. It is installed in a
7 cloud -- internet cloud system. The facility that it is
8 installed is called QTS. I believe it's in Sunnyvale. The
9 location server does all of the location calculation. It does
10 the initial classification calculations.

11 The somewhat -- the somewhat third portion of this
12 would be the actual incident review center, the human
13 operators that listen to the audio clips and determine whether
14 or not the computer was correct or not in its initial
15 assessment. They're not really there to determine if
16 something is actually gunfire. They're actually there to weed
17 out those incidents that are definitely not gunfire, so that
18 what we do report to our customers is more likely to be
19 gunfire.

20 And the last part of the system is our user
21 interface which we have a number. Reviewers have a review
22 interface which is -- it's software that runs in a browser on
23 their desktop computers. They use it to receive the initial
24 alert, to listen to audio clips, to publish or dismiss an
25 incident. It gets sent to then an interface called the
26 respond application. This would reside on the 911
27 dispatcher's desktop or sometimes on a police M.D.T. or even
28 on a mobile device, a telephone or tablet, and it receives

1 that alert so that somebody can act upon it.

2 It shows the -- it shows the user the date, time and
3 location of all of the alerts for a seven-day period. It
4 plots those alerts onto -- onto a street map or onto a
5 satellite map. It's the user choice, and when new events
6 occur, when new incidents come in, they're alerted
7 immediately. There's a noise that plays and the screen
8 flashes and the map then moves to the place of the newest
9 incident.

10 And the last interface would be the insight
11 interface which is typically what I use, and it is a -- it's a
12 similar browser-based software that allows you to historically
13 view all -- every alert that is captured by a system. You can
14 go all the way back to 2006, for instance, here in Oakland and
15 look at the first incidents. You'd be able to listen to the
16 audio clips, view the map, look at the street view -- Google
17 street view of that location. It gives me all of the
18 locations, the logs. It allows me a historical review.

19 Q. And the ShotSpotter analyst at the incident review
20 center, what kind of training do they receive?

21 A. The reviewers go through a training program called the
22 ShotSpotter Academy. It is a battery of audio clips that we
23 know definitely are gunfire and many that are not gunfire.
24 And they listen to these and have to, at the end of their
25 training period, be able to correctly identify at least 90
26 percent -- correctly identify the gunfire from the -- 90
27 percent accuracy, the gunfire from the non-gunfire events.
28 And it takes them anywhere from two to three weeks to go

1 through that.

2 Alongside that, there is a number of task trainings
3 that they have to go through for other software programs.
4 They do front-line customer support functions for us. When
5 the end users have a problem, they click a chat button and the
6 person they chat with is actually the incident review person
7 because the incident reviewers are on duty 24 hours a day, 7
8 days a week.

9 Q. You referenced earlier that the various sensors use
10 multilaterations to determine the location of a respective
11 gunshot; is that correct?

12 A. That's correct, sir.

13 Q. Can you describe a little bit more what multilateration
14 is and what it consists of?

15 A. Certainly. Multilateration is very similar to what we
16 know as triangulation which in a simplest form is using two
17 unknown points -- two unknown geographic points to
18 determine -- excuse me, two known geographic points to
19 determine one unknown geographic point where you might have a
20 street map or you might have a topographic map in front of
21 you. You don't know where you're at, but you can see two
22 geographic features. And if you have a compass, you are able
23 to determine the compass angle from one to the other and draw
24 two lines on the map and determine where you are.

25 Multilateration expands on that greatly. It's
26 essentially using many -- as many -- as many known points as
27 possible to determine a single unknown point.

28 And we do that by using a technique called time

1 difference of arrival. So if we assume that there are three
2 sensors that detect a single gunshot, sensors A, B and C, so a
3 weapon is fired. The sound of that weapon being fired, the
4 muzzle blast, the bang, travels outward in all directions at
5 the speed of sound. As it -- it's detected by these three
6 sensors at different times because they are at different
7 distances from the shooting location.

8 As those sensors detect that sound, they timestamp
9 it. They look at the GPS clock that they have internally.
10 They read the time and they send that time back to the
11 location server. We take the -- we call those times the
12 arrival times. So what we do is we take the arrival time from
13 sensor A and the arrival time from sensor B, we subtract one
14 from the other and we find the difference in that time. We
15 use the difference formula from calculus to calculate against
16 the known speed of sound. And instead of outputting, say, a
17 single number, we take the result of that calculation and we
18 plot it onto a graph.

19 Now, the interesting part of the graph that we plot
20 that onto is it's the actual map of the earth or at least a
21 map of the area that we're operating in. We're using the
22 latitude and longitude lines as the X and Y axis of that
23 graph.

24 So the curve that we plot onto that graph is called
25 the curve of constant difference. Every point on that curve
26 is representative of time and distance, and it is also equal
27 to any other point on that curve. So we can't locate a single
28 gunshot from that. So we take the next pair of sensors,

1 sensors B and C. We repeat the operation.

2 We find the difference in times between the two
3 sensors, arrival times. We compute them around the time, the
4 difference against the speed of sound. We generate yet
5 another curve, and we plot it on top of the first, on top of
6 that map -- that graph, the geographic -- with the geographic
7 lines.

8 And then we do it with the third pair of sensors,
9 sensors A and C. At some point all of those curves, they
10 cross. They intersect. And because they're plotted onto an
11 actual map, we can look at that spot and find the latitude and
12 longitude from -- from that intersection, and that's what we
13 report as the location of a gunshot. And that's essentially
14 how a ShotSpotter calculates location, using
15 multilateration.

16 Q. And how accurate is the ShotSpotter system?

17 A. ShotSpotter guarantees that it will detect and
18 accurately locat at least 90 percent of all outdoor
19 unsuppressed gunfire, and we define "accurate" as a 25-meter
20 radius. Essentially, we're guaranteeing that the location
21 that we -- that we report to the customer will be within 25
22 meters of the actual shooter.

23 We see that as an obvious understatement of our
24 system performance, and we have to do that because ShotSpotter
25 is not perfect. We operate -- we operate outdoors in a very
26 dynamic environment that we have no control over. So we
27 deliberately understate our performance in our guarantee.

28 But from my own experience doing live-fire testing,

1 the -- and the feedback that we get from law enforcement and
2 customers, it's typical to see locations within 10 or 15 feet
3 of the actual shooter.

4 Q. 25 meters, is that like 90 feet?

5 A. That's 82 feet.

6 Q. 82 feet, thank you. How do you ensure the accuracy of
7 the clocks and the sensors and the time?

8 A. So all of the clocks involved in ShotSpotter, whether
9 it's the hardware, the sensors, whether it's the software or
10 the servers, the servers themselves and the networks we
11 operate on, all are synchronized and use GPS time. GPS being
12 the Global Positioning Satellite System or satellites orbiting
13 the earth. They radiate timing signals from their own
14 internal clocks so that we use the devices on the face of the
15 earth to determine the time or to -- more commonly to find
16 your place on the face of the earth, to locate yourself.

17 Whether you're using an application like Google Earth or a
18 satellite in a car, they have to have very accurate clocks.

19 So those satellites in turn have -- their internal
20 clocks are synchronized back to a master atomic clock at the
21 National Institute of Standards and Technology in Boulder,
22 Colorado. And that clock is accurate down to billions of a
23 second. So we consider our clocks to be very accurate.

24 Q. And how do you know that the ShotSpotter system itself
25 as a whole was working when it picks up a gunshot in a
26 specific location?

27 A. Well, first obvious clue is that it detected and
28 located in the first place. It would indicate that enough

1 sensors in the first place picked up information to allow us
2 to detect and locate an incident.

3 The other side of that coin is sensors that aren't
4 working would not report information that we can use, and they
5 would essentially be considered sensors that wouldn't have
6 heard the incident in the first place, but we do keep records
7 of when sensors are operating and when they're not operating.
8 Every sensor reports back to the server every 60 seconds with
9 what we call a status package.

10 That status package includes its current GPS
11 location, the time, it's power stay, how many impulsive events
12 it has detected over the last 60 seconds, the temperature that
13 is detected, a number of data points. And all of that
14 information is saved in the database within the system
15 database and we keep that indefinitely. We can go back into
16 the system database and research at any given point what
17 sensor was operating when.

18 Q. And you mentioned the live-fire testing. Is that
19 something that is done at the time of installation of the
20 system, or is that something that is done repeatedly as an
21 accuracy check or a test?

22 A. Typically a live-fire test is performed only in
23 installation. There have been cases where, say, we have added
24 sensors or there have been sensors moved through the
25 construction or various other circumstances where the customer
26 has requested that we perform follow-up tests. But,
27 typically, it's just when the system is installed.

28 Q. And do the sensors -- is there any type of ongoing

1 calibration that they require?

2 A. No. Sensors don't require any calibration. When
3 they're turned on, they simply acquire -- GPS satellites
4 connect to the network and start listening for gunfire.

5 Q. And does ShotSpotter Incorporated release the location
6 of your sensors?

7 A. No, we do not.

8 MR. DOSA: I'm sorry. I didn't hear that question.
9 Could you have it read back?

10 (Record read.)

11 MR. FLYNN: Q. Why is that?

12 A. Increasingly we end up having to install our sensors on
13 private properties. It's up to and including private
14 residences and businesses. While we do try to install sensors
15 on public properties such as libraries, police stations,
16 schools, even some churches in some cases, as we expand, as
17 customers want more coverage, we have to install onto private
18 properties. We obtain a permission contract with those --
19 with those properties which, first of all, states that we will
20 not disclose the location that the sensors are located on.
21 And, ultimately, that's because we don't want those property
22 owners to suffer any sort of retaliatory property damage or
23 vandalism due to having a ShotSpotter sensor installed.

24 Q. You mentioned that the sensors are typically installed
25 20 feet in the air or higher; is that correct?

26 A. That's correct.

27 Q. Can you just explain why that is?

28 A. Well, 20 feet or -- 20 feet or higher is optimum. What

1 we're looking for is to install the sensors above the general
2 roofline of a neighborhood. Sound will travel above the
3 rooflines and travel farther that way than it will through the
4 streets. There are fewer obstructions.

5 Q. And does ShotSpotter retain audio recordings of the
6 gunshots that the system captures?

7 A. Yes, it does.

8 Q. And are those altered in any way?

9 A. No, sir, they are not.

10 MR. FLYNN: Your Honor, I'm going to ask to qualify
11 Mr. Greene as an expert in the ShotSpotter system at this
12 time.

13 THE COURT: Mr. Dosa, would you like to voir dire
14 the witness?

15 MR. DOSA: I have a couple of questions.

16 THE COURT: Okay.

17 MR. DOSA: I'm not sure if it goes to his
18 expertise.

19 THE COURT: That's okay.

20 VOIR DIRE EXAMINATION

21 MR. DOSA: Q. Good afternoon, sir. My name is
22 Andrew Dosa and welcome to Oakland, California.

23 A. Good afternoon, sir.

24 Q. And Department 6. What I wanted to do is start with a
25 couple of questions. The first one having to do with your
26 statement a few moments ago about the optimum height of 20 or
27 more feet.

28 How do you know that's optimum? And the real

1 question is, what test were you involved in to determine 20
2 feet or more was optimum?

3 A. So back in -- I'll begin with your second path of
4 questions. In 2007, 2008, 2009, when I was involved in
5 military testing, we found that through experience, through
6 actual testing, that we got better results the higher we
7 mounted the sensors. But it really does come down to there
8 are fewer obstructions to -- that prevent the sound of gunfire
9 from reaching ShotSpotter sensors when you mount the sensors
10 above the roofline and that -- it's optimum. Optimum is
11 meaning that it has a clear line of sight, essentially. It's
12 not that -- that it would be optimum lower or higher, but my
13 statement was optimum in general.

14 Q. Okay. And with -- with these sensors mounted at about
15 20 feet, are they still able to, in your opinion, accurately
16 identify a gunshot that may have come from an alleyway so that
17 there was -- picking up of the sound from a ricochet, for
18 example?

19 A. Typically, yes, and we do pick up sounds of ricochets,
20 and they are readily identifiable. Sound will travel.
21 Sound -- sound of a gunshot will travel either in a direct
22 path, or it can be a reflection, or as an echo, or it will
23 actually refract in some cases where it will come over the top
24 edge of a building and refract over. What that does is
25 introduce a -- slight errors in timing. It depends on the
26 distance from the gunshot to the sensor. It detects it. So
27 sensors that are farther away, those -- the actual shot
28 impulse to the echo, that timing will spread some. But for

1 sensors that are closer to a gunshot and -- it will be less
2 prevalent and less of an issue.

3 Q. And when a shot -- when a sensor picks up a -- say, a
4 ricochet, or echo -- I think I used the word echo, so let's
5 deal with echo, is that something that is discernible by the
6 people who are reading the -- the -- you called it the sound
7 wave -- the audio waveform?

8 A. It is to me in most cases. The software that we use
9 allows me to visually inspect that audio waveform as well as
10 play that sound and listen to it at different speeds. I can
11 listen to it quickly. I can slow the sound down. I can
12 listen for individual elements that are happening. I can also
13 visually inspect that. The software allows me to essentially
14 zoom in on -- on the actual pulses. So I can -- I can see --
15 say, if -- if the echo is just a millisecond or two following
16 the initial gunshot impulse, I can see that, and I can
17 determine the time difference between the two down to the
18 millisecond level.

19 Q. Right. And the audio waveform would reflect,
20 essentially, a second sound if there was an echo or a
21 ricochet, right? Because it's the initial sound, then it's
22 the sound waves hitting off of an object and coming back to a
23 sensor?

24 A. That's correct, sir. Depending on the -- on the actual
25 gunshot and the waveform, the initial gunshot impulse may
26 present as being louder or having more amplitude meaning a
27 taller impulse or -- and the following echoes might be shorter
28 and shorter and shorter. Or in some cases, the -- where the

1 system may erroneously detect an echo rather than a gunshot,
2 the gunshot impulse might be very faint but still present, and
3 then what you see is the most visible is then followed by the
4 echo impulse.

5 Q. Assuming a relatively open space with a shooter aiming
6 in a certain direction and a ShotSpotter sensor behind him,
7 would that still be able to pick up the sound of a gunshot
8 even if it was aimed away from the sensor?

9 A. In general, yes. The sound of the muzzle blast travels
10 in all directions, though. Typically it's 40 percent, 50
11 percent louder along the direction of fire. What is more
12 important is the close end, local circumstances of how the
13 weapon is fired, whether it was fired into or out of a closed
14 space. The direction of fire sometimes has a huge effect
15 whether a sensor can pick up or not or whether it was fired in
16 the ground or fired in the air. You know, if it was -- how --
17 the distance to the target has an effect, as well. So if the
18 target is very close, then the target can soak up some of that
19 acoustic energy and prevent farther sensors from detecting
20 properly.

21 Q. Does wind or weather affect the ability of the sensor
22 to pick up the sound?

23 A. Yes, sir, but typically wind would have to be pretty
24 fast and pretty loud against the sensors to obscure the
25 microphone. Gusts 30, 40 miles-an-hour would definitely have
26 an effect. But, you know, a light breeze, 15 to 20
27 miles-an-hour would have very little effect. Rain might have
28 an effect on whether or not a sensor picks up. We do have --

1 we do have a system in place to -- we call it the floating
2 triggers to account for that. What it does is lowers the gain
3 of the microphone which allows the lower frequency gunshot
4 pulses to become more prominent.

5 Q. A slightly different question. Whenever a firearm, a
6 pistol, is shot, is there always a flash?

7 THE COURT: Is there always a flash?

8 MR. DOSA: Yes.

9 THE WITNESS: A visible flash?

10 MR. DOSA: Q. Yes.

11 A. No, sir.

12 Q. Is it typically the case a firearm generates a visible
13 flash?

14 A. That would depend -- it would depend on the visual
15 wavelength of that. If you were looking at an infrared
16 camera, then, yes, you would almost always see a visible
17 flash. But in -- in daylight -- in most daylight situations,
18 it would have to be a really dirty propellant in the cartridge
19 case to generate a muzzle flash. At nighttime you would
20 probably see a flash.

21 Q. So a shot, say, at 3:17 in the middle of October in
22 2019, if there was a gunshot at night, assuming darkness all
23 around, would the person who was shot at be able to see the
24 flash if they were looking at the gun?

25 A. It's possible, yes.

26 Q. Would you say probably?

27 A. I -- no, I couldn't say probably because the -- again,
28 I don't have any details of other than the actual sound of the

1 gunshot at this point. Anything that I gave you would be, you
2 know, speculation.

3 MR. DOSA: All right. Thank you.

4 THE COURT: Anything further? Submitted?

5 MR. DOSA: A couple of more questions.

6 THE COURT: Okay.

7 MR. DOSA: Q. How do you know that -- how does
8 ShotSpotter guarantee that it will accurately identify at
9 least 90 percent of the gunfire that -- that's -- that goes
10 off in the city?

11 A. So our guarantee is based off of a 1997 National
12 Institute of Justice study that was done in Redwood City,
13 California where the results of that they found that a
14 ShotSpotter detected 82 to 83 percent of the gunfire that
15 was -- that they fired and located -- properly located at
16 least 80 percent of those within that 25-meter radius.

17 Since then, working with our customers and doing
18 more of our testing, we have decided that we would increase
19 our -- our guarantee, so to speak, increase that accuracy
20 level to 90 percent. But, essentially, it's based on that NIJ
21 study.

22 Q. And it was the National Institute of?

23 A. Justice.

24 Q. Justice, thank you. In Palo Alto?

25 A. It was Redwood City.

26 Q. Redwood City. Hey, I may have trusted it if it was in
27 Palo Alto. Redwood City is a little shaky.

28 No further questions.

1 THE COURT: Submitted?

2 MR. DOSA: Submitted.

3 MR. FLYNN: Submitted.

4 THE COURT: He's deemed an expert in the area
5 requested.

6 (Resumed)DIRECT EXAMINATION

7 MR. FLYNN: Q. So, Mr. Greene, is the concept -- is
8 multilateration a new concept?

9 A. No, sir, it's not.

10 Q. Can you describe the history of multilateration?

11 A. Mathematically, no. But as employed by ShotSpotter as
12 a system to detect impulsive sounds and then locate them, yes.
13 The first known instance that we know of is 1913. It was a
14 system called Sound Artillery Ranging, and it was patented in
15 1913. It was employed in World War I. The first deployment
16 was they put observers out in the trench lines with,
17 essentially, accurate pocket watches, and they recorded the
18 times that they heard the German artillery across the line
19 firing.

20 And they would take those times back and they would
21 compare, and they would use a slide rule and manually --
22 manually compute a location where they thought that German
23 artillery was. And then they would take those results back to
24 their own artillery and they'd fire counter back and they'd
25 fire back at them.

26 Later in the war they devised a system using
27 microphones, using the -- that drove needles that scratched a
28 calibrated film. And then they would calculate the locations

1 IN THE CIRCUIT COURT OF THE
2 FOURTH JUDICIAL CIRCUIT, IN
AND FOR DUVAL COUNTY, FLORIDA.

3 CASE NO.: 16-2017-CF-8075-AXXX

4 DIVISION: CR-A

5

6 STATE OF FLORIDA

7 -vs-

8 RONALD DIQUAN BOST,

9 Defendant.

10

11 STATE OF FLORIDA)

12 COUNTY OF DUVAL)

13

14 PROCEEDINGS before the Honorable ADRIAN G. SOUD,
15 Judge of the Circuit Court, Division CR-A, as cause in
16 this matter came to be heard at 2:00 p.m., on the 16th
17 of January, 2020, before Colleen S. David, Court
18 Reporter and a Notary Public in and for the State of
19 Florida at Large.

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24 OFFICIAL REPORTERS, INC.
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1 APPEARANCES:

2 CHYNA-MICHELE MAKAROWSKI, Esquire,

3 Assistant State Attorney,

4 Appearing on behalf of the State of Florida.

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6 MELINA BUNCOME, Esquire,

7 Assistant Public Defender,

8 Appearing on behalf of the Defendant.

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1 not there's a degree of acceptance. He indicated
2 that he has testified in other areas and has been
3 qualified as an expert in other areas, but not in
4 Florida. He indicated this was the first time in
5 Florida.

6 What we're saying is that based on all these
7 things we feel that the Court should grant our
8 motion in limine to prevent the presentation of the
9 ShotSpotter in this case.

10 THE COURT: All right, thank you.

11 The Court has had an opportunity to consider
12 the testimony presented for purposes of
13 determination of the Daubert motions. For the
14 reasons that the Court will in a moment recite for
15 purposes of the record, the Court is going to deny
16 the amended motion in limine to limit the scope of
17 testimony of the expert and witnesses, to wit,
18 ShotSpotter System.

19 The reason is because, and it's important to
20 note at the outset that the Court's function at a
21 Daubert hearing is really more of a gatekeeping
22 function, and the Court must conclude based upon
23 the testimony and evidence presented at the hearing
24 that the State of Florida in this case has met its
25 burden to establish by the preponderance of the

1 evidence that the testimony offered as it pertains
2 to ShotSpotter is the product of reliable
3 principles and methods.

4 Specifically in performing the gatekeeping
5 function that is not meant to be a basis for a
6 conclusion that certain matters argued by defense
7 counsel may form the basis at trial for
8 cross-examination for the jury's ultimate
9 determination as to the weight to be afforded any
10 particular evidence.

11 In performing the gatekeeping function, first
12 the Court concludes that Walter Collier, III, is
13 qualified and competent to offer expert testimony
14 or opinion testimony as to the ShotSpotter system
15 and what was determined or what is found as a
16 result of ShotSpotter's involvement in this
17 particular case. Certainly the Court notes, my
18 recollection and my notes, as well as my
19 recollection is that he began his employment there
20 in 2014, that is confirmed in the State's Exhibit
21 No. 1, which is his curriculum vitae, where he
22 indicates he has been employed since August of 2014
23 as the senior technical support engineer, and for
24 the background he testified to as a law enforcement
25 officer, and for other pertinent background as set

1 forth in his CV, the Court determines he is
2 competent to testify, and apparently he has, in
3 fact, testified as an expert in some 50 cases.

4 Further the Court determines that each of the
5 three necessary elements have been established for
6 the admission of the testimony, and specifically
7 that is that the testimony is based upon sufficient
8 facts or data, that the testimony is the product of
9 reliable principles and methods, and that in this
10 case Mr. Collier has applied the principles and
11 methods reliably to the facts of this particular
12 case.

13 Certainly the method, the mathematics, things
14 of that sort as argued by counsel for the State of
15 Florida, and frankly as set forth in precedence
16 provided by the State of Florida, including Johnson
17 v. State, 68 Northeastern 3d 623 from the Court of
18 Appeals in Indiana in 2016, as well as the United
19 States versus Godinez, G-O-D-I-N-E-Z, found at 2019
20 Westlaw 4857745 from the northern district of
21 Illinois in 2019.

22 The principles at the core of this
23 ShotSpotter system, while perhaps comparatively new
24 in its application for law enforcement purposes,
25 the underlying principles are actually somewhat old

1 and certainly are well established. But certainly
2 the Court concludes, based upon the matters
3 presented, that the testimony is based upon
4 sufficient facts or data.

5 Mr. Collier made very clear that the
6 ShotSpotter system is fully capable and it is
7 designed to detect impulsive sounds, sounds which
8 are, I believe the word he used was sharp, in the
9 emergence of the frequency of the sound, as well as
10 the dissipation of that sound, and that when that
11 sound is detected by the system that sound that
12 sound then is sent, it is recorded but it is sent
13 to location services server for the server's
14 analysis and consideration, and of course this was
15 set out in his testimony, but it's also set out in
16 page 2 of State's Exhibit No. 2, that once the
17 acoustic sensors are activated by that which is
18 believed to be gunshot, the location server
19 application then utilizes GPS and multilateration
20 algorithms for the determination of a longitude and
21 latitude location from whence the shots were fired.
22 And that determination, as he testified to and as
23 is set out in the report, certainly establishes for
24 the Court that the testimony is not only based on
25 sufficient facts or data, but the testimony is the

1 product of reliable principles and methods that are
2 reliably applied to the facts of this particular
3 case. And that which I just stated, of course, are
4 the second on third necessary requirements for the
5 testimony to be admissible under 90.702.

6 Because of the acoustic sensors reliably
7 involved there is a safety feature, the Court's
8 word safety feature, that if a sensor is
9 malfunctioning that is reported and the sensor is
10 then not utilized for purposes of the location
11 determination.

12 But for the involvement of four sensors in
13 this particular case transmitting that information
14 to servers, perhaps both servers, one on each coast
15 of the continental United States, that the
16 information transmitted via those servers
17 accurately, reliably for purposes of the finding of
18 the Court, reliably pinpoints the location of the
19 three gunshots in this particular case.

20 The Court has certainly endeavored to
21 articulate in summary form its findings based on
22 the Court's understanding and appreciation of the
23 testimony, appreciation not affinity, but
24 appreciation and understanding, if you will, of
25 Mr. Collier's testimony. The Court in summary form

1 is determining its conclusions, but certainly it's
2 set out specifically in State's Exhibit No. 2 as to
3 not only the acoustic sensors but the manner in
4 which the location is determined.

5 For those reason the Court determines that
6 the motion in limine is due to be denied, and the
7 testimony concerning ShotSpotter and its
8 involvement in this case will be permitted by the
9 Court, though not permitted via Skype, it's going
10 to have to be in person.

11 MS. MAKAROWSKI: Absolutely, Your Honor.

12 THE COURT: The technological difficulties
13 courts can navigate that for purposes of Daubert,
14 but I'm not going to impose that on the jury, and I
15 know the State apparently is willing and prepared
16 for that.

17 Madam Clerk, I am returning to your custody
18 and care State's Exhibits 1 and 2.

19 With that being said, let me, if I can, get
20 back to the Court's calendar so that we can discuss
21 the next court date. Do we have a trial date?

22 MS. BUNCOME: We do not, Your Honor.

23 THE COURT: Are we ready to reset the case for
24 trial?

25 MS. MAKAROWSKI: I believe we are, Your Honor.

1 MS. BUNCOME: Yes, Your Honor.

2 MS. MAKAROWSKI: The State has two remaining
3 defense witnesses that we have a depo scheduled
4 early February. The State is requesting a trial
5 date of May 18. I have not discussed that with
6 defense counsel.

7 THE COURT: What's your availability,
8 Ms. Buncome?

9 MS. BUNCOME: Your Honor, I am available that
10 week.

11 THE COURT: Okay. May 18th of 2020.
12 It is Bost?

13 THE DEFENDANT: Bost.

14 THE COURT: Bost, my apologies for
15 mispronouncing your name, Mr. Bost. Your trial
16 date is going to be May 18th of 2020. The final
17 pretrial conference will be the preceding Tuesday,
18 May 12th of 2020.

19 Following the depositions referenced by the
20 State, Ms. Buncome, are you, as far as the progress
21 of depositions that the defendant wishes to take,
22 are you close to the conclusion of those
23 depositions? Would a pretrial conference shortly
24 after the State's deposition be appropriate in your
25 estimation?

1 MS. BUNCOME: Yes, Your Honor. That would be
2 fine.

3 THE COURT: February 20, are you each
4 available that day, that's a Thursday? It needs to
5 be the 20th.

6 MS. MAKAROWSKI: Yes, Your Honor.

7 THE COURT: Or I can go to another week, I
8 should say.

9 MS. BUNCOME: The 20th is fine, Your Honor.

10 THE COURT: February 20th will be your next
11 court date for an intervening pretrial conference.
12 That is after the depositions, is it not?

13 MS. MAKAROWSKI: It is, Your Honor.

14 MS. BUNCOME: Yes, Your Honor.

15 THE COURT: All right. They'll bring you back
16 to the courthouse on February 20th. Thank you very
17 much.

18 (Proceedings concluded at 4:00 p.m.)

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1 C E R T I F I C A T E

2 STATE OF FLORIDA)

3 COUNTY OF DUVAL)

4 I, Colleen S. David, Court Reporter, certify
5 that I was authorized to and did stenographically
6 report the foregoing proceedings and that the
7 transcript is a true and complete record of my
8 stenographic notes.

9 DATED this 12th day of April, 2021.

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13 /s/ Colleen S. David
14 Colleen S. David
15 Court Reporter

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STATE OF MINNESOTA

DISTRICT COURT

COUNTY OF HENNEPIN

FOURTH JUDICIAL DISTRICT

State of Minnesota,

Case Type: Criminal
Judge Carolina A. Lamas

Plaintiff,

Court File No. 27-CR-14-11992

v.

Talia Donalee Brooks,

**ORDER DENYING
DEFENDANT'S MOTION TO
EXCLUDE**

Defendant.

The above-entitled matter came before the Honorable Carolina Lamas on October 7, 2016 at the Hennepin County Government Center for a Frye-Mack Hearing.

APPEARANCES

Peter Mason, Assistant Hennepin County Attorney, appeared on behalf of the State of Minnesota. Jeffrey Benson, Assistant Hennepin County Public Defender, appeared on behalf of Talia Donalee Brooks, who was present. Following the hearing, the parties submitted memoranda to the Court in support and opposition to the Defendant's Motion to Exclude Evidence.

Based upon the testimony adduced, the arguments and briefs of counsel, and all files, records, and proceedings herein, the Court orders the following:

1. Defendant's Motion to Exclude is **DENIED**.

By the Court:

Date: 12/15/16

Honorable Carolina A. Lamas
Judge of District Court

INTRODUCTION

The State has charged Defendant with (1) Terroristic Threats-Reckless Disregard Risk, (2) Dangerous Weapons-Reckless Discharge of Firearm within a Municipality, and (3) Possess Pistol/ Assault Weapon-Conviction or Adjudicated Delinquent for a Crime of Violence. Defendant brought a motion to exclude any ShotSpotter evidence regarding the location and time of shots fired on March 15, 2014.

FACTS ALLEDGED

1. On March 15, 2014, Officers Grout and Doran of the Minneapolis Police Department were dispatched on a report of gunshots fired.
2. Officers were alerted of the gunshots because the ShotSpotter system detected potential gunshot sounds.
3. The ShotSpotter report indicates that there were two occurrences of a “Single Gunshot” type of incident. Ex. 1¹ Incident #84457 occurred on March 15, 2014 at 19:20 (7:20 p.m.), listing an address of 912 23rd Ave. N. *Id.* Incident #84456 occurred on March 15, 2014 at 19:19 (7:19 p.m.), listing an address of 914 23rd Ave. N. *Id.*
4. The alleged victim told Officer Grout that Defendant arrived at her apartment, yelled at her, and shot at her house.
5. Officers located a single spent shell casing near the mouth of the alley, located behind the alleged victim’s house.

FINDINGS OF FACT

1. On October 7, 2016, Paul Greene, Manager of Forensic Services for SST, Inc. testified on behalf of the State. SST, Inc. is the company that manufactures and operates the ShotSpotter system.
2. The ShotSpotter process has three primary components: (1) the sensor array, (2) the location server, and (3) the human operator review.
3. The sensor array consists of an array of self-calibrating, microphone and GPS-enabled sensors installed in a geographic location. These sensors listen for impulsive noises. A

¹ This exhibit was labeled as Exhibit 1 when offered by the State and received at the hearing, and labeled as Exhibit B in the attached exhibits to the Defendant’s Memorandum in Support of Motion to Exclude.

sensor timestamps and sends data to the location server when it detects a sound consistent with its criteria for a potential gunshot. For a single gunshot to be detected and reported, four sensors must detect the noise.

4. Sensors communicate with the location server every thirty to sixty seconds, sending the status of its power and health indicators.
5. Minneapolis has 5.4 square miles of ShotSpotter coverage, over two coverage areas. The present case occurred in the north side coverage system, where there are fifty-seven sensors.
6. The array is designed so that if twenty to thirty percent of the sensors become inoperable, the remaining sensors could accurately maintain operation of the ShotSpotter system.
7. The sensors are placed above the roofline, in an effort to avoid obstacles that would hinder sound from reaching the sensors.
8. The second component of the system is the location server which coordinates the pulses that are received from sensors. If the location server's criteria are met for a sound to be deemed a gunshot, it will attempt to locate the geographic location of the pulse.
9. The location server is where the scientific and mathematical operation of ShotSpotter occurs.
10. The operation that the location server uses to locate a pulse is called multilateration. Multilateration plots hyperbolas between known geographic points to locate an unknown geographic point.
11. The third component of the ShotSpotter system is the human operator review. If the location server's criteria are met, the audio clip of the impulsive noise and pictures of the audio waveform are sent to the human operator. Human operators cannot create or alter events. Human operators review the data, and if consistent with a gunshot publish the data to the ShotSpotter customer.
12. The human reviewers tend to be former law enforcement, EMS dispatchers, and former military. Human reviewers receive on the job training.
13. Mr. Greene, or another forensic analyst, may then review the data and create a forensic report. These reviews are done to check on the accuracy of the location and the number of shots fired.

14. In the present case, Mr. Greene created a forensic report. Mr. Greene found no erroneously located pulses and performed no corrections.
15. ShotSpotter performs redundant calculations and error correction routines on its system.
16. ShotSpotter also monitors temperature and weather conditions.

CONCLUSIONS OF LAW

Defendant moves the Court to exclude the ShotSpotter evidence, arguing that the State has failed to meet its burden under the *Frye-Mack* test. The *Frye-Mack* standard requires the Court to “determine whether [the scientific evidence] is generally accepted in the relevant scientific community. In addition, the particular scientific evidence in each case must be shown to have foundational reliability. Foundational reliability requires the proponent of a *** test [to] establish that the test itself is reliable and that its administration in the particular instance conformed to the procedure necessary to ensure reliability.” *Goeb v. Tharaldson*, 615 N.W.2d 800, 814 (Minn. 2000) (citations omitted). The *Frye-Mack* standard puts the burden on the proponent of the novel scientific evidence to demonstrate the sufficiency of both prongs of the *Frye-Mack* test: (1) that the scientific evidence is generally accepted in the relevant scientific community, and (2) the particular scientific evidence in the case at hand has foundational reliability. *Doe v. Archdiocese of St. Paul*, 817 N.W.2d 150, 165 (Minn. 2012). The State contends that it met its burden under the *Frye-Mack* test. State’s Reply Mem. at 2. The Court will address each prong of the *Frye-Mack* test in turn.

A. The Scientific Evidence Offered is Generally Accepted in the Relevant Scientific Community

In *State v. Mack*, Minnesota adopted the *Frye* rule which requires, “the thing from which the [expert testimony] deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.” *State v. Fenney*, 448 N.W.2d 54, 57 (Minn. 1989) (quoting *State v. Mack*, 292 N.W.2d 764, 767 (Minn. 1980)). “The results of mechanical or scientific testing are not admissible unless the testing has developed or improved to the point where experts in the field *widely share* the view that the results are scientifically reliable as accurate.... The scientific technique on which expert testimony is based must be scientifically reliable and broadly accepted *in its field*. The test, then, requires neither unanimity nor acceptance outside its particular field.” *Id.* at 57–58 (internal citations omitted). Scientific evidence that is not “novel” need not be assessed under the first prong of the *Frye-Mack* test.

Evidence obtained from “a new scientific method that the [Minnesota Supreme Court] has never before considered” and is “sufficiently different” from previously generally accepted methods, is novel scientific evidence. *State v. Roman Nose*, 649 N.W.2d 815, 821 (Minn. 2002).

Sound multilateration is the mathematical operation that is the basis for the geographic locating component of the ShotSpotter system. Transcript at 44. The State contends that it adequately demonstrated that sound multilateration evidence is generally accepted in the relevant scientific community. State’s Mem. Opp’n at 3. Defendant concedes that sound multilateration is generally accepted, but argues that ShotSpotter technology specifically is not. Def.’s Mem. at 5. Defendant specifically asserts that “Shotspotter combines sound multilateration principles with the complex, real world environment and a human interprets that data. This combination takes ShotSpotter outside of the general acceptance of sound multilateration, and the state has not satisfied their burden under the first prong of *Frye-Mack*.” Def.’s Mem. at 6.

The State presented expert testimony from Mr. Greene from SST, Inc. Defendant highlights that “Mr. Greene holds no college degrees, and he never attended a course in engineering, acoustics, acoustical engineering, or sound propagation.” *Id.* at 2. Mr. Greene has worked for SST, Inc. for nine and a half years. Tr. at 5. He currently serves as a manager of forensic services, which primarily deals with forensic analysis. *Id.* Mr. Greene is a former U.S. Marine. *Id.* at 7. During his eight years in the Marines, Mr. Greene shot several years on rifle and pistol teams and was trained as a machine gunner. *Id.* He has worked in the field, performing live fire tests against Shotspotter, military, and public safety systems. *Id.* Mr. Greene became aware of the technology used by ShotSpotter in 2004, when he was employed by the U.S. Joint Forces Command, which conducted battlefield sensor testing and integration. *Id.* Mr. Greene also was employed by the New Mexico Institute of Mining Technology at the Playas Training and Research Center where he was the command and control manager, tasked with operating test ranges for military hardware clients to test their systems. *Id.* at 8. Since working for ShotSpotter, Mr. Greene has conducted over 600 forensic analyses of gunfire incidents and has analyzed audio of thousands of gunshot incidents. *Id.* at 9. He has testified fifty-five times in court and has been certified as an expert in gunshot sound detection and location technology each time. *Id.* at 10.

The State offered Mr. Greene as an expert in “gunshot sound detection and location technology.” *Id.* at 10. Defendant did not object to Mr. Greene being offered as such an expert and the Court accordingly certified Mr. Greene as such an expert. *Id.* Defendant questions the application of multilateration within the ShotSpotter system and the human interpretation of the data. Def.’s Mem. at 6. The area of gunshot detection and location technology falls within the relevant scientific community in question. Therefore, Mr. Greene’s expert testimony weighs heavily in favor of the State.

Mr. Greene testified at length about the processing system for the ShotSpotter. ShotSpotter has three primary components to its process. Tr. at 15. Put simply, the first component is a sensory array, which is an array of microphone and GPS-enabled sensors that are installed in a geographic area. *Id.* The sensors “listen constantly for the sound of impulsive noises, anything that does bang, boom, or pop” and if such a noise is detected, it timestamps it and sends the data related to the impulsive noise to the location server. *Id.* at 15–16.

The second component is the location server which coordinates the pulses that are received from sensors and attempts to match them, and if there is a match within a specific time period the location server attempts to locate the pulse. *Id.* at 16. Mr. Greene testified that ShotSpotter “uses a mathematical system called multilateration to locate -- or, or to determine a geographic location of the source of that impulsive noise.” *Id.* at 15. If certain characteristics are met, then the location and data is sent to a human operator, which is component three. *Id.* The human operator listens to the audio clip they receive and reviews pictures of the corresponding audio waveform and makes a “judgment call” whether or not they believe it is gunfire. *Id.* at 33. The reviewer can add notes to the incident report but cannot create or alter an incident. *Id.* at 33, 36. Reviewers receive on-the-job training and tend to be former law enforcement, dispatchers or military. *Id.* at 35. The reviewer will send an alert or dismiss the event as a gunshot within one minute. *Id.* at 41. If deemed to be a gunshot, the result will then be published to the customer (i.e., law enforcement). *Id.* at 31. A forensic analyst, such as Mr. Greene, may ultimately conduct a forensic analysis and draft a report, in an effort to confirm the accuracy of particular incidents. *Id.* at 43.

Multilateration has had practical applications starting over one hundred years ago. Tr. at 44. The use of multilateration to locate sound has been utilized in earlier forms in World War I and subsequent military involvement, including applications to the use of sonar by the Navy.

Id. at 48. Multilateration is used in locating submarines underwater, in plane navigation, and by seismologists in determining the epicenter of earthquakes. *Id.*

Law enforcement's utilization of a scientific technique or practice is not dispositive of whether the technique is generally accepted, but may be relevant evidence as to whether the technique has gained general acceptance in the relevant scientific community. *Roman Nose*, 649 N.W.2d at 821. The first installation of ShotSpotter was in 1996 in Redwood City, California. Tr. 6. ShotSpotter operates in about one hundred cities, including Minneapolis. *Id.* Minneapolis has used ShotSpotter since 2007. State's Mem. Opp'n at 4.

"The decisions of other appellate courts may be relevant evidence at an evidentiary hearing on the general acceptance of a scientific technique within the relevant scientific community." *Id.* at 820. The Supreme Court of Nebraska considered a challenge to the ShotSpotter system in *State v. Hill*, 851 Neb. 767 (2014). In *Hill*, the Defendant did not challenge the "underlying GPS triangulation methodology upon which the ShotSpotter location is based." *Id.* at 793. Instead, the Defendant made three arguments, "(1) that 'blind' tests of the system have never been performed; (2) that Greene did not know what percent capacity of the Omaha ShotSpotter system was operating at on [the date in question]; and (3) that the SST employees at the incident review center 'are ultimately just people using their own subjective opinions about whether particular sound files are consistent with gunfire.'" *Id.* The Nebraska Supreme Court found that the lower court's conclusion that absence of blind testing and Mr. Greene's inability to identify the percent capacity of the Omaha ShotSpotter system did not seriously undermine the reliability of the ShotSpotter technology was a reasonable conclusion. *Id.* at 794. The Nebraska Supreme Court also disagreed with Hill's assertion that the SST, Inc. employees were unqualified to characterize sounds as being consistent with gunshots due to the employees' training and the system's recognition of potential gunshots prior to the data being sent to the review staff. *Id.* While Nebraska follows the *Daubert/Schafersman* jurisprudence, the Court takes this case into consideration as an example of acceptance and utilization of the ShotSpotter system and its underlying mathematical and scientific approach. *Id.* at 792.

The scientific and mathematical technique used by ShotSpotter is sound multilateration. The other components to ShotSpotter are tools to collect and record data for the multilateration process, and to check the accuracy of the system's decision to qualify a noise as a gunshot. The State has demonstrated that sound multilateration is a scientific practice that is generally

accepted in the relevant scientific community. The Court will analyze the foundational reliability of ShotSpotter's application of sound multilateration. Defendant's concerns regarding the accuracy of the system based on the environmental elements as well as the human operator involvement will be addressed under the reliability prong of the *Frye-Mack* analysis. See *State v. Traylor*, 656 N.W.2d 885, 893 (Minn. 2003) (determining that the science of PCR-STR DNA testing was generally accepted, and concerns over the utilized testing kits and procedures dealt more with reliability).

B. The Scientific Evidence Has Foundational Reliability

The second prong of the *Frye-Mack* test requires that the State show that the scientific evidence in the case at hand has foundational reliability. *Doe*, 817 N.W.2d at 165. The proponent of scientific evidence has the burden to establish the proper foundation for the admissibility of the test by showing that the methodology used is reliable and in the particular instance produced reliable results. *Goeb*, 615 N.W.2d at 816. Sound multilateration, as applied through the ShotSpotter system, in the matter at hand has foundational reliability.

1. The methodology used is reliable.

At each stage of the ShotSpotter system, ShotSpotter has built in redundancy and safeguards to better ensure the accuracy of its results. First, the sensors pick up an impulsive event. The array of sensors are installed in such a manner that if twenty to thirty percent of the sensors became inoperable, the remaining sensors could accurately maintain operation of the ShotSpotter system. Tr. at 22. Each sensor communicates with the location server every thirty to sixty seconds, sending the status of its power and health indicators. *Id.* at 27. The "health" of the sensors is constantly monitored. *Id.* The sensors are self-calibrating; a sensor will either record or not record. *Id.* at 28. For a single gunshot to be detected and reported, four sensors must actively participate in detecting the gunshot. *Id.* at 44. The location of the sensors is known based on their installation but also through the GPS receiver on the sensors which communicates with GPS satellites. *Id.* at 28. Only if the event meets between twenty-eight and thirty-two criteria will the event data be sent to the location server. *Id.* at 32-33.

The location server also has its own set of criteria for which the sound is evaluated. *Id.* at 31. If the criteria are met an alert is created and a request is sent back to the participating sensors to transmit the audio clip. *Id.* at 31-32. The audio clip and the pictures of the audio waveform are then reviewed by a human operator at the review center, who cannot alter the event. *Id.* at

33. If the human operator believes it is a gunshot, then they publish the data. *Id.* at 38. If they believe it is something other than gunfire, the alert is dismissed. *Id.* The human operator acts a check on the system in an effort to make sure only likely gunfire is being published. Mr. Greene testified that the main reason there are human reviewers is to verify that the sound is a gunshot and not another sound that is similar. *Id.* at 65. Mr. Greene or another forensic analyst may then perform a forensic analysis and create a detailed forensic report. *Id.* at 43. The chief function of the forensic analyst when writing the report is to confirm the accuracy of the location and the number of shots fired. *Id.*

With regards to the utilization of multilateration, Shotspotter uses the time that each sensor detects the pulse, measuring that sensor's detection of the pulse against another sensor's detection of the pulse against the speed of sound, to generate curves called hyperbolas. *Id.* at 45–46. As Mr. Greene described it, for example, if there are three sensors, “[ShotSpotter] take[s] the time differences between sensor A, sensor B, then sensor A and then C, and then sensor B and C and it gives [ShotSpotter] three different measurements... three different curves.” *Id.* at 46. Where the hyperbolas intersect is where the source of the impulsive noise, or gunshot, is located. *Id.* Because of ShotSpotters' use of GPS, ShotSpotter knows the exact latitude and longitude of the starting points to plot out the hyperbolas and find the point of intersection. *Id.* at 46–47.

Defendant specifically questions the utilization of human operators. Human involvement in this system acts as an additional check on the processes that have already occurred. The Supreme Court of Minnesota has held the human involvement in a protocol designed to develop or identify evidence, and specifically non-scientist human involvement, does not make that evidence inadmissible. *See State v. Klawitter*, 518 N.W.2d 577 (Minn. 1994). In *Klawitter*, the Minnesota Supreme Court reasoned that following a specified protocol for drug recognition, including nystagmus testing, did not involve “any significant scientific skill or training on the part of the [police] officer. Drug recognition training is intended to refine and enhance the skill of acute observation which is the hallmark of any good police officer and to focus that power of observation on a particular situation.” *Id.* at 585. The *Klawitter* Court put it another way, “the protocol, in the main, dresses in scientific garb that which is not particularly scientific.” *Id.*

Similarly, the Court here finds that the human operators are not required to engage in particularly scientific processes. The human reviewers tend to be former law enforcement, EMS dispatchers, and former military. Tr. at 35. They generally “have more than a passing familiarity with real gunfire.” *Id.* When someone is hired, they receive on the job training, where an experienced operator or shift leader, sits with the new operator for one to two weeks, and coaches them through the process of determining what is and is not gunfire. *Id.* In determining if a noise is a gunshot, the reviewer listens to the audio clip and views a picture of the audio waveform. *Id.* at 33. Reviewers cannot create a gunshot incident, or alter the times or locations of a gunshot incident. *Id.* at 36. In the aforementioned *State v. Hill*, the Nebraska Supreme Court agreed that the ShotSpotter employees were not unqualified to characterize sound as consistent or inconsistent with gunshots, based on their training and the fact that the system recognizes the potential gunshot before it is sent to the reviewer. *Hill*, 851 Neb. at 794.

Defendant also raises concerns over the environmental elements of the urban city of Minneapolis affecting the accuracy and reliability of ShotSpotter. Def’s Mem. at 6. Factors like temperature, background noise, buildings, and trees may affect the soundwaves and ultimately location accuracy. Tr. at 62–70. ShotSpotter performs “redundant calculations” and “error correction routines” to ensure that results are accurate. *Id.* at 79. ShotSpotter monitors temperature and weather. *Id.* at 62. ShotSpotter installs “as many sensors as [they] do in an array because [they] know that there are going to be environmental facts that [they] cannot account for.” *Id.* at 78. The sensors are placed above what SST, Inc. calls the “acoustic horizon,” meaning that they try to place sensors high enough above the roofline that there are few obstacles that would hinder sound from reaching the sensors. *Id.* at 17–18. Further, Mr. Greene testified that even if there are refraction and diffusion issues, they are “usually in the millisecond range, a thousandth of a second... even if [they] had half the sensors with a couple milliseconds of diffraction error, it may only change the location of the gunshot, ultimately, by a couple of feet.” *Id.* at 78. Taking into consideration the efforts of ShotSpotter to ensure accuracy, the Court finds that the methodology used has foundational reliability.

2. In this particular instance, the methodology used produced reliable results.

The methodology described above yielded reliable results in the case at hand. Minneapolis has 5.4 square miles of ShotSpotter coverage. *Id.* at 17. There are two separate ShotSpotter systems in two coverage areas, the north of the city and the south. *Id.* In this case,

the data in question comes from the north side system. *Id.* There are fifty-seven sensors in the north side array. *Id.* at 56. There are two types of sensors in the Minneapolis system, each with two to four microphones, a processor board with a GPS antenna and receiver, a certain amount of memory, and a cellular based communication device. *Id.* at 18–19.

In the present case, the ShotSpotter report indicates that there were two occurrences of a “Single Gunshot” type of incident. Ex. 1. On March 15, 2014 ShotSpotter detected two impulsive events. Tr. at 54. Both incidents were detected by five sensors. *Id.* at 56. Mr. Greene created a forensic report on the reported incidents. *Id.* at 54; *see* Ex. 2. To create this report, Mr. Greene reviewed the audio and the location that the system created. Tr. at 56. Mr. Greene found no error, specifically relocating one shot by less than one yard. *Id.* Mr. Greene testified that he confirmed the locations of the incidents, and saw no erroneously located pulses and performed no corrections. *Id.* at 58. Mr. Greene believes that both incidents were gunfire. *Id.* at 56. The ShotSpotter’s detection of gunshots is further bolstered in this case by the recovery of a shell casing found at the mouth of an alley located behind the victim’s house, very close to the locations listed in the ShotSpotter report.² Therefore, the Court finds that in the present case, the methodology used produced reliable results.

CONCLUSION

Both prongs of the *Frye-Mack* test have been sufficiently demonstrated. Multilateration is a generally accepted mathematical and scientific technique for locating a geographic point from other known geographic points. The other components of ShotSpotter are tools for the collection of data for the sound multilateration process, and checks on the process as a whole. The methodology utilized has foundational reliability. Further, the methodology as used in the present case produced reliable results.

Based on the foregoing the Defendant’s motion to exclude is denied.

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² The police report, attached to Defendant’s Memorandum as Exhibit A, lists the “Incident Details... Address,” “Victim... Residence,” and “Witness... Residence” as “2303 Bryant AV N Apt. UPPER Minneapolis, MN 55411”. Def’s Mem., Ex. A. This Bryant address is 213 feet or a one minute walk from 912 23rd Ave N (the address listed in the ShotSpotter report for Incident # 84457) and 285 feet or a one minute walk from 914 23rd Ave N (the address listed in the ShotSpotter report for Incident # 84456). Ex. 2; GOOGLE MAPS, <https://www.google.com/maps>.

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA
IN AND FOR THE COUNTY OF CONTRA COSTA
BEFORE THE HONORABLE CLARE MAIER, JUDGE

--oOo--

THE PEOPLE OF THE STATE OF CALIFORNIA,
Plaintiff,

vs.

No. 5-121583-9

TIMONTE COOK,

Defendant.

/ **CERTIFIED COPY**

REPORTER'S TRANSCRIPT OF PROCEEDINGS

DEPARTMENT NO. 36

A.F. BRAY BUILDING, MARTINEZ, CALIFORNIA

NOVEMBER 25, 2014

A P P E A R A N C E S

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Contra Costa County

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Official Court Reporter, CSR License No. 12139

1 NOVEMBER 25, 2014

MORNING SESSION

2 --o0o--

3 P R O C E E D I N G S

4
5 THE COURT: I'm on the record in the matter of
6 People versus Timonte Cook.

7 Both attorneys are here as well as the
8 defendant.

9 Mr. Jallepalli, do you have any further
10 evidence?

11 MR. JALLEPALLI: I do not.

12 I would seek to admit People's 6 through 19
13 which were the various exhibits.

14 THE COURT: You mean Court's?

15 MR. JALLEPALLI: I'm sorry, Court's Exhibits 6
16 through 19 which were the various exhibits that were
17 proffered or demonstrated during our Kelly-Frye hearing
18 yesterday.

19 THE COURT: Mr. Brown?

20 MR. BROWN: No evidence.

21 THE COURT: Those exhibits are received in
22 evidence.

23 *(Court's Exhibits Nos. 6 through 19 were*
24 *received in evidence.)*

25 THE COURT: Mr. Brown, do you have any
26 evidence for the Court?

27 MR. BROWN: No. Argument only.

28 THE COURT: And do you wish to be heard with

1 regard to the *Kelly-Frye* exclusion?

2 MR. BROWN: I do, Judge. And as we discussed
3 yesterday, would the Court consider, People consider the
4 argument on being cumulative and relevant at this time
5 also.

6 THE COURT: Okay. So with regard to the
7 cumulative argument, I think I would need to just first
8 rule on *Kelly-Frye* --

9 MR. BROWN: Right.

10 THE COURT: -- as to its admissibility.

11 MR. BROWN: Yes.

12 THE COURT: And then move on to cumulative,
13 and that would likely be addressed in the context of the
14 remaining evidence of the trial. Because Mr. Jallepalli
15 did mention -- and maybe I'll just let you speak for
16 yourself -- something to the effect of certain other
17 acts, certain other events and records would coincide to
18 compel you to argue a circumstantial evidence pinning,
19 I would guess, Mr. Cook to the scene. But that what was
20 implied by your comments, I believe, when we were in
21 chambers yesterday.

22 MR. JALLEPALLI: Correct. And it's actually
23 two things. One is the time stamp shows the shooting in
24 relationship to phone activity by Mr. Cook where
25 Mr. Cook's phone appears to be going from his residence
26 in Pinole to the location or towards the location of the
27 shooting in San Pablo and then back to Pinole, and that
28 back and forth, the time of the shooting is identified

1 basically consistent with him being in San Pablo near
2 the scene of the shooting.

3 The second thing is -- and I didn't have a
4 chance to mention this yesterday -- the audio recording
5 does tend to corroborate some of the information that
6 Ms. Millard gave when she was giving her description a
7 couple of days after the murder about how the shots
8 sounded, things like that. Obviously, yes, she can
9 testify to that, but in having the sound itself,
10 essentially an irrefutable audible recording of the
11 shooting, does tend to corroborate.

12 It's my understanding from her testimony at
13 the preliminary hearing that she recanted her
14 identification, so evidence that corroborates her
15 statements at the time she made the identification,
16 obviously, then become even more relevant.

17 So as to relevance, those are sort of the two
18 main areas that would be important to the People.

19 THE COURT: Mr. Brown, anything further?

20 MR. BROWN: Now?

21 THE COURT: Yes.

22 MR. BROWN: Okay. In regards to Kelly-Frye,
23 Judge, I believe that the standard that is required has
24 not been met.

25 The cofounder of SST testified to the fact
26 that he only recalls one time testifying in court as an
27 expert. He did indicate that his cofounder had
28 testified much more often but in regards to custodial

1 aspects of the company primarily. He cannot respond to
2 Mr. Jallepalli's question in regards to the substantive
3 testimony that his partner or cofounder had given.

4 Going on, additionally, though the science can
5 be documented as having been used in the battlefield
6 theater in various cities across the country, it still
7 appears to be an evolving science. When you think in
8 terms of the number of cities that exist in this country
9 and you consider the total that ShotSpotter is
10 established in, which I believe the testimony was
11 approximately 70, there have been instances of which
12 cities have stopped using ShotSpotter for various
13 reasons ranging from economics to a lack of reliability
14 of the instrument itself. When I asked the expert
15 directly has there been a -- well, strike that.

16 His testimony was it was their intent that
17 ShotSpotter would help to lead to a decrease in the
18 number of shootings in municipalities. And when asked
19 to respond to that assumption, if the Court recalls, the
20 expert was somewhat hesitant. He also acknowledged that
21 there was not -- even though there were no hard numbers,
22 there was not the decrease as expected.

23 And the Court, even though it didn't get
24 entered into evidence and is not part of the evidence in
25 this case, just from a perusal of the paper on a daily
26 basis over the last couple of years would show that both
27 Oakland and the Richmond area, which have ShotSpotters,
28 have not led to a decrease in shootings nor an increase

1 in the conviction rate. As a matter of fact, Oakland
2 fluctuates, Richmond fluctuates, but they both have been
3 on an upward spiral or a constant upward spiral in the
4 number of shootings and killings that have occurred.

5 When you take into account is this
6 something -- would the evidence that this testimony
7 would attempt to show or demonstrate if it was given by
8 a layperson on the stand, do we need to supplement that
9 with the testimony of an expert, is it beyond something
10 the everyday comprehension of a jury in this case that
11 shots were fired, someone was killed. I don't believe
12 we need that.

13 It is not beyond the testimony -- I'm assuming
14 the People will call officers in here. They responded
15 to the scene at a certain time, what have you, the time
16 proximity in regards to the recording of the shots, the
17 response of the officers, the paramedics would be close
18 enough that we don't need the expert testimony to convey
19 that information to a jury that a gun was fired, that
20 someone was, in fact, killed.

21 It would serve only the purpose, in my mind,
22 of being a testimonial to the ShotSpotter company. It
23 doesn't in any way enhance the movement of this case in
24 regards to were shots fired and at what time. And
25 that's in regards to the Kelly-Frye aspect. In regards
26 to the others -- well, does the Court want to hear that
27 now or do you want me to waive on that?

28 THE COURT: I think let's just stick with

1 Kelly-Frye for right now. Thank you.

2 Mr. Jallepalli.

3 MR. JALLEPALLI: Just briefly.

4 One, I don't think that we can ever disqualify
5 science on the grounds that it's an evolving science.
6 I think all sciences, when we're talking about
7 fingerprints, genetics, physics, is an evolving science.

8 In terms of the cities that kept or didn't
9 keep ShotSpotter, I think Mr. Dunham was very clear he
10 could not speak to personal knowledge about why cities
11 did not continue to use it.

12 I would submit that saying that if a city
13 could no longer afford to use ShotSpotter that that's
14 evidence of lack of reliability of the science would be
15 like something in a city no longer maintains its own
16 crime lab, its own genetics lab to do DNA work, that
17 that would somehow be an indictment against DNA.

18 In terms of the intent to reduce the number of
19 shootings. One, I can't speak to Oakland. Mr. Brown
20 may be right on that point. But my understanding is
21 that actually shootings have gone down. But, frankly,
22 I don't think that's really here nor there because,
23 again, whether or not gun violence or violence of any
24 kind of crime of any kind goes down does not necessarily
25 speak to the underlying legitimacy of the science.

26 In this case you have the three-prong
27 Kelly-Frye. We have not only Mr. Dunham's testimony but
28 also Mr. Beegle's. The court in Kelly did make these

1 sort of broad expansive statements about saying, "We
2 want numerous witnesses." The court is interpreting
3 Kelly somewhat perhaps recognizing the plausibility of
4 someone qualified that and some have even said one
5 witness, even the director of a DNA lab, for example,
6 can be sufficient to show general acceptance. Indeed,
7 I would argue that that language in Kelly may be of
8 questionable validity in light of both the statutory and
9 judicial law that says that the testimony of a single
10 witness can prove any point. But in this case, I think
11 that's moot because we do, in fact, have both witnesses.

12 In addition, we have not only the testimony of
13 these two witnesses, we have a body of literature
14 specific to ShotSpotter. We also have testimony that
15 the underlying fields related to ShotSpotter have been
16 extensively reviewed, peer-reviewed.

17 I had noted in my moving papers that the
18 definition of peer review is actually a pretty broad one
19 under the *Hill* case. Even documents generated by the
20 proponent of the science or the proponent of the
21 technology can qualify as peer review.

22 In addition, there is the Nebraska Supreme
23 Court case which I cited and provided a copy to this
24 Court and counsel, *Thylun, T-H-Y-L-U-N, Hill*, usual
25 spelling, a case from the Nebraska Supreme Court,
26 granted that was under the *Daubert* standard, but I do
27 think that the courts recognize that that is something
28 that assists the court.

1 To the extent that much of what ShotSpotter
2 would tell us other than the audio is something that is
3 visually and essentially comparable to a layperson,
4 arguably that actually undercuts the need for Kelly-Frye
5 or the concerns of Kelly-Frye.

6 I had cited in my point in *I.D.* case from my
7 moving papers where it held that, for example,
8 fingerprints, you know, the layperson can say, "This is
9 what the fingerprint from the crime scene looked like,
10 this is what the defendant's fingerprint looked like,
11 they look like they match."

12 So, really, the concerns that Mr. Brown brings
13 up go to quashing or reducing concerns about the jury
14 being unduly impressed or unduly swayed by the science
15 and the technology.

16 But be that as it may, I think that again the
17 People have met our burden. We have established
18 compliance with *Kelly-Frye*. Mr. Dunham testified that
19 the tests were performed using the standardized software
20 that he developed to incorporate the multilateration
21 methodology. And obviously, again, we have that
22 evidence where we know that, in fact, the correct
23 procedures were used because they arrived at the correct
24 result, a quantifiable known, correct result. So based
25 on that, I do think the People have met our burden.

26 I believe I've already touched on the
27 relevance, but I would reserve further comment on that.

28 THE COURT: Mr. Brown, submitted with regard

1 to Kelly-Frye?

2 MR. BROWN: Couple additional comments in
3 response to what the People just indicated.

4 I believe the analogy to fingerprints would be
5 inappropriate in this matter. That would be that is
6 evidence directly related to the defendant when a
7 defendant says, "I didn't do it," or the People are
8 trying to confirm that he or she did it, presenting
9 evidence that once fingerprints are at the scene is
10 personally connected to the defendant. The ShotSpotter
11 is not directly connected to the defendant. It is more
12 an abstract connection in the sense that they're trying
13 to say events occurred, they're not -- the instrument
14 itself is not identifying the individual, it's
15 identifying events that occurred that are not directly
16 connected to a defendant in the same sense as
17 fingerprints or voice ID.

18 So in that regard I would say there is a
19 difference. I would think also that the testimony
20 presented in this case, while it tried to present much
21 more than what was presented before Judge Kennedy a
22 short time back, I believe that the observations and
23 findings that he made, and if the Court has reviewed
24 that matter, I believe that the same issues exist and
25 I would ask the Court to rule in the same way, that it's
26 inappropriate at this time and the requirements have not
27 been met.

28 Thank you.

1 THE COURT: Mr. Jallepalli, submitted?

2 MR. JALLEPALLI: Yes.

3 THE COURT: All right. I listened very
4 carefully to the evidence. And as you both know,
5 I spent a bit of time, more than I would like to admit,
6 preparing for the hearing. And I found in particular
7 the attachments to Mr. Jallepalli's opposition helpful
8 once I waded through them.

9 I will note that of the Court's exhibits that
10 were admitted, almost all of them are in the packet, but
11 there were additional materials that I did consider
12 including the Nebraska Supreme Court case which
13 Mr. Jallepalli just referenced, as well as I looked very
14 carefully at Judge Kennedy's decision with regard to the
15 Kelly-Frye standard and the difficulties or the
16 omissions that he found which made this particular
17 technology fall short of being generally accepted in the
18 relevant scientific community.

19 I will not repeat all of what he had to say,
20 but I will note that the Kelly-Frye standard is
21 important to be upheld because jurors may give undue
22 weight to experimental techniques presented by
23 credentialed experts whose testimony may convey an aura
24 of scientific certainty.

25 There are three prongs to Kelly-Frye, and the
26 first prong is the test must be generally accepted in
27 the relevant scientific community, there must be a
28 consensus drawn from a typical cross-section of relevant

1 and qualified scientific -- or scientists; and the
2 second prong, the testimony must be given by properly
3 qualified experts; and the third prong, the correct
4 procedures must have applied in the case at issue.

5 I would agree with Judge Kennedy that the
6 primary field of the relevant scientific communities is
7 acoustic engineering. However, in addition, sound
8 propagation, wave propagation, and computer science of
9 developing software in order to make the calculations of
10 location are all implicated in this technology.

11 The information that was before Judge Kennedy
12 included a Popular Science magazine article from 1918
13 which referenced the use of multilateration to locate
14 German guns in World War II, a U.S. Geological Survey in
15 the 1990s that was referred to but was not in evidence,
16 and the ShotSpotter's test-firing in Richmond, and then
17 finally an anecdotal questionnaire commissioned by
18 ShotSpotter conducted independently by the National
19 Organization of Black Law Enforcement Executives. This
20 study I did not have before me, nor did I have the
21 Popular Science article nor the test-fires in Richmond.

22 But in general, Judge Kennedy also reviewed
23 the article by Robert Calhoun which describes the
24 science and technology of acoustic gunshot location.
25 I do not believe he had the two articles that Mr. Dunham
26 coauthored, "Three Layers of Battlefield Gunfire
27 Protection - Soldier, Vehicle, and Area Protection
28 Sensors," as well as -- that's Court's Exhibit 8 -- as

1 well as Court's Exhibit 7, "Acoustic Gunshot Location in
2 Complex Environments - Concepts and Results." Those
3 were not before Judge Kennedy.

4 MR. JALLEPALLI: I'm sorry, Your Honor, I do
5 apologize. I wanted to interrupt just to clarify for
6 the Court, the Calhoun presentation to the New Jersey
7 forensic scientists was not actually in evidence.

8 Directing the Court --

9 THE COURT: I'm sorry, which is Court's 9.

10 MR. JALLEPALLI: So --

11 THE COURT: "The Science and Technology of
12 Acoustic Gunshot Technology."

13 MR. JALLEPALLI: Correct. The presentation by
14 Dr. Calhoun. And just to direct the Court at
15 Judge Kennedy's ruling on page 4064 --

16 THE COURT: Yes?

17 MR. JALLEPALLI: -- he notes that there were
18 references to the presentation but that it was not
19 admitted into evidence itself.

20 THE COURT: I see.

21 MR. JALLEPALLI: So just to clarify the record
22 on that point.

23 THE COURT: Thank you.

24 But what was not before Judge Kennedy were the
25 articles that had been presented to this Court
26 including -- well, I believe the patents were before
27 Judge Kennedy. But the thesis provided by the Naval
28 Postgraduate School which I noted I did not find it

1 tremendously helpful, although what is premised within
2 that article is a clear acceptance of the reliability of
3 the ShotSpotter technology.

4 Although the thesis was focused on a
5 comparison of the functional concept of battlespace
6 awareness versus the concept of power to the edge,
7 meaning a distribution of power, as opposed to a
8 hierarchical structure in power which is very typical in
9 military operations, necessitated by the advances in
10 technology and focusing on ShotSpotter as the impetus to
11 changing the very structure of how the battlefields
12 might be run in the future based on this trend in
13 technology with very realtime information being provided
14 to the troops so immediately.

15 So despite the fact that that thesis really
16 wasn't an analysis of the accuracy of the ShotSpotter
17 technology, it was clearly an acceptance in the
18 scientific community or the relevant community of the
19 validity of the ShotSpotter technology.

20 Moreover, Court's Exhibit 17, the "Distributed
21 Radar Network for Realtime Tracking of Bullet
22 Trajectory," is, for me, yet another article which
23 evidences the acceptance and analysis by peers of the
24 relevant technology as being not only acceptable but
25 reliable.

26 And the Court's 10, "Distributed Radar Network
27 Realtime Tracking of Bullet Trajectory," again an
28 article that does not solely focus on ShotSpotter but

1 the related technologies that use similar technology as
2 being accepted within the community.

3 And finally Court's 12, "Technological
4 Approaches to Controlling Random Gunfire."

5 So what was largely missing with regard to
6 Judge Kennedy's ruling has been amply filled here.

7 The peer review which also includes the
8 ShotSpotter experts -- and I will note that I found
9 Mr. Dunham to be highly qualified and proficient in
10 understanding his technology, working with the
11 technology and presenting it to the Court.

12 What wasn't presented are any conflicting
13 theories in the scientific community. And I did ask a
14 few questions of Mr. Dunham and the expert with regard
15 to the practicality of the system and the problems of
16 the system, meaning that would there be any what
17 I characterize as false positives, something that would
18 be gunshots that were heard by the audio that didn't
19 exist, phantom gunshots, and that basically was -- I was
20 assured was impossible, which I think for basic science
21 or basic acoustic science would agree with that.

22 There haven't been any new studies presented
23 to the Court that pose new challenges to any of these
24 assumptions, so no conflicting theories from the
25 scientific community were presented to the Court. The
26 technique has been peer-reviewed and all of the reviews
27 are positive and support the accuracy of the technology.

28 Moreover, I am noting that some portion of the

1 technology requires human interaction. The
2 interpretation of the audio clips, there may be, as
3 Mr. Brown noted, a margin of error, but that is an area
4 that's ripe for cross-examination, not an area which
5 would exclude the technology.

6 I would also note that the notion of a
7 decrease in a number of shootings needing to -- being
8 needed to validate the technology itself is not
9 necessary. The accuracy or reliability of the
10 technology does not hinge upon the result of less
11 shootings. It actually hinges on the result of noting
12 where the shootings occurred.

13 I'm looking at prong two and prong three,
14 although it was really the first prong of Kelly-Frye
15 that was challenged. In prong two was the expert
16 qualified to test about the technique. I found that
17 both Mr. Dunham as well as Mr. Beegle were both amply
18 qualified as experts in their area of expertise. The
19 experts both had the proper foundation to testify about
20 the technique.

21 And finally prong three was whether or not
22 correct scientific procedures were used in this case.
23 There was no evidence with regard to any problems with
24 the system. I appreciate the fact that there was
25 different topography in San Pablo, but it appears to be
26 addressed by the number of sensors. And once again, the
27 only deficit or problem would be they would miss
28 gunshots, and, in fact, I believe one of them was missed

1 on the Spotter. There were 15 shell casings found and
2 14 gunshots heard. And that again is an area that's
3 ripe for cross-examination, not ripe for admissibility.

4 So with that said, I am finding that all three
5 prongs of Kelly-Frye have been met and that the
6 ShotSpotter technology is admissible and is accepted in
7 the scientific community -- generally accepted in the
8 relevant scientific community, and therefore I will deny
9 the motion to exclude it.

10 So with that, I wanted to check with Mr. Brown
11 and see if there are any further motions in limine or
12 should we just talk about planning for trial?

13 MR. BROWN: Was the Court going to hear the
14 argument on it being cumulative?

15 THE COURT: Oh, I'm sorry. On the second part
16 of it, with it being redundant as well as --

17 MR. BROWN: Cumulative.

18 THE COURT: Cumulative, thank you. Please --
19 excuse me -- relevant and cumulative. Please proceed.

20 MR. BROWN: Thank you, Judge.

21 In regards to the cumulative issue, I'd like
22 to begin.

23 THE COURT: Please proceed.

24 MR. BROWN: With that, the People have a slew
25 of witnesses to testify in this case. They will be
26 testifying, be it police officers or witnesses at the
27 scene, testifying as to the fact that shots were fired,
28 the victim was killed. There will be people called who,

IN THE DISTRICT COURT OF DOUGLAS COUNTY, NEBRASKA

STATE OF NEBRASKA

Case No. CR 12-861

Plaintiff,

THYLUN M. HILL,

Defendant.

ORDER

COPY

Pending before the Court is Defendant's Motion *in Limine* to determine the admissibility of expert testimony and expert conclusion and opinion related to technology known as "ShotSpotter". Hearing was had on January 31, 2013. The State was represented by Jim Masteller and Shawn Hagerty. Kelly Steenbock and Cindy Tate appeared with and on behalf of Defendant. Evidence was adduced and briefs were scheduled to be submitted. Upon receipt of the final written submission on March 18, 2013, the Court took the matter under advisement. The Court has carefully reviewed the evidence, the relevant legal authorities, and the arguments and briefs of counsel.

ShotSpotter is an acoustic gunfire detection and location system designed to detect a gunshot, within seconds, and provide accurate location information to the customer. Additionally, the system is able to archive the audio information for later forensic analysis. Plaintiff presented evidence from Paul Greene ("Greene"). Greene's education and experience is set forth in Exhibit 6. Greene is currently employed for SST, Inc. He is a lead customer support engineer and forensic engineer for the company. SST, Inc. manufactures, installs, services and interprets data from ShotSpotter. The Omaha Police Department contracted with SST, Inc. and the ShotSpotter system was installed in a particular area of Omaha, NE in 2011. At the time a system is first installed in a

coverage area, a live fire test is conducted to verify that the system is functioning properly. This testing was conducted when the technology was located in Omaha, NE.

ShotSpotter's General Technology

Generally, the ShotSpotter system is a network of audio sensors designed to detect impulsive audio pulses (sounds) generated within a designated coverage area. Arrays of microphoned sensors are dispersed within a particular geographic area (designated by the client city). Sensors are linked to a centralized processing server that has an interface with local dispatch personnel. The sensors record and measure the sounds and the server calculates geographic location and transmits that information to local personnel. When a particular detected sound is initially classified as a gunshot, the sensor maintains a copy of the actual recorded sound and transmits it to the server. To account for the possibility of an initial false positive identification of an impulsive audio pulse as a gunshot, the system will have the actual recorded sounds from the sensors transmitted to the ShotSpotter Incident Review Center ("IRC"). The IRC provides for a trained operator to listen to the available sounds and reclassify if necessary. Upon review, the operator publishes the event to the client's dispatch personnel with the click of a button. A Flex Alert Console ("FAC") plays an alert noise and flashes. The FAC zooms in on street address, time and designates the incident as a single or multiple gunshot event.

Triangulation

ShotSpotter sensors are distributed, within the coverage area, at distances of 400 to 500 meters. This distribution is designed by the ShotSpotter technicians to obtain the

best possible acoustic triangulation of sound waves emitted from gunfire. As a sensor detects an impulsive sound, the input is transmitted to an Omaha Central system server location that triangulates the location by computer. A ShotSpotter sensor has a known range of detection for impulsive sound, up to two miles (Ex. 7). Also each sensor has an accurate time source. Time is measured by the system in thousands (.001) of a second, using the atomic clock. The speed at which sound travels is a known variable. Triangulation is accomplished with a comparison of the data from individual sensors. As the impulsive sound reaches each sensor, the difference in distance between the impulsive sound and each sensor can be determined within a radius. There will be overlap in the detection radius of the two sensors (portrayed as a differential hyperbola in Figures 7, 8 and 9 in Ex. 7). Triangulation requires detection by three or more sensors. The principle related to the third detecting sensor is similar. The three overlapping detection radius circles will now only have one location of intersection which will be the probable location of the sound. The more sensors that detect the sound, the more detection radius circles (differential hyperbola) will be plotted thereby narrowing the location as they intersect. ShotSpotter utilizes a minimum of three sensors detecting a single gunshot sound to triangulate and a fourth sensor detection to confirm. Multiple gunshot sounds involve a repetition of pulse data and therefore only three sensors are minimally necessary for triangulation. The actual ShotSpotter technology is more sophisticated in identification of location, as it recognizes and accounts for the fact that sound will reduce in amplitude over distance, the closer sensor will detect a better wave form. The principals involved in triangulation are well established and recognized in the fields of mathematics and physics. Triangulation is recognized in various scientific

disciplines, including of sonar applications and seismology, as a methodology for location of an event.

ShotSpotter guarantees 80% of detectable outdoor gunfire will be picked up and accurately located. (Ex. 8) ShotSpotter's triangulation calculation is 100% accurate within a twenty-five meter radius circle. Although the twenty-five meter radius circle is the company's designated range for accuracy, Greene testified that ShotSpotter regularly accurately detects location to within a ten foot radius circle.

Classification

Each ShotSpotter sensor takes the input from its microphone and compares the impulsive audio pulse against twenty-eight (28) different audio characteristics, such as amplitude of the pulse, sharpness, medium frequency, the bass, the rise time, and the duration of the pulse. The 28 preprogrammed criteria or measurements are intended to identify sounds that are consistent with the previously identified characteristics made by a gunshot. If the impulsive audio pulse meets the preprogrammed criteria in the digital signal processor (those predetermined to be consistent with a gunshot), the sensor then marks it with a time stamp from the GPS receiver and transmits its measurements to the central server.

After the audio impulse origin location is identified, the location server then begins a process known as classification. In the classification process, the location server initiates an automated process of comparing the audio measurements taken by the sensors to a different set of criteria in order to classify the incident as a single gunshot, multiple gunshots, fireworks, possible gunfire, explosions, among other possible impulsive noises.

The purpose of the classification process is to identify and eliminate any impulsive noises that are not gunshots. If the impulsive noise is determined by the classification process to be a single gunshot, multiple gunshots, or possible gunshot, the sensors are requested to transmit audio recordings of the incident to the server and SST's IRC will receive an alert.

The IRC will conduct an individual review of each incident referred, to further verify the classification of the impulsive noise as a single gunshot, multiple gunshots, or possible gunshot. This review is not done by the computer; rather, the operator at the incident review center will listen to all of the available audio recordings of the incident and make a determination as to whether or not the incident is consistent with gunfire. If the operator believes the incident is not an incident involving gunfire, the operator will reclassify the incident. However, if the operator believes that the incident does involve gunfire, they will classify it as a single gunshot, multiple gunshots, or a possible gunshot and then forward all the pertinent information to the customer.

Operators at the IRC typically have experience and are familiar with the sounds of gunshots. Individuals with musical backgrounds who are proficient in distinguishing tone variations are also hired as operators. Once hired, the operators go through an initial training program and are required to review 500 audio recordings of known gunfire as well as 500 audio recordings of sounds known to not be gunfire. (At the completion of this initial training, operators must complete a proficiency exam where they must correctly identify incidents as gunfire or not gunfire with an accuracy rate of at least 80 percent.) After being hired, the operators receive ongoing training and continue to review impulsive audio pulses known to be gunfire. Operators are also tested for proficiency

every quarter. SST, Inc. has seen the accuracy of their operators in classification actually increase over the duration of their employment.

Greene testified that there is no recognized rate of error for classification and it is not guaranteed. In his opinion, a gunshot is more likely to be missed than misclassified. The client is directed to attempt to confirm any incident classification with a scene investigation to determine "ground truth". This would include witnesses or physical evidence.

Forensic Analysis

Upon request of the customer, SST will generate a detailed forensic report with the assistance of an engineering application which allows the analysts to duplicate the process from the central server at a slower speed. The analyst is able to examine the archived sensor data points and recordings, verify time stamps, locate each separate gunshot and locate each shot onto a Google Earth map. A written report is prepared for the client and includes a graphic representation of the differential hyperbola for triangulation, the audio recordings of the detected gunshots and pictorial representations (graphic audio wave form) of the audio files. As gunshots have a characteristic audio wave form, a pictorial representation provides an additional verification to the analyst. The author of the forensic report will also listen to the audio recordings, applying training and experience in gunshot sound recognition, to verify the original classification. A forensic analysis was performed by Greene and submitted as Ex. 7. Greene concludes that "ShotSpotter detected three gunshots incidents on February 18, 2012. Further, after review, the locations and times of seven rounds fired were calculated". (Ex. 7, p. 13).

Discussion

The decision to admit or exclude expert testimony is an issue of fact for the Court under Neb. Rev. Stat. 27-104(1). Defendant challenges the admissibility of Plaintiff's proffered technology, ShotSpotter, as well as any conclusions and opinions derived from the data generated by the ShotSpotter system.

The Defense argues that ShotSpotter technology does not meet the criteria for admissibility from *Daubert* and recognized in *Shafersman v. Agland Coop*, 262 Neb. 215, 631 N.W. 2d 862 (2001).. *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993); *State v. Tolliver*, 268 Neb. 920, 689 N.W.2d 567 (2004).

"Before admitting any expert opinion testimony, the trial court must determine whether the expert's knowledge, skill, experience, training, and education qualify the witness as an expert. If the opinion involves scientific or specialized knowledge, trial courts must also determine whether the reasoning or methodology underlying the expert's opinion is scientifically valid." *State v. Casillas*, 279 Neb. 820, 835-36, 782 N.W.2d 882, 896-97 (2010).

Paul Greene testified for the State. As previously mentioned, his qualifications are set forth in Ex. 6. The Court will not repeat those here. Of note, Greene has extensive experience in hearing and recognizing gunshot sounds and in IT system design and operation. The Defense does not raise a challenge to Greene's qualifications. The Court finds that Greene is qualified as an expert in the design, installation and function of the ShotSpotter system. Further, the Court finds Greene to possess sufficient knowledge,

skill, experience, training and education to qualify him to be an expert in gunshot sound recognition. Therefore, if the ShotSpotter technology is scientifically reliable and the methodology used to arrive at conclusions from the data produced by ShotSpotter is reliable, then Greene's conclusions are admissible.

The Defense does not challenge the underlying mathematical and physics principles incorporated by ShotSpotter to triangulate location. Instead, Defendant challenges ShotSpotter's testing, positioning, and maintenance of the sensors and the process of classification of an individual impulsive sound as a gunshot.

Defendant alleges that SST failed to conduct reliable testing at the time of installation of the ShotSpotter system in 2011. Greene testified that there is testing done with an individual system. This testing is done after the sensors are installed and is used to ensure sensor accuracy and to help calibrate the sensors. The client selects 3 to 5 locations within a coverage area. Shots will be fired at the select point and a SST project manager will record the number of shots, the caliber and type of weapon, the GPS location of the shooter and the time. The system is then allowed to operate as designed and the documented information is compared to the ShotSpotter system output for verification. Greene testified that, upon testing and evaluation, the Omaha system operated accurately to record and locate the shots. The Defense argues that since the SST project manager was present, the testing was not sufficient. Defense contends that the testing was not "blind". Blind studies are useful in predicting scientific reliability. Although blind testing is certainly preferred when determining proficiency in laboratory technicians, it is not a necessary requirement in determining if electronic equipment operates properly. Essentially, blind testing requires that the individual performing the

test not be aware of the correct outcome. There is no evidence to suggest that the SST technician interfered with the testing results or somehow influenced the outcome. Even in true “blind” testing, the final result obtained by the “test” must be compared to a predetermined accurate set of data. For the geolocation portion of the “live fire” testing, the Defense argument is not persuasive. Arguably the operators at the IRC should have no “inside information” when participating in a “live fire” test. However, due to the speed at which the entire process of the system operates (less than one minute from trigger pull to alert) it is difficult to imagine how tampering could occur. Additionally, Greene testified that the operators are subjected to proficiency testing separate from the “live fire” tests of individual systems.

Rule 702 reflects an attempt to liberalize the rules governing the admission of expert testimony. The rule clearly is one of admissibility rather than exclusion. Under Rule 702 and *Daubert* the court serves as gatekeeper to ensure that a witness is qualified as an expert by knowledge, skill, experience, training, or education, that the testimony is based upon sufficient facts or data, . . . [and] is the product of reliable principles and methods, and that the witness [applies] the principles and methods reliably to the facts of the case. When evaluating the methodology that an expert witness applies, it may be important to consider (1) whether the theory or technique can be (and has been) tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the known or potential rate of error; and (4) whether the theory has been generally accepted. These factors are not exclusive, however, and they need not be considered in every case because, [o]f course, the *Daubert* reliability factors should only be relied upon to the extent that they are relevant and the district court must customize its inquiry to fit the facts of each particular case. The inquiry envisioned by Rule 702 is, we emphasize, a flexible one.

Shuck v. CNH Am., LLC, 498 F.3d 868, 872-875 (8th Cir. Neb. 2007) (internal citations omitted). See *Lauzon v. Senco Prods., Inc.*, 270 F.3d 681, 686 (8th Cir. 2001);

Weisgram v. Marley Co., 169 F.3d 514, 523 (8th Cir. 1999), *aff'd*, 528 U.S. 440, 120 S. Ct. 1011, 145 L. Ed. 2d 958 (2000); *Arcoren v. United States*, 929 F.2d 1235, 1239 (8th Cir. 1991); *Peitzmeier v. Hennessy Indus., Inc.*, 97 F.3d 293, 2971020; *Jaurequi v. Carter Mfg. Co.*, 173 F.3d 1076, 1083 (8th Cir. 1999).

Defendant argues that there is no scheduled maintenance of the sensors and there is no way to determine, at the time an incident occurs, whether all sensors were working properly. The evidence indicated that faulty sensors are replaced when the overall system function is reduced by 10%. This means when the active sensor count falls below 90%, a technician will be sent to replace the faulty sensors. Sensors are constantly monitored for sensor health, including the on board microphones and the GPS system. Each sensor sends a pulse every 30 seconds to ensure contact with the system. If a sensor is defective there will be no contact with the system. The sensor array is configured, within the coverage area, to be able to accurately detect sound location even with a loss of up to 20% of the sensor capability. There are sufficient safeguards in the protocol to support the reliability of the technology. If a sensor is faulty, no data will be obtained and transmitted to the server for incorporation into the final analysis, therefore as long as the minimum number of sensors detect and transmit an incident, the results are not affected by a faulty sensor. The direction of orientation of the sensor is not important to triangulation. The microphones are placed in several directions on each sensor and the resulting location information radiates in a circular pattern from each sensor accounting for all direction. It is the intersection of the various radius boundaries that is significant.

The mathematical and scientific principles utilized by the ShotSpotter program to determine the location of an impulsive audio pulse represents widely recognized, reliable methodology for triangulating a location.

Defendant's final challenge is to the classification protocol or process. Final classification is a three step process. The forensic analysis is the review of the location and verification of the three step classification process. The determination that a particular impulsive audio pulse is a gunshot is made in three phases. First, the sensor's digital signal processor determines whether the audio pulse meets the preprogrammed criteria of 28 audio characteristics. Next, the location server will compare the audio pulse to additional criteria, and finally, if the classification is still that of a gunshot, the location server will transmit the audio to the IRC to be reviewed by a trained operator for final classification.

This Court recognizes that science is distinguished from other fields of study by the application of the "scientific method". The "scientific method" creates a reviewable framework to test hypothesis and render conclusions. The responsibility of the Court is to ensure that evidence, under the guise of expert opinion, is not simply subjective and conclusory without an assessment of reliability. However, competing experts will often argue as to the significance and interpretation of particular steps in reliable protocols. The Nebraska Court has recognized that an expert's opinion must come from a sound, reasonable basis "such that an expert is able to express a reasonably accurate conclusion as distinguished from a mere guess or conjecture." *Kirchner v. Wilson*, 262 Neb. 607, 614 (Neb. 2001).

The first and second steps in the classification process rely on certain predetermined criteria to conclude that the sound detected should be classified as gunfire. The criteria are arrived at by the developers of the ShotSpotter program as being those criteria consistent with the characteristics of the sounds made from gunshot. The sensor's digital signal processor takes measurements of particular sounds. Those measurements are compared with the 28 preprogramed characteristic measurements. These characteristics (measurements) include the amplitude (loudness), the sharpness, the medium frequency, the base, the rise time, and the duration of the pulse. If the sound meets the 28 characteristic measurements, it will be time stamped, called "impulsive" and sent to the server. The server determines, based upon these measurements, whether the incident is classified as a single, multiple, or possible gunshot. If any of these classifications are given, the incident is referred to the IRC for the final level of screening. If a sound is consistent with the identified characteristics and is classified as a gunshot(s), the third step involves an IRC operator actually listening to the sounds as recorded. Since the system has "been known" to give a false positive, the operator will listen to all available sound to draw their own conclusion. The operator has the discretion to reclassify the pulse. The operators, or incident reviewers, are usually people familiar with firearms. Some have musical experience. SST seeks people with a more developed ear. Their training includes frequently listening to live gunfire and reviewing at least 500 known audio files from gunshot incidents. They also listen to another 500 known audio files that are not gunfire. Then they are tested with the known audio files without knowing whether they are confirmed gunfire. The reviewers also train on a year's worth of customer audio data and conduct reclassification of the incidents.

The first two steps in classification involve the application of predetermined criteria to a sound captured by the sensors. Those criteria are screening tools based upon the company's determination that they are most consistent with gunfire sounds. Whether the criteria are appropriately chosen is a matter for cross examination, not admissibility. The Nebraska Supreme Court and the Eighth Circuit have examined whether erroneous factual assumptions require the exclusion of an opinion. "As a general rule, the factual basis of an expert opinion goes to the credibility of the testimony, not the admissibility, and it is up to the opposing party to examine the factual basis for the opinion in cross-examination. Only if the expert's opinion is so fundamentally unsupported that it can offer no assistance to the jury must such testimony be excluded." *Hose v. Chicago Northwestern Transp. Co.*, 70 F.3d 968, 970 (8th Cir. 1996) (internal citations and quotations omitted).

... [a]n appellate court is not a super expert and will not lay down categorically which factors and principles an expert may or may not consider. Such matters go to the weight and credibility of the opinion itself and not to its admissibility.

Kirchner v. Wilson, 262 Neb. 607, 614 (Neb. 2001) (quoting from *Nebraska Nutrients v. Shepherd*, 261 Neb. 723, 770, 626 N.W.2d 472, 510 (2001)).

There is a risk for a false positive classification of a sound as a gunshot. Classification is not guaranteed by the company and there is not a known rate of error. The ShotSpotter technology is based upon validated scientific principles but is designed primarily to meet the needs of law enforcement to respond quickly to a gunshot incident. It is not designed to prove that a particular sound was, *in fact*, a gunshot. However, an opinion that a *recorded sound is consistent with the sound made from a gunshot* can

reasonably be drawn by a trained, experienced individual upon review of the pictorial representations of the audio files and listening to the recordings themselves.

The final determination for the Court is whether the ShotSpotter technology and protocol has been applied in a reliable manner. *Carlson v. Okerstrom*, 267 Neb. 397, 675 N.W. 89 (2004). Greene performed a forensic analysis upon the information generated by the ShotSpotter program and protocol for the incident at issue, occurring February 18, 2012. His review of each step of the program revealed that the ShotSpotter program and protocol worked as designed. ShotSpotter sufficiently tests, supports, documents and archives all aspects of the protocol.

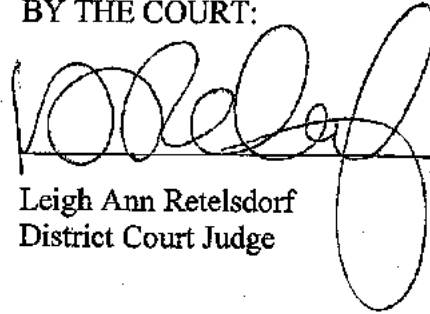
"[O]bservations coupled with expertise generally may form the basis of an admissible expert opinion." See *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 150, 119 S. Ct. 1167, 143 L. Ed. 2d 238 (1999); *Shuck v. CNH Am., LLC*, 498 F.3d 868, 872-875 (8th Cir. Neb. 2007). Based upon Greene's qualifications and expertise, the reliability of the ShotSpotter technology and the applicability of the technology to the facts in this case, the Court finds that Greene should be allowed to proffer an opinion as to the location of origin and time of the audio pulses, the number of recorded audio pulses and whether the audio pulses were consistent with those made by gunshots.

Therefore, the Court finds that Defendant's Motion *in Limine* should be overruled with the limiting qualification on the opinions to be offered by the State.

IT IS HEREBY ORDERED, ADJUDGED AND DECREED that the Defendant's Motion *in Limine* shall be overruled with the limiting qualification on the opinions to be offered by the State.

Dated this 22 day of March, 2013.

BY THE COURT:

A handwritten signature in black ink, appearing to read "Leigh Ann Retelsdorf", written over a horizontal line. The signature is stylized with large loops and a long vertical stroke extending downwards.

Leigh Ann Retelsdorf
District Court Judge

cc: Jim Masteller/Shawn Hagerty
Kelly Steenbock/Cindy Tate

MEMORANDUM DECISION

Pursuant to Ind. Appellate Rule 65(D), this Memorandum Decision shall not be regarded as precedent or cited before any court except for the purpose of establishing the defense of res judicata, collateral estoppel, or the law of the case.



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IN THE COURT OF APPEALS OF INDIANA

Bryant Johnson,
Appellant-Defendant,

v.

State of Indiana,
Appellee-Plaintiff.

November 22, 2016

Court of Appeals Case No.
71A03-1603-CR-672

Appeal from the St. Joseph
Superior Court

The Honorable Elizabeth C.
Hurley, Judge

Trial Court Cause No.
71D08-1508-MR-10

Robb, Judge.

Case Summary and Issue

- [1] Following a jury trial, Bryant Johnson was convicted of murder, attempted murder, and battery. Johnson appeals his convictions, raising the sole issue of whether the trial court abused its discretion in admitting certain evidence. Concluding the trial court did not abuse its discretion, we affirm.

Facts and Procedural History

- [2] In the early morning hours of August 1, 2015, Justin Sharpe and Marcus Harris were passengers in a green SUV driven by Stephen Johnson (“Stephen”). Around 2:30 a.m., Stephen pulled out of a gas station and proceeded toward an intersection near 301 North Lafayette Street in South Bend, Indiana. While stopped at the intersection, a champagne-colored Chevrolet Tahoe pulled up to right of the green SUV and a white vehicle pulled up behind the green SUV. Stephen recognized the driver of the Tahoe as Johnson. Johnson then pulled out a revolver and fired four bullets in the direction of the green SUV. One of the bullets struck Stephen in the shoulder and at least one bullet struck Sharpe. As Stephen attempted to drive away, an individual in the white vehicle also fired at least three bullets in the direction of the green SUV.
- [3] South Bend Police Officer John Cox heard the gunshots, but did not know where the sound was coming from until he received a ShotSpotter alert

notifying him the shots were fired near 301 North Lafayette Street.¹ Upon arrival at that address, police officers observed multiple bullet holes in the green SUV's front passenger-side window and door; Sharpe was pronounced dead at the scene from multiple gunshot wounds. Police officers then collected fragments of ammunition from the street and the green SUV indicating at least one of the guns used was either a .38 caliber special or a 357 magnum revolver. Some of these fragments recovered from the scene matched the fragments removed from Sharpe's body during an autopsy. On August 5, 2015, the State charged Johnson with murder, a felony; attempted murder as a Level 1 felony; and battery as a Level 5 felony.

[4] At trial, the State elicited testimony pertaining to ShotSpotter technology from Paul Greene, the lead forensic analyst and lead customer service support engineer for SST Inc., the manufacturer of ShotSpotter. Greene testified ShotSpotter is an acoustic gunshot detection and location system and its purpose is to provide law enforcement with rapid notification of when and where local gunfire occurs. The system uses microphone sensors with GPS antennas to detect gunshots by recording nearly twenty acoustic measurements and a location server that measures the latitude and longitude of the gunshots recorded. The system then plots the location of gunshots on a map and reports the location of gunshots to police departments. SST Inc. guarantees

¹ Evidence pertaining to ShotSpotter is the sole issue on appeal, which we discuss in detail below.

ShotSpotter will detect and locate at least 80 percent of all outdoor detectable gunfire and will locate that gunfire to within 25 meters of where the weapon was actually fired. So you take where the weapon is fired, draw a 25 meter line out, draw a big single [sic] and we guarantee that at least 80 percent of the time that gunfire will have originated within that 25 meter or 50 meter diameter circle, actually, which actually comes out to about 150 feet diameter, 160 feet diameter or so.

Transcript at 267. Greene explained the more sensors that record a gunshot, the more precise the system can be. For example, if at least five sensors record a gunshot, then it is likely the system will pinpoint a location on the map within ten meters of the gunshot's location. *Id.* at 267-69.

- [5] The State then moved to admit State's Exhibit 180, a detailed ShotSpotter forensic report of the August 1 incident. Specifically, the report includes a map showing the location of the shooting; a map showing the number of microphone sensors that recorded the shooting; and a table showing the exact time the gunshots were recorded and the strength and sharpness of the recordings. Johnson objected on the ground the report was cumulative. Specifically, Johnson expressed concern that one page of the report merely gave "a description about ShotSpotter" *Id.* at 271. The trial court agreed the one page was cumulative of Greene's previous testimony, but noted the remaining pages, which include the maps and tables, would assist the jurors in understanding Greene's testimony. Johnson objected again, this time arguing the remainder of the report was scientific evidence lacking proper foundation pursuant to Indiana Evidence Rule 702. Specifically, he expressed concern as

to how much ShotSpotter has been tested and whether it has been subjected to peer review. The trial court disagreed and overruled the objection as to the remainder of the report, noting, “I would find it to be . . . more of a weight issue than an admissible evidence issue and [an] argument that you could make, [Defense Counsel], should you choose to do so.” *Id.* at 274.

- [6] The jury found Johnson guilty as charged. At the sentencing hearing, the trial court entered judgment of conviction and ordered Johnson to serve an aggregate sentence of eighty-five years executed in the Indiana Department of Correction. This appeal ensued.

Discussion and Decision

I. Standard of Review

- [7] The trial court has broad discretion in ruling on the admissibility of evidence. *Washington v. State*, 784 N.E.2d 584, 587 (Ind. Ct. App. 2003). This court will reverse the trial court’s ruling only if it abused that discretion. *Id.* An abuse of discretion involves a decision that is clearly against the logic and effect of the facts and circumstances before the court. *Huffines v. State*, 739 N.E.2d 1093, 1095 (Ind. Ct. App. 2000) (citation omitted), *trans. denied*.

II. ShotSpotter Evidence

[8] Johnson argues the trial court abused its discretion in admitting State’s Exhibit 180.² Specifically, he contends the trial court failed to assess the reliability of the ShotSpotter technology pursuant to Rule 702(b). We disagree.

[9] Rule 702(b) states, “Expert scientific testimony is admissible only if the court is satisfied that the expert testimony rests upon reliable scientific principles.” Stated differently, “expert scientific testimony is admissible only if reliability is demonstrated to the trial court.” *Doolin v. State*, 970 N.E.2d 785, 787 (Ind. Ct. App. 2012), *trans. denied*.

The proponent of expert testimony bears the burden of establishing the foundation and reliability of the scientific principles. There is no specific test that must be considered in order to satisfy Rule 702(b). Rather, reliability may be established by judicial notice or, in its absence, by sufficient foundation to convince the trial court that the relevant scientific principles are reliable. In determining whether scientific evidence is reliable, the trial court must determine whether the evidence appears sufficiently valid, or, in other words, trustworthy, to assist the trier of fact.

Id. at 787-88 (citations and internal quotation marks omitted).

[10] Prior to admission of Exhibit 180, the State elicited extensive testimony from Greene. Our review of Greene’s testimony indicates he explained how the

² Johnson does not challenge Greene’s testimony or any other exhibits the State admitted that contained evidence pertaining to ShotSpotter.

ShotSpotter system operates to inform local law enforcement of any shots fired in their jurisdiction. Specifically, he explained how the system generates reports pinpointing the location of gunshots within twenty-five meters. As noted above, Exhibit 180 is a ShotSpotter report prepared by Greene with regard to the August 1 incident and it is clear by the trial court's own words it determined Exhibit 180 would "help" and "assist" the jurors "in understanding the testimony." Tr. at 272. Therefore, contrary to Johnson's assertion, the trial court properly assessed the reliability of the ShotSpotter evidence prior to the admission of Exhibit 180.

[11] In addition, we note "Rule 702 is not intended to interpose an unnecessarily burdensome procedure or methodology for trial courts." *Turner v. State*, 953 N.E.2d 1039, 1050 (Ind. 2011) (citation and internal quotation marks omitted). Rather, the intent of Rule 702 is to liberalize the admission of reliable scientific evidence and therefore the evidence need not be conclusive to be admissible. *Id.* In the event shaky—but reliable—scientific evidence is admitted, the appropriate means of attacking such evidence is by "[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof" *Id.* (alteration in original) (citation omitted). For example, by cross-examining the witness, the opposing party has the opportunity to expose the differences between the actual evidence and the scientific theory. *Id.* at 1051. "The dissimilarities go to the weight rather to the admissibility of the evidence." *Id.* To the extent Johnson argues the evidence lacked reliability, the trial court concluded the evidence was reliable and would

assist the jury in understanding Greene’s testimony. Even assuming the evidence was “shaky,” the trial court correctly noted Johnson’s reliability concerns went to the weight of the evidence, not its admissibility. Johnson had a full opportunity to attack the credibility of the evidence in an attempt to diminish any weight it carried with the jury. We conclude the trial court did not err in admitting Exhibit 180.

[12] Further, and assuming the trial court erred, we conclude any error was harmless. *See Barnhart v. State*, 15 N.E.3d 138, 143 (Ind. Ct. App. 2014) (“Errors in the admission or exclusion of evidence are to be disregarded as harmless error unless they affect the substantial rights of a party.”) (citation omitted). Exhibit 180 merely shows a shooting occurred near 301 North Lafayette Street, and at trial, the State admitted numerous other ShotSpotter exhibits also showing a shooting occurred near 301 North Lafayette Street; Johnson does not challenge the admission of these other exhibits on appeal. In addition, many witnesses testified they heard a shooting occur, Stephen testified Johnson shot him, the green SUV had numerous bullet holes, and Sharpe was killed by a gunshot. This evidence undoubtedly indicates a shooting occurred. Exhibit 180 is no different and its admission did not prejudice Johnson.

Conclusion

[13] The trial court did not abuse its discretion in admitting evidence. Accordingly, we affirm Johnson’s convictions.

[14] Affirmed.

Mathias, J., and Brown, J., concur.

SUPERIOR COURT OF CALIFORNIA

COUNTY OF SAN FRANCISCO

BEFORE THE HONORABLE LINDA H. COLFAX, JUDGE PRESIDING

DEPARTMENT NUMBER 26

---oOo---

PEOPLE OF THE STATE OF CALIFORNIA,)	
)	
Plaintiff,)	SCN 226661
)	Court No. 16015117
vs.)	
)	<u>402 HEARING</u>
MICHAEL D. REED,)	
)	
Defendant.)	
_____)	

Reporter's Transcript of Proceedings

Monday, June 5, 2017

APPEARANCES OF COUNSEL:

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George Gascón, District Attorney
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BY: **CHRISTOPHER ULRICH**, Assistant District Attorney

For Defendant:

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BY: **MICHELLE TONG**, Deputy Public Defender

Reported by: Teanna L. Ward, CSR No. 11918, RPR

I N D E X

Monday, June 5, 2018

PEOPLE'S WITNESS

PAGE VOL.

GREENE, PAUL

Cross-Examination by Ms. Tong

6 1

E X H I B I T S

EXHIBITS

DESCRIPTION

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Enlargement of the
visual wave lengths
for audio clip 41334

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Enlargement of page
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1 Monday, June 5, 2017, 1:47 p.m.

2 ---oOo---

3 **THE COURT:** Let's go back on the record in our trial matter,
4 People vs. Michael Reed.

5 Counsel are present. Mr. Reed is present.

6 I have had an opportunity to review your pleadings, as well
7 as the testimony in the ShotSpotter 402, as well as arguments by
8 counsel. And the motion to exclude the testimony is denied.

9 Mr. Greene will be permitted to testify in the trial.

10 (Whereupon, the ShotSpotter 402 hearing was concluded.)

11 ---oOo---

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 KeyCite Red Flag - Severe Negative Treatment
Unpublished/noncitable

57 N.E.3d 899 (Table)
Unpublished Disposition
Court of Appeals of Indiana.

Isaiah SAMELTON, Appellant–Defendant,
v.
STATE of Indiana, Appellee–Plaintiff.

No. 71A03–1509–CR–1589.

|
June 16, 2016.

Appeal from the St. Joseph Superior Court; The
Honorable Jane Woodward Miller, Judge; Trial Court
Cause No. 71D01–1407–F1–2.

Attorneys and Law Firms

Charles W. Lahey, South Bend, IN, Attorney for
Appellant.

Gregory F. Zoeller, Attorney General of Indiana, Eric
P. Babbs, Deputy Attorney General, Indianapolis, IN,
Attorneys for Appellee.

MEMORANDUM DECISION

RILEY, Judge.

STATEMENT OF THE CASE

*1 [1] Appellant–Defendant, Isaiah Samelton (Samelton), appeals his conviction for attempted murder, a Level A felony, Ind.Code §§ 35–42–1–1; –41–5–1; and aggravated battery, a Level 3 felony, I.C. § 35–42–2–1.5(2).

[2] We affirm.

ISSUES

[3] Samelton raises two issues on appeal, which we restate as follows:

(1) Whether the trial court abused its discretion in admitting certain evidence; and

(2) Whether the trial court abused its discretion by not instructing the jury on Samelton's proposed jury instruction offering attempted voluntary manslaughter as a lesser included offense to the attempted murder charge.

FACTS AND PROCEDURAL HISTORY

[4] During the evening hours of July 9, 2014, Antonio Garcia (Garcia) was working as a cashier at the Phillips 66 gas station located at the corner of Western Avenue and Falcon Street in South Bend, Indiana. Willie Menyard (Menyard), a patron at the store, was prepaying for his gas. At about that time, a red sedan drove into the pump area and, without stopping, drove to the front of the store entrance. An individual inside the car pointed a gun out of the driver's side window and began firing. As Menyard was exiting the store, a bullet struck him in his back and exited out of his right arm. The red sedan then turned around, drove back into the pump area where the customer vehicles remained parked, and fired more shots. The vehicle circled around the pump area before speeding off. The patrons outside the gas station ran for cover.

[5] Garcia called the police. Also, the Shot–Spotter system—a gunshot detection, alert and analysis tool that incorporates sensors to detect, locate, and alert law enforcement agencies of illegal gunfire incidents in real time—notified the police. Four bullet fragments and seventeen fired casings were left at the scene. Officer Greg Howard (Officer Howard) of the South Bend Police Department got the description of the red car and its suspects after reviewing the store surveillance videos and started searching the surrounding area. Driving on Meade Street, Officer Howard located the suspected red sedan parked on the sidewalk. After watching the car for a couple of minutes, he saw two male individuals enter the vehicle, and drive south on Meade Street toward Western Avenue. When the red sedan crossed Western Avenue, Officer Howard initiated a traffic stop. Samelton was identified as the driver. A male, later identified as Juwan Jones (Jones), exited the vehicle from the passenger's side and ran through an alley. During the foot pursuit, Officer Howard saw an object, later identified as a semiautomatic handgun, fall from Jones' person. The handgun contained

a loaded magazine. The following day, a K-9 officer found another semiautomatic handgun along the route where Jones had fled. A magazine was also found nearby. Each of the semiautomatic handguns matched the casings and the bullet fragments left at the gas station. The fired casings were both on the west and east sides of the gas station's property. Garcia's car, which was parked on the west side parking lot, sustained damage from three bullet holes. Also, a gas pump and a dumpster sustained bullet damage.

*2 [6] On July 11, 2014, the State filed an Information, charging Samelton with Count I, attempted murder, a Level 1 felony; and Count II, aggravated battery, a Level 3 felony. Samelton's jury trial commenced on August 25, 2015. Among the evidence introduced and admitted were the two semiautomatic firearms, bullet fragments, and casings recovered from the gas station, the gas station's surveillance videos¹, and Exhibit 101, a map image showing the approximate location of each of the twenty-three shots fired at the gas station. Exhibit 101 also included a large circle representing a twenty-five meter margin of error. Samelton argued, in part, that the margin of error would essentially place each gunshot anywhere in the circled area, and consequently "have no assurance that shot number 1 wasn't really taken from location number 22 or that 21 was taken from location number 2[.]" (Transcript p. 273). After hearing Samelton's arguments, and the testimony on how the Shot-Spotter system works, the trial court overruled Samelton's objection and admitted Exhibit 101 into evidence.

[7] At the close of the evidence, Samelton requested the trial court to instruct the jury on attempted voluntary manslaughter as a lesser included offense of attempted murder. The trial court refused to tender the instruction, finding that there was no appreciable evidence of sudden heat. At the close of trial, the jury found Samelton guilty as charged. On September 23, 2015, the trial court sentenced Samelton to concurrent sentences of thirty years for his attempted murder conviction and nine years for his aggravated battery conviction.

[8] Samelton now appeals. Additional facts will be provided as necessary.

DISCUSSION AND DECISION

I. Admission of Evidence

[9] We review the admission of evidence for an abuse of discretion. *Wilson v. State*, 765 N.E.2d 1265, 1272 (Ind.2002). An abuse of discretion occurs "where the decision is clearly against the logic and effect of the facts and circumstances." *Smith v. State*, 754 N.E.2d 502, 504 (Ind.2001). Indiana Evidence Rule 702 governs the admissibility of testimony by expert witnesses. It provides that:

(a) A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand or to determine a fact in issue.

(b) Expert scientific testimony is admissible only if the court is satisfied that the expert testimony rests upon reliable scientific principles.

[10] The trial court acts as a gatekeeper when determining the admissibility of opinion evidence under Rule 702. *Estate of Borgwald v. Old Nat'l Bank*, 12 N.E.3d 252, 257 (Ind.Ct.App.2014). "The proponent of expert testimony bears the burden of establishing the foundation and reliability of the scientific principles." *Doolin v. State*, 970 N.E.2d 785, 787 (Ind.Ct.App.2012). "In determining whether scientific evidence is reliable, the trial court must determine whether the evidence appears sufficiently valid, or, in other words, trustworthy, to assist the trier of fact." *Id.* at 788.

*3 [11] Samelton seems to challenge the accuracy of Exhibit 101, arguing that because there was a twenty-five meter margin of error using the Shot-Spotter system, there was no way of decoding the accurate location of each of the twenty-three bullets fired at the gas station.

[12] Paul Greene (Greene), the lead forensic analyst at SST Inc.—the company that developed and manufactures the Shot-Spotter system—testified that he had written close to 600 forensic reports on shooting incidents and given testimony in court thirty-six times. He stated that the purpose of the Shot-Spotter system is to "simply

provide law enforcement agencies, rapid notification that a weapon has been fired within their jurisdiction, or at least within the sensory area.” (Tr. p. 255). Greene explained the science behind the Shot–Spotter system stating, in relevant part:

The [Shot–Spotter] system is an acoustic gunshot detection system. It is comprised of three separate parts. The first being the sensors. [] It has a processor board. It has a memory. It has a GPS receiver, and it also has a radio modem that allows network communication back to the location of the server. The location server is the second part of the system, and it's a software application that gathers all of the information that is sent [] by different sensors. It matches pulses from different sensors and then is able to locate the origin of a gunshot incident, whether single shot or multiple shots. It then reports that information to the user interface. The user interface is the third portion of it. We call that the [] investigator portal or the alert console which resides on the operator's desktop or laptop computer. It is where they receive the alerts.

(Tr. pp. 243–44). Greene testified that the Shot–Spotter system notifies law enforcement agencies within sixty seconds of any gunfire, and “they get a dot on the map indicating the latitude and longitude of where that incident happened, and they also get a street address.” (Tr. p. 256). There are sixty-five sensors installed in South Bend, and six of those sensors detected the gunfire. Greene identified Exhibit 101 as an aerial map of the gas station with twenty-three superimposed bullseye-type graphics reflecting the estimated location of each of the gunshots fired on July 9, 2014. The map also had a large circle representing a twenty-five meter margin of error, centered from the first shot fired. Greene explained that all twenty-three shots were within the twenty-five meter radius circle, and so “shot number 12 could have easily have been shot number 17 within the margin of error.” (Tr. p. 266).

[13] Samelton objected to the admission of Exhibit 101 by arguing, in part:

Our objection is to the attempt to extrapolate back the precise time of each shot and most particularly the location of each shot, because by doing so we have such a great margin of error in the scientific evaluation that it creates a situation where literally each of the gunshots is within the same area, and the margin of error essentially would place each gunshot anywhere within that circled area, and consequently we have no assurance that shot number 1 wasn't really taken from location number 22 or that 21 was taken from location number 2.

*4 So I think [] that's the problem right there. I think the [S]tate has failed to demonstrated that that process ... meets scientific standards In essence, we're telling the jury we have an expert telling the jury that this is where the shots occurred, when in fact, he is not. He's saying, within this margin of error, any of these shots could have been taken from the location....

[14] (Tr. pp. 273–74). After hearing Samelton's arguments and Greene's testimony regarding the Shot–Spotter system, the trial court overruled Samelton's objection to Exhibit 101, by stating, in part:

Looking at Rule 702 just on the face of the rule, [] scientific, technical, or other specialized knowledge would assist the tier of fact to understand the evidence or to determine fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of opinion or otherwise.

I think we have established that this witness has that kind of technical and specialized knowledge that he has accrued only in his current job [] and he certainly seems to have deep knowledge of science and math that I don't share but certainly explains it in a way that I feel that I'm understanding....

I am satisfied with the scientific principles upon which the expert testimony based as reliable....

And I think that the State's Exhibit 101 does provide the jury with the understanding that this is not a perfect science in the sense that, and maybe I'm using the word science wrong and maybe the system would be more accurate, and they cannot with a hundred percent accuracy to the centimeter determine the location of a

shot when it has been fired, but I think this coupled with other evidence that's presented certainly tells me, one, that there is enough scientific principles to allow it, and two, that the prejudice of this information does not outweigh its probative value So I'm overruling the objections to both Exhibits 101, and 102.

(Tr. pp. 281–83).

[15] We find Samelton's argument insufficient to establish an abuse of the trial court's discretion in admitting Exhibit 101. In determining whether scientific evidence is reliable, the trial court must determine whether the evidence appears sufficiently valid, or, in other words, trustworthy, to assist the trier of fact. *Doolin*, 970 N.E.2d at 788. The trial court evaluated Greene's testimony at length, and it determined that the scientific principle or workings of the Shot–Spotter system were reliable in presenting evidence of a shooting at the gas station. The jury could have readily understood from Greene's testimony that all twenty-three shots were fired in the area roughly corresponding to the gas station's property. Accordingly, the jury was not presented with inaccurate information, but instead with a margin of error that allowed them to judge and weigh the persuasiveness of Exhibit 101.

[16] The State argues that, under the circumstances, however, any error in the admission of Exhibit 101 is harmless. It is well recognized that any error in admitting evidence will be found harmless where the evidence is merely cumulative. *Fuller v. State*, 674 N.E.2d 576, 578 (Ind.Ct.App.1996). We note that the import of Exhibit 101 only corroborated that a shooting had occurred, and was merely cumulative to the following evidence: Garcia, the gas station attendant, testified that he saw the gunshots coming from the red sedan; Menyard was struck twice by bullets; the bullets and casing recovered at the gas station matched the firearms recovered during the police investigation; and the gas station's surveillance video displayed the shooting. In light of the foregoing, we conclude that trial court did not abuse its discretion in admitting Exhibit 101.

II. Attempted Voluntary Manslaughter Instruction

*5 [17] Lastly, Samelton argues that the trial court abused its discretion when it denied his proposed jury instruction offering attempted voluntary manslaughter as

a lesser included offense to the attempted murder charge. In response to Samelton's assertion, the State argues that the trial court correctly determined that the evidence did not support the tendering of the instruction because there was no appreciable evidence of sudden heat.

[18] In general, a trial court has complete discretion in matters pertaining to jury instructions. *Driver v. State*, 760 N.E.2d 611, 612 (Ind.2002). In reviewing whether a trial court has abused its discretion by refusing to include a party's jury instruction, this court considers: (1) whether the instruction correctly states the law; (2) whether the evidence supports giving the instruction; and (3) whether any other instructions cover the same substance as the excluded instruction. *Id.*

[19] In *Wright v. State*, 658 N.E.2d 563, 566–67 (Ind.1995), our supreme court held that a trial court must give a tendered lesser included offense instruction if the alleged lesser included offense is either inherently or factually included in the crime charged and there is a serious evidentiary dispute about the element or elements distinguishing the greater from the lesser offense such that a jury could conclude that the lesser offense was committed but the greater was not. Voluntary manslaughter is an inherently included offense of murder because it requires proof of the same material elements as murder. *See Champlain v. State*, 681 N.E.2d 696, 701–02 (Ind.1997). This is true because voluntary manslaughter is murder with the mitigating factor that it was committed while acting under sudden heat. *Id.* For the same reasons, attempted voluntary manslaughter is an inherently included offense of attempted murder.

[20] Sudden heat has been defined as “sufficient provocation to excite in the mind of the defendant such emotions as anger, rage, sudden resentment, or terror, and that such excited emotions may be sufficient to obscure the reason of an ordinary man.” *Fox v. State*, 506 N.E.2d 1090, 1093 (Ind.1987). Sudden heat is not an element of voluntary manslaughter. *See Boesch v. State*, 778 N.E.2d 1276, 1279 (Ind.2002). Rather, it is that which distinguishes voluntary manslaughter from murder.

[21] Here, the question is whether there was appreciable evidence of sudden heat, and from the record, we find that there was no evidence of sufficient provocation nor was there any evidence that Samelton was in such a state of terror or rage that he became incapable of cool reflection.

At the hearing, Garcia, the gas station attendant, testified that a red sedan drove into the pump area and without stopping, drove to front of the store entrance, and an individual inside the car pointed a gun out of the driver's side window and began firing. As Menyard walked out of the store, he was struck by gunfire. Soon after, Garcia called 911, and while still on the phone, Garcia saw the red vehicle circle around the parking lot, drive back through the pumps, and over to west side of the store. Multiple shots were fired in sequence. As the red vehicle sped away from the scene, the patrons outside the gas station ran for cover. After the police arrived, Garcia showed them the surveillance videos which documented the shooting. In addition, the State published the gas station's surveillance videos to the jury. Furthermore, Greene, the forensic analyst, testified that the first shot was fired at 10:41:33 p.m. and the twenty-third shot was fired at 10:42:12 p.m. The incident lasted thirty-nine seconds.

*6 [22] We find that the numerous shots, fired in rapid succession, revealed a deliberate attack on the persons at the gas station. Accordingly, we find that the evidence was not susceptible of an inference that Samelton was rendered incapable of cool reflection and deliberation. Because there was no evidence of sudden heat and no serious evidentiary dispute, the trial court did not abuse its discretion when it refused to tender Samelton's tendered instruction of attempted voluntary manslaughter.

[23] Moreover, we note that Samelton's attempted voluntary manslaughter instruction incorrectly stated the law. The purpose of jury instructions is to inform the jury of the law applicable to the facts without misleading the jury and to enable it to comprehend the case clearly and arrive at a just, fair, and correct verdict. *Munford v. State*, 923 N.E.2d 11, 14 (Ind.Ct.App.2010). A trial court does not err by refusing an instruction that incorrectly states the law. See *McEwen v. State*, 695 N.E.2d 79, 84, n. 1 (Ind.1998).

Footnotes

- 1 The record shows that the surveillance videos were admitted as Exhibit 2, however, they were submitted with Jones' appeal, and therefore were unavailable for Samelton's appeal.

[24] Sudden heat has been defined as “*sufficient provocation* to excite in the mind of the defendant such emotions as anger, rage, sudden resentment, or terror, and that such excited emotions may be sufficient to obscure the reason of an ordinary man.” *Fox*, 506 N.E.2d at 1093. (emphasis added). Samelton's proposed instruction, by contrast, gave a definition of sudden heat without any reference to sufficient provocation. The State argues that by “failing to link the anger, rage, sudden resentment or jealousy to any action that constitutes provocation, the instruction could have confused the jury into thinking that any time a person acts out of such emotions, there is sudden heat even though there may not be any provocation.” (Appellee's Br. p. 15) (quotation marks omitted). We agree. This court has held that “words alone will not constitute sufficient provocation.” See *Supernant v. State*, 925 N.E.2d 1280, 184 (Ind.Ct.App.2010), *trans. denied*. Because Samelton's tendered instruction used an incorrect definition of sudden heat, the trial court did not err in refusing it.

CONCLUSION

[25] Based on the foregoing, we conclude that the trial court did not abuse its discretion by admitting Exhibit 101, or for refusing to instruct the jury on Samelton's proposed attempted voluntary manslaughter instruction.

[26] Affirmed.

[27] KIRSCH, J. and PYLE, J. concur.

All Citations

57 N.E.3d 899 (Table), 2016 WL 3364769

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SUPERIOR COURT OF CALIFORNIA

COUNTY OF SACRAMENTO

HONORABLE ERNEST W. SAWTELLE, JUDGE, DEPARTMENT 19

---o0o---

THE PEOPLE OF THE STATE OF CALIFORNIA,)	
)	
Plaintiff,)	
)	
-vs-)	No. 17FE007924
)	
RICKEONEICO KEGAN WILLIAMS,)	
)	
Defendant.)	
_____)	

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WEDNESDAY, APRIL 4, 2018

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REPORTER'S TRANSCRIPT OF

KELLY-FRYE HEARING AND COURT RULING

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APPEARANCES:

For the People:

ANNE MARIE SCHUBERT, District Attorney for the
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By: SYDNE CHRISTENSEN,
Deputy District Attorney

For the Defendant:

PAULINO G. DURAN, Public Defender for the
County of Sacramento, State of California,
By: GREG FOSTER,
Assistant Public Defender

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Page Ref.

WEDNESDAY, APRIL 4, 2018

1

Kelly-Frye Hearing

1

PAUL GREENE, People's Witness;

Direct examination by Ms. Christensen

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Cross-examination by Mr. Foster

52

Redirect examination by Ms. Christensen

93

Recross-examination by Mr. Foster

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Argument by Ms. Christensen

98

Argument by Mr. Foster

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Court's ruling on Kelly-Frye hearing

104

Court denies motion

105

Court Reporter's Certificate

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1	<u>PEOPLE'S EXHIBITS</u>	<u>ID/REF</u>	<u>EVD</u>
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1 MS. CHRISTENSEN: Yes.

2 MR. FOSTER: Yes.

3 THE COURT: All right. The Court has listened to this
4 witnessed in both direct and cross.

5 And as I mentioned earlier, I had also read the
6 transcript of this same witness's testimony in San Francisco
7 Superior Court back in June of 2017. And in fact he was
8 cited in that Nebraska Supreme Court case for his testimony
9 related to that case.

10 In addition, there were other experts that testified
11 in Contra Costa County, that was in Exhibit Number 2 I
12 think, from 2016 dealing with similar issues, just not
13 the -- it wasn't this witness.

14 But when you listen to it all, I'm not sure I really
15 needed to hear all the testimony I did today. Nothing I
16 heard on direct or cross, either one, radically altered the
17 Court's information that the Court had already from reading
18 the other transcript.

19 And that is that when it comes down to it, you know,
20 there is really nothing new here. You know, speed of sound
21 is not new. Acoustics are not new. Acoustic location is
22 not new. Audio recordings sure is heck aren't new.
23 Microphones, multi-lateration is not new.

24 And I mean, cell phones use this, a lot of the same
25 technology all the time. We have a Third DCA case, I
26 can't -- escapes me at -- name of it at the moment but
27 recently published the Third DCA indicating there is no
28 Kelly-Frye issue with regard to cell phone triangulation.

1 And -- and we're -- we're doing something similar to this
2 in -- in here.

3 So I think it seems clear to the Court that this is
4 not new or novel scientific procedures being used in this
5 case with the ShotSpotter technology.

6 It's -- it's perhaps a -- a -- they put a lot of old
7 knowledge, old tech -- information together in one clever
8 application. But -- but I don't think that its component
9 parts can by any stretch of the imagination be considered
10 new or novel. They're clearly accepted in the -- in the
11 community. I think the -- in the scientific community that
12 is.

13 The -- the witness is more than qualified to give an
14 expert opinion in this case and he did. I didn't think he
15 was -- there were any questions really that he was
16 particularly stumped on that I heard.

17 I know that there were some questions about
18 questioning his mathematical background and there were a
19 couple questions that were asked that he did not know the
20 answer to. But I do not think that that was -- would
21 suggest that he didn't understand, wasn't qualified as an
22 expert in this system and in the various component parts
23 that make up the system. So I think he was properly
24 qualified.

25 And -- and I think his testimony bears out that all of
26 the correct procedures were used in this case so the motion
27 to exclude this is denied.

28 And that least was what, you still plan on calling

1 this witness as a witness, correct --

2 MS. CHRISTENSEN: Yes.

3 THE COURT: -- at trial?

4 So is there any issue that we still have outstanding?

5 MS. CHRISTENSEN: I do not believe so, your Honor.

6 THE COURT: Mr. Foster?

7 MR. FOSTER: The only thing that I brought to the
8 Court's attention Monday was my client stipulation to --

9 THE COURT: Yes.

10 MR. FOSTER: -- the felony element of the 29800
11 charge. I do still need a couple minutes to chat with him.

12 THE COURT: Okay.

13 MR. FOSTER: I think we could probably still get
14 through voir dire and I think we could probably just
15 characterize it as unlawful possession of a firearm or -- or
16 in some generic fashion if we're not able to handle that --

17 THE COURT: For the 29800 violation in Count 5, right?

18 MR. FOSTER: Yes.

19 THE COURT: So normally, well, the jury would always
20 know that he's convicted of a felony, right?

21 MR. FOSTER: Correct.

22 THE COURT: You would just stipulate to the type or
23 the -- in the CALCRIMS the parties stipulated or he was
24 convicted of a felony.

25 So I can't remember how we -- so what you're saying is
26 your client is willing -- so that the People don't have to
27 prove that, your client is willing to admit that he was
28 convicted of a felony in the past.

1 I think you specifically mentioned the 211, the
2 robbery, from January 30th of 20 -- of 2000 and 9, right?

3 MS. CHRISTENSEN: Correct.

4 THE COURT: That's the one that was elected in Count
5 5.

6 MS. CHRISTENSEN: Yes.

7 MR. FOSTER: And just so we're clear, that's -- I
8 propose that we handle it that way. I still need to confer
9 with him. He's down at the branch. It makes it difficult
10 sometimes but we'll have an answer to that sooner than
11 later.

12 I don't think that we need an answer to that before
13 jury selection because it can be identified simply as
14 possession of a firearm with a prior felony conviction or
15 some generic term, something like that.

16 THE COURT: Right.

17 So long as we address that issue certainly before we
18 get to jury instructions or so the People can prove it if
19 they need to.

20 You do have a 969 (b) packet or certified --

21 MS. CHRISTENSEN: I do, yes.

22 THE COURT: Okay. So as long as we have that, we can
23 deal with that at any time. So I won't tell the jury that
24 he was previously convicted of a felony.

25 And, of course, I am bifurcating the prior convictions
26 that have been alleged.

27 I think that covers everything.

28 So tomorrow jury instructions or jury selection. I've

1 got a panel set up to be outside the doors at 9 o'clock.

2 And I have your witness list I think already.

3 MS. CHRISTENSEN: Yes. I do believe I inadvertently
4 left Paul Greene off of it so I apologize for that, and I
5 would ask that the Court add him on to that.

6 THE COURT: Last name spelled G-r-e-e-n-e?

7 MS. CHRISTENSEN: G-r-e-e-n-e.

8 THE COURT: Okay. Okay. So I'll add him.

9 Mr. Foster, normally, if you're -- if you would like
10 me to, I would just advise the jury that during the process
11 of selection I have a -- I have a Power Point that I use
12 that goes through.

13 And one of the points would be that the defendant is
14 in custody in this matter and will be a sheriff's deputy
15 sitting behind him at all times. Jury's ordered to
16 disregard that not consider it for any purpose.

17 Do you want me to say that to the jury or not?

18 MR. FOSTER: I do.

19 THE COURT: Okay. I will do that then.

20 And otherwise, I go over my Power Point. I do the 100
21 series and give them general admonitions about things.

22 I usually go through and talk to all of the jurors
23 before you talk to 'em. I will have gone over some of the
24 law. I will have gone over general types of things in this
25 case.

26 There is not anything very specific, right? I mean,
27 there is not -- there is none -- there is no particular
28 issue except for maybe there is the issue of sexual assault,

1 right?

2 MS. CHRISTENSEN: Potentially, yes.

3 THE COURT: I don't know how much to explore that
4 really. I don't want to make too big of a deal since that's
5 not really -- there is no charge on it, but I think probably
6 should address it just in case there are people who are
7 victims of that so I will.

8 MS. CHRISTENSEN: And I will note -- and I don't know.
9 It's just because of the time that we're in. All of the
10 allegations deal with a firearm.

11 And I'm happy to address it all on my own and to do
12 that in voir dire, but I'll just give the Court ahead --
13 heads -- a head's up. If you don't do it, I definitely will
14 just because I think that is a hot ticket item right now and
15 unfortunately all the counts involve a firearm.

16 THE COURT: It is -- it's not the type of -- you know,
17 it's not like a school shooting.

18 MS. CHRISTENSEN: Right.

19 THE COURT: He's not shooting at anybody. It's more
20 on the street. And I don't know how much that will inflame
21 a jury at this point. But you're right, guns are always a
22 big topic right now.

23 Mr. Foster, what about the issue of either one of you
24 think you need to address anything to do with the Clark
25 shooting or there is no -- there is no real police
26 involvement initially, right, in any of this?

27 MS. CHRISTENSEN: I mean, my concern, it is Sacramento
28 Police Department officers that I will be calling which are

1 the same officer -- you know, it's the same department
2 obviously involved in the Stephon Clark incident that we are
3 dealing with right now.

4 Not initially. I mean, initially it's all civilians,
5 right, but there is a potential for impeachment and all of
6 that is going to be with law enforcement officers. So they
7 do come out. The law enforcement officer are the ones that
8 collect the shell casings. So I mean, there is law
9 enforcement involved in it of course.

10 THE COURT: Right.

11 Do you want to handle that on your own or -- there,
12 something either one of you want me to ask about it?

13 MR. FOSTER: I think we've covered that issue
14 historically for years in terms of evaluating witness
15 credibility regardless of their occupation.

16 THE COURT: I hit that one pretty hard always and we
17 go over anybody's hesitating on it. I talk 'em through it
18 and see where they are.

19 If their attitude is if they're law enforcement,
20 they're gonna favor them, I usually kick 'em. If there
21 their attitude is law enforcement so don't believe 'em,
22 I kick 'em. So same thing.

23 Most people are in -- somewhere in between all that
24 and they're gone. I don't think going to be a huge issue
25 but we'll -- so I'll address it in that way and I won't
26 specifically mention Steven (sic) Clark shooting. I know
27 it's a hot topic but somebody else might. One of the jurors
28 that is might bring it up.

1 And if they do, I guess we'll just, you know, have to
2 deal with it on the fly and see how it -- how it goes. I
3 don't want to spend a lot of time with that.

4 Do you agree with that, Mr. Foster?

5 I mean, I don't want to inflame the jury about that
6 issue. It is separate but it could come up. And if I does,
7 I'll try to address to it a degree and then try -- I don't
8 want to turn this into a voir dire about that. I don't
9 think that's relevant here to this type of case. We don't
10 really have any accusation that would -- that should bring
11 up those types of pages I don't believe.

12 Do you -- do you disagree with me on that?

13 MR. FOSTER: I do not.

14 THE COURT: Okay. So --

15 MS. CHRISTENSEN: I don't.

16 I think if something comes up, it's a potential that
17 I'll ask about it. But I do the -- in fact, definitely
18 don't want to spend a lot of time. I don't want to delve
19 into it.

20 THE COURT: All right. We'll try to handle it with
21 tact if we can.

22 Mr. Foster, do you have any sense of how long you
23 would need to talk to the jury?

24 MR. FOSTER: Assuming there is no super-outlandish
25 responses, you know, 20, 20, 30 minutes at most.

26 THE COURT: Okay. That sounds reasonable.

27 So both of you --

28 MS. CHRISTENSEN: I'm right around the same, yes.

1 THE COURT: All right. Well, we'll bring them in
2 tomorrow morning at nine and we should be finished by the
3 end of the day I think.

4 Both parties have 20 preemptory, right?

5 MS. CHRISTENSEN: Yes.

6 THE COURT: Okay. Anything else?

7 MS. CHRISTENSEN: No, thank you.

8 THE COURT: All right. We'll see you guys tomorrow at
9 nine.

10 MS. CHRISTENSEN: Thank you.

11 THE COURT: Well, the exhibits that were marked I
12 think we should -- they weren't addressed but I think they
13 need to -- they need to stay because there's a pending --
14 there could be an appellate issue on tell Kelly-Frye. These
15 were all motions but they're exhibits obviously for the
16 Kelly-Frye hearing.

17 MS. CHRISTENSEN: I can. And that's fine. I can have
18 an additional copy for -- the CD marked for the trial
19 purposes. I have no objection to that.

20 THE COURT: So A, B and --

21 MS. CHRISTENSEN: I believe it's A and B. And for me
22 it's one and two were used. I'm happy to withdraw three.
23 We never addressed it at all.

24 THE COURT: In other words, so Exhibit Number 3 will
25 be withdrawn. People's Exhibit Number 1 and 2 --

26 And Defense Exhibits A, B and C -- let me ask, Mr.
27 Foster.

28 Mr. Foster, do you want A and B in? Do you want

1 these? You marked these two exhibits A and B or do you want
2 C in or do you want any of it in?

3 MR. FOSTER: A B and C, please.

4 THE COURT: Okay. A, B and C will be admitted and the
5 Court will just keep those for purposes of any appellate
6 purposes they might have.

7 And People's 1 and 2 and they're withdrawing number
8 three.

9 MS. CHRISTENSEN: Yes.

10 THE COURT: So that's the order.

11 Thank you.

12

13 (proceedings concluded)

14 --o0o--

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Shooting Description

At 21:09:38 (9:09:38 PM) hours on April 01, 2016 ShotSpotter detected a Multiple Gunshot incident in Rochester, NY. ShotSpotter recorded the incident as Flex ID #140660 and located it at 9 Immel St.

Incident Time Analyzed

The spool data were reviewed for 21:09:38 hours on April 01, 2016.

Position With Respect to the Coverage Area

Figure 1 – ShotSpotter Coverage Area displays the ShotSpotter coverage in Rochester, NY at the time of the incident. The red dot indicates the location of the shooting incident, the red dashed line denotes the boundaries of the ShotSpotter coverage area, and the triangle symbols represent the sensors that participated in detecting the incident.

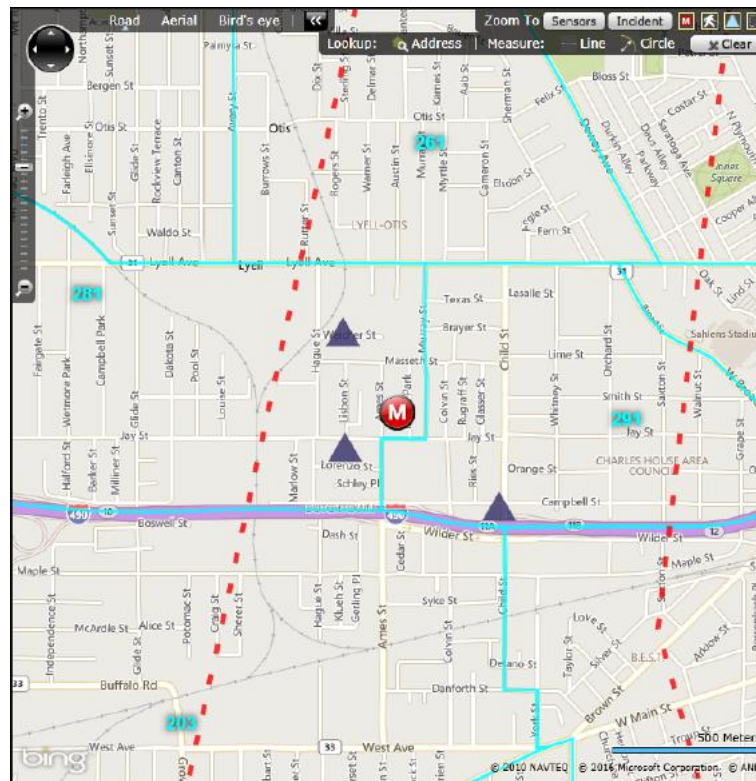


Figure 1 - ShotSpotter Coverage Area Rochester, NY



Detailed Forensic Report

City :	Rochester, NY
Zone :	281
Reference Date :	01 APR 2016
Customer's Ref. #:	CAD#
Report Date :	07 APR 2016

Auto-detected by ShotSpotter? Yes

About ShotSpotter

ShotSpotter was installed in Rochester, NY in 2006. ShotSpotter has three primary components: acoustic sensors, a Location Server application, and the ShotSpotter Flex user interface. The ShotSpotter Location Server is operated by SST, Inc. and runs on a virtual server hosted at a remote facility, the ShotSpotter Flex user interface resides on a PC at the customers dispatch facility, and the acoustic sensors are deployed in geographic areas that are designated by the customer.

Each sensor is triggered by impulsive sounds in its environment. The acoustic measurements of these impulsive sounds and the exact time that they were detected are transmitted to the Location Server as possible gunshot sounds. The Location Server analyses the data received and determines if the impulsive sound can be located and classified as gunfire. If the impulsive sound can be located and classified as gunfire it reports the incident to the SST Service Operations Center where a human operator reviews the incident for classification accuracy. The reviewed gunfire incident is then published to the customers user interface. The user interface, referred to as the Flex Alert Console, provides an actionable view of the incident with an emphasis on the time and location that the shooting occurred. Gunfire incidents are typically detected, located, reviewed, and published to the customer in less than 60 seconds.

The firing of a gun or an explosive device creates a loud, impulsive sound that can, under optimum environmental conditions, be detected above urban background noise up to two miles away from the firing incident location. Thus, the operation of ShotSpotter is understandably subject to the laws of physics and acoustic propagation.

ShotSpotter detects and properly geo-locates (provides latitude and longitude) 80% of detectable outdoor incidents within the coverage area, accurate to within a circle whose radius is 25 meters. SST, Inc. does not guarantee 100% detection because real world, urban environments may contain intervening buildings, topography, foliage, periods of increased traffic or construction noise, and other urban acoustic noises that may either prevent the sound of a gunshot from being detected by the sensor(s), or may change or modify the audio characteristics of the sound of a gunshot so that it no longer matches the sensor(s) detection parameters.


Other factors, such as obstructed or attenuated muzzle blast, weapon discharge in an enclosed space, or if the weapon discharged is of .22 or smaller caliber, may also prevent the sensor(s) from not detecting all, or some shots fired.


Detailed Forensic Report

City :	Rochester, NY
Zone :	281
Reference Date :	01 APR 2016
Customer's Ref. #:	CAD#
Report Date :	07 APR 2016


Analysis


Figure 2 – Incident review At 21:09:38 on April 01, 2016, ShotSpotter detected and located a Multiple Gunshot incident in Rochester, NY. Below is a table which shows the timeline of the incident being updated.


Search Results


140660

Source: **RochesterNYWest**
Details: **4 ROUNDS**
Rounds: **4**
District:
Beat: **281**
Latitude: **43.160141**
Longitude: **-77.643351**
Address: **9 Immel St**
CAD ID:
Date/Time: **4/1/2016 21:09:38**


View this incident on ShotSpotter Siren website
(requires Siren login privileges)


Copy link to ShotSpotter Siren website
for this incident (for email, etc.)

ShotSpotter
Apr 1 21:09:42

Incident auto-acknowledged and not alerted because: squelch mode was enabled at time of detection.

shotspotter\rbresler
Apr 2 00:55:57

Reclassified to Multiple Gunshots from Helicopter, Reason: per customer. OIS.

shotspotter\rbresler
Apr 2 00:55:57

Number of rounds updated from 3 to 4

Figure 2 – Flex ID #140660 Incident review timeline

Detailed Forensic Report

City :	Rochester, NY
Zone :	281
Reference Date :	01 APR 2016
Customer's Ref. #:	CAD#
Report Date :	07 APR 2016

Figure 3 – Address Location displays the locations calculated by ShotSpotter. The address of 9 Immel St was read from either a database of parcel information provided by the city or county and uploaded into ShotSpotter or from the map provider. The red dot indicates the location of the shooting incident as calculated by ShotSpotter in real-time and reported to the ShotSpotter operator.

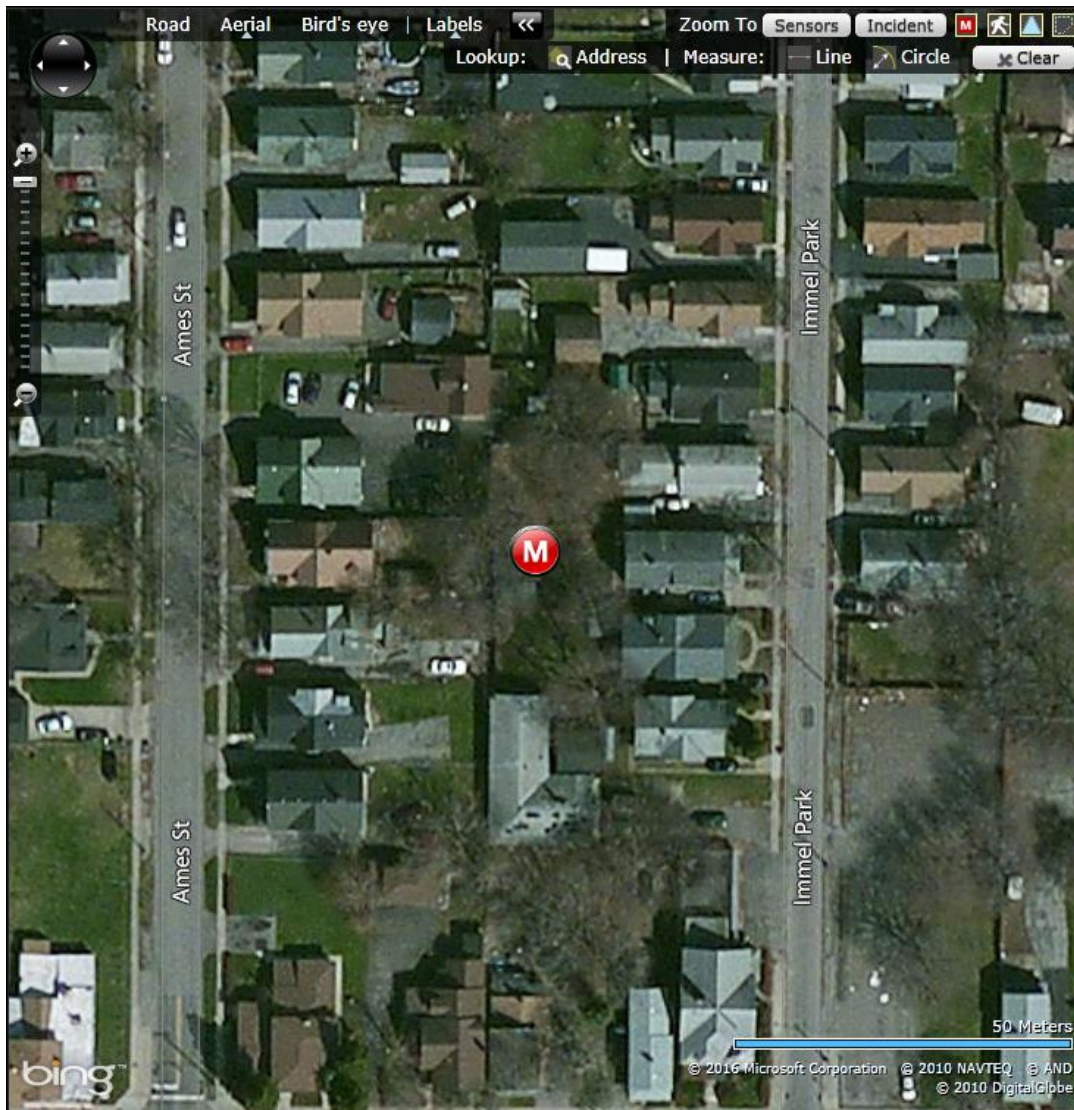


Figure 3 – Flex ID #140660 Flex Location



Detailed Forensic Report

City : Rochester, NY
Zone : 281
Reference Date : 01 APR 2016
Customer's Ref. #: CAD#
Report Date : 07 APR 2016

Table 1 – Timeline of Discharge of Shots: The following table shows the time of discharge for each of the rounds which comprise this shooting event. The times listed below are the time the system calculated the trigger was pulled based on the environmental conditions at the time of the event. These times precede the time at which the system notified the ShotSpotter Operator listed because of small radio, computational, and network delays. All times are obtained from system and sensor clocks that are synchronized to GPS time, which is in turn synchronized with the atomic clock at the National Institute of Standards and Technology in Boulder, CO.

Shot	Time
1	21:09:35.122
2	21:09:37.377
3	21:09:37.723
4	21:09:38.057
5	21:09:38.325

Table 1 – Shot timeline, Flex ID #140660

Detailed Forensic Report

City :	Rochester, NY
Zone :	281
Reference Date :	01 APR 2016
Customer's Ref. #:	CAD#
Report Date :	07 APR 2016

Figure 4 – Individual Shots Fired The following image plots the location of each round fired in Google Earth. This image is created by post-processing the archived data. Post-processing is a “manual” re-evaluation of the archived data through software tools that duplicate the real-time location algorithms that are a resident part of the ShotSpotter Location Server. Post-processing can be selectively performed on subsets of the raw data so that noises from different sources can be isolated for analysis.

In the image below the red dots indicate the location of each of the rounds fired. The locations calculated in post-processing are not identical to, but are typically within normal limits of what the ShotSpotter calculated in real-time. The yellow circle indicates a 25m margin of error radius for gunshot incidents that occur within the boundaries of the coverage area depicted on page 1 and is present in the image for reference only.

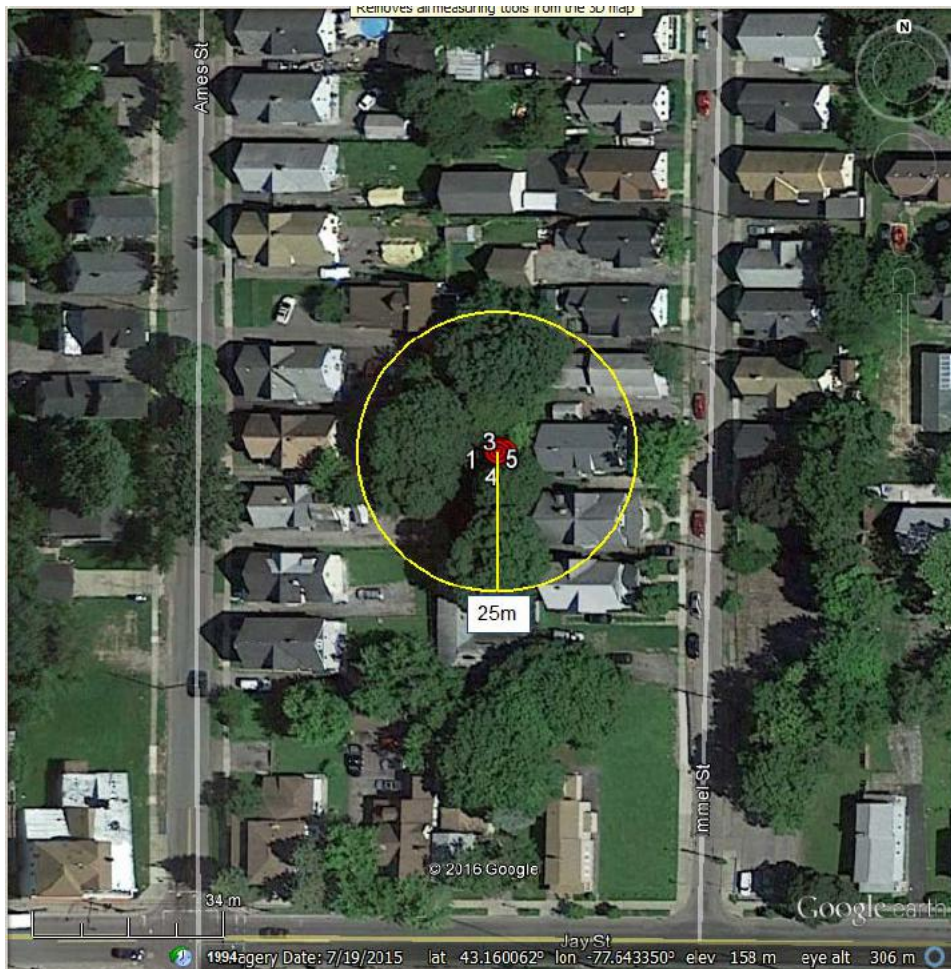


Figure 4 – Individual Shot Locations, Flex ID #140660

Multilateration:

The source of a pulse (a sound that goes bang, boom, or pop) is located using a mathematical process called multilateration. Multilateration requires a minimum of three sensors that surround the source to accurately report the time that a pulse is detected. Each participating sensor will detect that pulse at slightly different times. The Location Server calculates the time differences between pairs of sensors to generate a curve called a hyperbola. All of the resulting hyperbolae are then plotted onto a map. The spot where the hyperbolae intersect is where ShotSpotter locates the shot. When more than three sensors participate in the detection, Location Server performs automatic calculations to find a solution that minimizes the error to the greatest extent possible.

Figure 5 – Multilateration plot Flex ID #140660 was detected by six sensors.

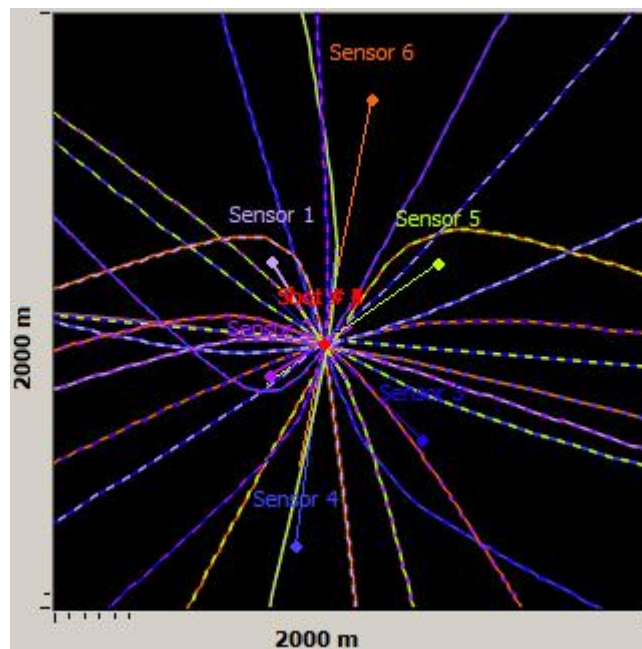
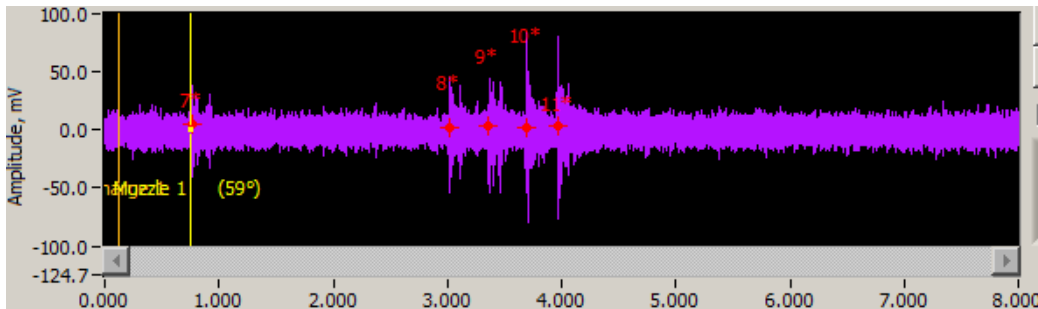


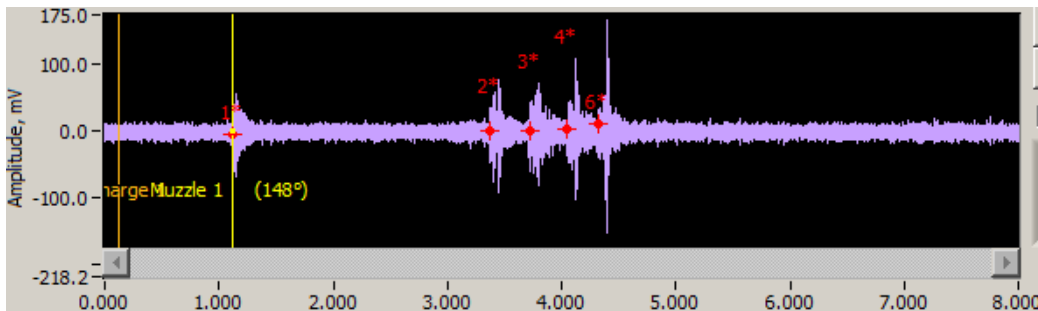
Figure 5 - Multilateration, Flex ID #140660

Site-specific Acoustics

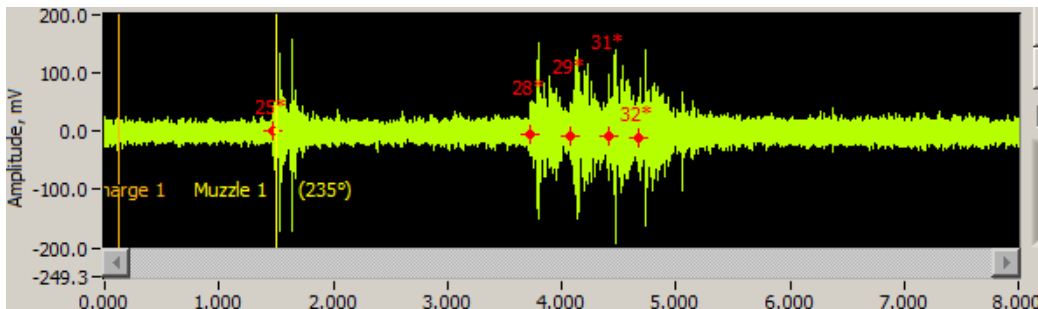
The sound of these shooting events can be heard on many sensors. Below are pictorial representations of the audio clips and a link to the corresponding .wav file for three sensors close to the incident. The depicted audio waveforms and audio clips represent 8.0 seconds of audio that was manually downloaded from each participating sensor. (Double-click on the speaker icons to play the audio from each sensor.)



Sensor 10 (211m)



Sensor 8 (329m)



Sensor 28 (466m)



Detailed Forensic Report

City :	Rochester, NY
Zone :	281
Reference Date :	01 APR 2016
Customer's Ref. #:	CAD#
Report Date :	07 APR 2016

Conclusion

At 21:09:38 (9:09:38 PM) hours on April 01, 2016 ShotSpotter detected a Multiple Gunshot incident in Rochester, NY. ShotSpotter recorded the incident as Flex ID #140660 and located it at 9 Immel St.

After review, the locations and times of five rounds fired were calculated.

Acoustical data analysis of a gunfire incident is complex and not comprehensive. The conclusions above should be corroborated with other evidentiary sources such as recovered shell casings, and witness statements.



Detailed Forensic Report

City : Rochester, NY
Zone : 281
Reference Date : 01 APR 2016
Customer's Ref. #: CAD#
Report Date : 07 APR 2016

Certification and Acknowledgement

Certification

I, Paul C Greene, declare that I am the Lead Customer Support Engineer at SST Inc. I have personal knowledge of the matter referred to in this report, and, if called as a witness, could and would testify thereto. I declare that the above is true and correct.

Executed this ____ of ____, 20____,
at _____, _____.

Paul C Greene

SST, Inc.
7979 Gateway Blvd.

Suite 210
Newark, CA 94560-1156
+1 (510) 794-3162
+1 (650) 887-2106 fax
pgreene@shotspotter.com

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document

Arizona All-Purpose Certificate of

Acknowledgement

State of Arizona)
County of Cochise)

On _____

before me _____,
Notary Public personally appeared Paul C Greene
who provided to me on the basis of satisfactory
evidence to be the person whose name is
subscribed to the within instrument and
acknowledged to me that he executed the same
in his authorized capacity, and that by his
signature on the instrument the person, or the
entity upon behalf of which the person acted,
executed the instrument.

I certify under the laws of the State of Arizona that
the foregoing paragraph is true and correct.

Witness my hand and official seal.

Signature _____

Notary Public

Exhibit 19



SIGN IN CREATE ACCOUNT

+ ENGLISH

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ANADOLU AGENCY / GETTY IMAGES

MOTHERBOARD
TECH BY VICE

Police Are Telling ShotSpotter to Alter Evidence From Gunshot-Detecting AI

Prosecutors in Chicago are being forced to withdraw evidence generated by the technology, which led to the police killing of 13-year-old Adam Toledo earlier this year.

Prosecutors in Chicago are being forced to withdraw evidence generated by the technology, which led to the police killing of 13-year-old Adam Toledo earlier this year.

TP By [Todd Feathers](#)

July 26, 2021, 1:00pm [Share](#) [Tweet](#) [Snap](#)

On May 31 last year, 25-year-old Safarain Herring was shot in the head and dropped off at St. Bernard Hospital in Chicago by a man named Michael Williams. He died two days later.

Chicago police eventually arrested the 64-year-old Williams and charged him with murder (Williams maintains that Herring was hit in a drive-by shooting). A key piece of evidence in the case is video surveillance footage showing Williams' car stopped on the 6300 block of South Stony Island Avenue at 11:46 p.m.—the time and location where police say they know Herring was shot.



How did they know that's where the shooting happened? Police said ShotSpotter, a surveillance system that uses hidden microphone sensors to detect the sound and location of gunshots, generated an alert for that time and place.

Except that's not entirely true, according to recent court filings.

That night, 19 ShotSpotter sensors detected a percussive sound at 11:46 p.m. and determined the location to be 5700 South Lake Shore Drive—a mile away from the site where prosecutors say Williams committed the murder, according to a [motion filed by Williams' public defender](#). The company's algorithms initially classified the sound as a firework. That weekend had seen widespread protests in Chicago in response to George Floyd's murder, and some of those protesting lit fireworks.

But after the 11:46 p.m. alert came in, a ShotSpotter analyst manually overrode the algorithms and "reclassified" the sound as a gunshot. Then, months later and after "post-processing," another ShotSpotter analyst changed the alert's coordinates to a location on South Stony Island Drive near where Williams' car was seen on camera.



changed the alert's coordinates to a location on South Stony Island Drive near where Williams' car was seen on camera.

Search Results

135393

(Customer Visible)

135393

Support Internal

Source: ChicagoILDistrict3

Details: 1 ROUND

Rounds: 1

District:

Beat: 0331

Latitude: 41.780491

Longitude: -87.586388

Address: 5700 S Lake Shore Dr

CAD ID: 2015227078

Date/Time: 5/31/2020 11:46:28 PM

4 audio files,

48ft closest, 0.2mi farthest

19 sensors participated,

48ft closest, 0.9mi farthest

310069

622ft

310061

994ft

reviewer@shotspotter.com May 31 23:47:12

Reclassified from Firecracker to Single Gunshot

pt0aw47@chicagopolice.org May 31 23:57:30

A SCREENSHOT OF THE SHOTSPOTTER ALERT FROM 11:46 PM, MAY 31, 2020 SHOWING THAT THE SOUND WAS MANUALLY RECLASSIFIED FROM A FIRECRACKER TO A GUNSHOT.

"Through this human-involved method, the ShotSpotter output in this case was dramatically transformed from data that did not support criminal charges of any kind to data that now forms the centerpiece of the prosecution's murder case against Mr. Williams," the public defender wrote in the motion.

The document is what's known as a Frye motion—a request for a judge to examine and rule on whether a particular forensic method is scientifically valid enough to be entered as evidence. Rather than defend ShotSpotter's technology and its employees' actions in a Frye hearing, the prosecutors withdrew all ShotSpotter evidence against Williams.

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The case isn't an anomaly, and the pattern it represents could have huge ramifications for ShotSpotter in Chicago, where the technology generates an average of 21,000 alerts each year. The technology is also currently in use in more than 100 cities.

Motherboard's review of court documents from the Williams case and other trials in Chicago and New York State, including testimony from ShotSpotter's favored expert witness, suggests that the company's analysts frequently modify alerts at the request of police departments—some of which appear to be grasping for evidence that supports their narrative of

trials in Chicago and New York State, including testimony from ShotSpotter's favored expert witness, suggests that the company's analysts frequently modify alerts at the request of police departments—some of which appear to be grasping for evidence that supports their narrative of events.

Untested evidence

Had the Cook County State's Attorney's office not withdrawn the evidence in the Williams case, it would likely have become the first time an Illinois court formally examined the science and source code behind ShotSpotter, Jonathan Manes, an attorney at the MacArthur Justice Center, told Motherboard.

"Rather than defend the evidence, [prosecutors] just ran away from it," he said. "Right now, nobody outside of ShotSpotter has ever been able to look under the hood and audit this technology. We wouldn't let forensic crime labs use a DNA test that hadn't been vetted and audited."

Sam Klepper, senior vice president for marketing and product strategy at ShotSpotter, told Motherboard in an email that the company has no reason to believe the prosecutor's decision reflects a lack of faith in its technology.

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ShotSpotter evidence and employee testimony has been admitted in 190 court cases, he wrote. "Whether ShotSpotter evidence is relevant to a case is a matter left to the discretion of a prosecutor and counsel for a defendant ... ShotSpotter has no reason to believe that these decisions are based on a judgment about the ShotSpotter technology," he said.

The Chicago Police Department, Cook County State's Attorney's Office, Mayor Lori Lightfoot's office, and Alderman Chris Taliaferro, who chairs the city council's public safety committee, did not respond to interview requests or questions.

A pattern of alterations

In 2016, Rochester, New York, police looking for a suspicious vehicle stopped the wrong car and shot the passenger, Silvon Simmons, in the back three times. They charged him with firing first at officers.

The only evidence against Simmons came from ShotSpotter. Initially, the company's sensors didn't detect any gunshots, and the algorithms ruled that the sounds came from helicopter rotors. After Rochester police contacted

The only evidence against Simmons came from ShotSpotter. Initially, the company's sensors didn't detect any gunshots, and the algorithms ruled that the sounds came from helicopter rotors. After Rochester police contacted ShotSpotter, an analyst ruled that there had been four gunshots—the number of times police fired at Simmons, missing once.

Paul Greene, ShotSpotter's expert witness and an employee of the company, testified at Simmons' trial that "subsequently he was asked by the Rochester Police Department to essentially search and see if there were more shots fired than ShotSpotter picked up," according to a [civil lawsuit Simmons has filed](#) against the city and the company. Greene found a fifth shot, despite there being no physical evidence at the scene that Simmons had fired. Rochester police had also refused his multiple requests for them to test his hands and clothing for gunshot residue.

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Curiously, the ShotSpotter audio files that were the only evidence of the phantom fifth shot have disappeared.

Both the company and the Rochester Police Department "lost, deleted and/or destroyed the spool and/or other information containing sounds pertaining to the officer-involved shooting," according to Simmons' civil suit. "Greene acknowledged at plaintiff's criminal trial that employees of ShotSpotter and law enforcement customers with an audio editor can alter any audio file that's not been locked or encrypted."

A jury ultimately acquitted Simmons of attempted murder and a judge overturned his conviction for possession of a gun, [citing ShotSpotter's unreliability](#).

Defendant Greene acknowledged at Plaintiff's criminal trial that he listened to the audio that was presented to the dispatcher, he could hear the sound of four (4) gunshots and subsequently he was asked by the Rochester Police Department to essentially search and see if there were more shots fired than Shotspotter picked up. (Amended Complaint, para. 237). After further review, Shotspotter modified their report and indicated that five (5) rounds were fired. (Amended Complaint, para. 242). Defendant

EXCERPT FROM SILVON SIMMONS CIVIL LAWSUIT AGAINST SHOTSPOTTER AND THE ROCHESTER POLICE DEPARTMENT.

Greene—who has testified as a government witness in dozens of criminal

EXCERPT FROM SILVON SIMMONS CIVIL LAWSUIT AGAINST SHOTSPOTTER AND THE ROCHESTER POLICE DEPARTMENT.

Greene—who has testified as a government witness in dozens of criminal trials—was involved in another altered report in Chicago, in 2018, when Ernesto Godinez, then 27, was charged with shooting a federal agent in the city.

The evidence against him included a report from ShotSpotter stating that seven shots had been fired at the scene, including five from the vicinity of a doorway where video surveillance showed Godinez to be standing and near where shell casings were later found. The video surveillance did not show any muzzle flashes from the doorway, and the shell casings could not be matched to the bullets that hit the agent, according to court records.



During the trial, Greene testified under cross-examination that the initial ShotSpotter alert only indicated two gunshots (those fired by an officer in response to the original shooting). But after Chicago police contacted ShotSpotter, Greene re-analyzed the audio files.

“An hour or so after the incident occurred, we were contacted by Chicago PD and asked to search for—essentially, search for additional audio clips. And this does happen on a semi-regular basis with all of our customers,” Greene told the court, according to a transcript of the trial. He later ruled that there were five additional gunshots that the company’s algorithms did not pick up.

Greene also acknowledged at trial that “we freely admit that anything and everything in the environment can affect location and detection accuracy.”

In this case, ShotSpotter only detected the final two shots that you heard in the audio clip. An hour or so after the incident occurred, we were contacted by Chicago PD and asked to search for -- essentially, search for additional audio clips. And this does happen on a semiregular basis with all of our customers.

EXCERPT FROM THE TRANSCRIPT OF PAUL GREENE'S EXPERT WITNESS TESTIMONY DURING THE TRIAL OF ERNESTO GODINEZ.

ShotSpotter analysts “agree with the machine classification over 90% of the time.” Klenner from ShotSpotter wrote to Motherboard: “In a tiny number

EXCERPT FROM THE TRANSCRIPT OF PAUL GREENE'S EXPERT WITNESS TESTIMONY DURING THE TRIAL OF ERNESTO GODINEZ.

ShotSpotter analysts "agree with the machine classification over 90% of the time," Klepper, from ShotSpotter, wrote to Motherboard. "In a tiny number of cases, our customers request us to perform a location analysis to validate the accuracy of the location. If we find an error, we provide a more accurate location to the customer to assist the investigation."

Prior to the trial, the judge ruled that Godinez could not contest ShotSpotter's accuracy or Greene's qualifications as an expert witness. Godinez has appealed the conviction, in large part due to that ruling.

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"The reliability of their technology has never been challenged in court and nobody is doing anything about it," Gal Pissetzky, Godinez's attorney, told Motherboard. "Chicago is paying millions of dollars for their technology and then, in a way, preventing anybody from challenging it."

The evidence

At the core of the opposition to ShotSpotter is the lack of empirical evidence that it works—in terms of both its sensor accuracy and the system's overall effect on gun crime.

The company has not allowed any independent testing of its algorithms, and there's evidence that the claims it makes in marketing materials about accuracy may not be entirely scientific.

Over the years, ShotSpotter's claims about its accuracy have increased, from 80 percent accurate to 90 percent accurate to 97 percent accurate. According to Greene, those numbers aren't actually calculated by engineers, though.

"Our guarantee was put together by our sales and marketing department, not our engineers," Greene told a San Francisco court in 2017. "We need to give them [customers] a number ... We have to tell them something. ... It's not perfect. The dot on the map is simply a starting point."

In May, the MacArthur Justice Center analyzed ShotSpotter data and found that over a 21-month period 89 percent of the alerts the technology generated in Chicago led to no evidence of a gun crime and 86 percent of the alerts led to no evidence a crime had been committed at all.

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generated in Chicago led to no evidence of a gun crime and 86 percent of the alerts led to no evidence a crime had been committed at all.



Klepper disputed those findings to Motherboard, saying that “the data source used to draw their conclusions, on its own, results in an incomplete picture of an incident” because a gun may have been fired even if there is no documented police evidence that it was.

He also said that Greene’s testimony in the San Francisco trial “had nothing to do with the determination of our actual historical accuracy rate. While marketing and sales have appropriate input on our service level guarantees for our contracts, actual accuracy rates are based on detections that we record.”

Meanwhile, a growing body of research suggests that ShotSpotter has not led to any decrease in gun crime in cities where it’s deployed, and several customers have dropped the company, citing too many false alarms and the lack of return on investment.

One recent study of ShotSpotter in St. Louis found that ShotSpotter “has little deterrent impact on gun-related violent crime in St. Louis. [Automated gun detection systems] also do not provide consistent reductions in police response time, nor aid substantially in producing actionable results.”



Klepper contested those and other research findings, saying that “the studies’ conclusions do not reflect what we see.”

He pointed to a 2021 study by New York University School of Law’s Policing Project that determined that assaults (which include some gun crime) decreased by 30 percent in some districts in St. Louis County after ShotSpotter was installed. The study authors disclosed that ShotSpotter has been providing the Policing Project unrestricted funding since 2018, that ShotSpotter’s CEO sits on the Policing Project’s advisory board, and that

decreased by 30 percent in some districts in St. Louis County after ShotSpotter was installed. The [study authors disclosed](#) that ShotSpotter has been providing the Policing Project unrestricted funding since 2018, that ShotSpotter's CEO sits on the Policing Project's advisory board, and that ShotSpotter has previously compensated Policing Project researchers.

Chicago pushes back

Chicago is one of the most important cities in ShotSpotter's portfolio and is increasingly becoming a battleground over its use.

If a court ever agrees to examine the forensic viability of ShotSpotter, or if prosecutors continue to drop the evidence when challenged, it could have massive ramifications. From January 2017 through June 2021, ShotSpotter reported 94,313 gunfire incidents in the city, an average of 20,958 per year, according to data obtained by Motherboard through a public records request.

Chicago is ShotSpotter's second biggest client, after New York City, accounting for 13 percent of the company's revenue during the [first quarter of 2021](#). But Chicago's \$33 million contract with the company is coming to an end and city officials must decide this August whether or not to renew it.

Meanwhile, the city is grappling with new research, a rise in shootings, cases like the Williams and Godinez trials, and tragedies that have prompted renewed criticism of the technology.

It was a ShotSpotter alert in the early-morning hours of March 29 that [dispatched police to a street in Little Village](#) where they eventually shot and killed 13-year-old Adam Toledo, who was unarmed at the time.

That and other recent events have sparked a [new campaign by community and civil rights groups](#) in Chicago calling on city officials to drop ShotSpotter.

"These tools are sending more police into Black and Latinx neighborhoods," Alyx Goodwin, a Chicago organizer with the Action Center on Race and the Economy, one of the groups leading the campaign, told Motherboard. "Every ShotSpotter alert is putting Black and Latinx people at risk of interactions with police. That's what happened to Adam Toledo."

Motherboard recently obtained data [demonstrating the stark racial disparity](#) in how Chicago has deployed ShotSpotter. The sensors have been placed almost exclusively in predominantly Black and brown communities, while the white enclaves in the north and northwest of the city have no sensors at all, despite Chicago police data that shows gun crime is spread throughout the city.

Community members say they've seen little benefit from the technology in the form of less gun violence—the number of shootings in 2021 is [on pace to be the highest](#) in four years—or better interactions with police officers.

"If you had relationships with any of the people on the block, you wouldn't need the technology, 'cause we could tell you," Asiaha Butler, president of

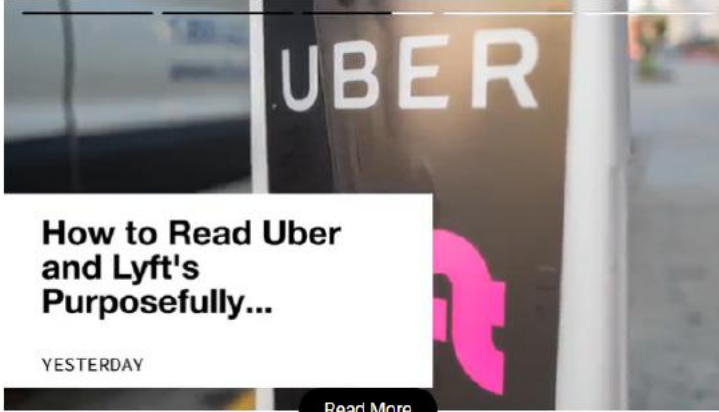
be the highest in four years—or better interactions with police officers.

“If you had relationships with any of the people on the block, you wouldn’t need the technology, ‘cause we could tell you,” Asiaha Butler, president of the Resident Association of Greater Englewood, told Motherboard. Instead, the technology seems to have given police another excuse not to build relationships with residents. When shots ring out in the neighborhood, police may respond faster, but it’s an “over-militarized police presence. You see a lot of them. It’s not a friendly interaction,” she said.

TAGGED: [SURVEILLANCE](#), [ARTIFICIAL INTELLIGENCE](#), [POLICING](#), [CHICAGO POLICE DEPARTMENT](#), [CHICAGO POLICE](#), [SHOTSPOTTER](#), [POLICE TECH](#)

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Here's where all the candidates stand on the controversial technology, which is known to falsely identify and discriminate against people of color.

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Robert Williams was arrested last year in Detroit after a facial recognition system misidentified him as a suspect.

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First came facial recognition. Now, an early form of lip-reading AI is being deployed in hospitals, power plants, public transportation, and more.

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06.14.21



VICE News

Video Shows 13-Year-Old Adam Toledo Had His Hands Up When Cops Shot Him

Bodycam footage of the March 29 incident was released on Thursday.

EO By [Emma Ockerman](#)

April 15, 2021, 8:34pm [f](#) Share [t](#) Tweet [s](#) Snap



A SCREENSHOT OF VIDEO RELEASED BY THE CHICAGO POLICE DEPARTMENT THAT SHOWS POLICE SHOOTING 13-YEAR-OLD ADAM TOLEDO. (CIVILIAN OFFICE OF POLICE ACCOUNTABILITY)

A Chicago police officer chased Adam Toledo down an alley, shouting at the 13-year-old to show his “fucking hands,” before ultimately shooting him in the chest, according to new [body camera footage released Thursday](#).

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Why Did Cops Think This Guy's Daughter's Ashes Were Meth or MDMA?



A Chicago police officer chased Adam Toledo down an alley, shouting at the 13-year-old to show his “fucking hands,” before ultimately shooting him in the chest, according to new [body camera footage released Thursday](#).

In the graphic video from the March 29 encounter, Adam can be seen falling to the pavement after a single gunshot rang out, covered in blood and gasping for air.



He appeared to raise his hands immediately before he was hit.

“Stay with me, stay with me,” an officer told the seventh-grader. He called for an ambulance.

Another officer who arrived on the scene pleaded with Adam to “Stay awake, man,” according to footage published Thursday by the Civilian Office of Police Accountability, which is investigating the shooting. Multiple officers performed chest compressions.

But Adam was pronounced dead at the scene, surrounded by police.

Chicago city officials [released few details](#) about the early-morning incident in the days that followed. The materials published Thursday by the Civilian Office of Police Accountability included bodycam footage from the officer who shot Toledo, along with 16 other bodycam videos, two audio recordings of 911 calls, an incident report, and a response report, among other documents.

Adam’s mother, Elizabeth Toledo, had reported Adam missing the week before the shooting, though he returned home on March 27 before leaving again that night, according to [WBEZ](#). Police struggled to identify Adam after the shooting because he lacked identification, so the family wasn’t told about his death until March 31, according to [WBEZ](#). A [GoFundMe page](#) set up by Elizabeth noted that one of Adam’s “dreams was to become a police officer.”



05.02.21

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Why Did Cops Think This Guy's Daughter's Ashes Were Meth or MDMA?

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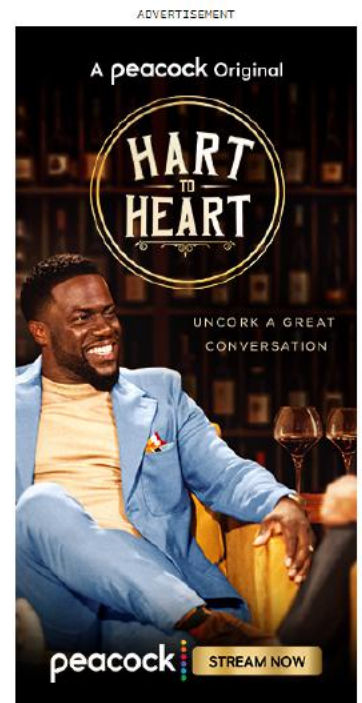


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BEN CHARLIE SNOKE

04.21.21





Adam's killing has rattled the city and spurred protests, though the family has asked for demonstrations to remain peaceful.

"It weighs heavy on our hearts to be planning our last goodbyes instead of watching him grow up and live out those dreams," the family wrote on their GoFundMe page.

The Chicago Police Department initially described the incident, which took place in the largely Latino neighborhood of Little Village, as a "police-involved shooting" in which officers saw two people in an alley while responding to a ShotSpotter alert about gunfire nearby. An "armed offender" fled on foot, police said, ending in a fatal confrontation. Cops found a weapon at the scene and posted a photo of it to social media.



Tom Ahern @TomAhernCPD · Mar 29, 2021

Police involved shooting following a Shot Spotter alert in the 2400 blk of S. Sawyer @ChicagoCAPS10. Firearm recovered on scene. #ChicagoPolice



Tom Ahern @TomAhernCPD

Officers observed two subjects in a nearby alley, one subject fled on foot which resulted in an armed confrontation. One subject shot and killed. 2nd subject in custody. Gun recovered on scene. COPA investigating. #ChicagoPolice





10:19 AM · Mar 29, 2021



45



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Later, on April 1, Chicago Police Superintendent David O. Brown acknowledged that police had killed a juvenile but said he didn't want to name the "young man" to protect his privacy.

Cook County prosecutors have said that an adult, 21-year-old Ruben Roman, fired a gun while standing near Adam, according to the [Chicago Tribune](#). At some point, prosecutors say Roman handed Adam the weapon, according to [WBEZ](#). Roman has been charged with several offenses, including child endangerment, reckless discharge of a firearm, and aggravated unlawful use of a weapon.

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Bodycam footage released Thursday shows that an officer tackled Roman to the ground during the incident.

Chicago Mayor Lori Lightfoot and the Toledo family's attorneys released a [joint statement](#) before the footage of Adam's killing was published, asking for calm. Lightfoot also said Thursday that there's no evidence Adam fired a gun at police.

Toledo's death is one of many high-profile police killings in recent months—but is notable for how young the victim was.



USA TODAY · @USATODAY · Apr 15, 2021

Police shooting of 13-year-old Adam Toledo addressed by mayor and his family in press conference.



USA TODAY

Police shooting of 13-year-old Adam Toledo addressed by mayor

CHICAGO MAYOR TALKS ADAM TOLEDO SHOOTING

USA TODAY

Police shooting of 13-year-old Adam Toledo addressed by mayor and his family in press conference.



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"Simply put we failed Adam. And we cannot afford to fail one more young person in our city...we have too many damn guns on our streets," Mayor Lori Lightfoot said during a press conference on the police shooting of Adam Toledo.



5:40 PM · Apr 15, 2021



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"We acknowledge that the release of this video is the first step in the process toward the healing of the family, the community and our city," the joint statement reads. "We understand that the release of this video will be incredibly painful and elicit an emotional response to all who view it, and we ask that people express themselves peacefully."



Tom Ahern @TomAhernCPD · Mar 29, 2021



Replying to @TomAhernCPD


Officers observed two subjects in a nearby alley, one subject fled on foot which resulted in an armed confrontation. One subject shot and killed. 2nd subject in custody. Gun recovered on scene. COPA investigating. #ChicagoPolice



Tom Ahern @TomAhernCPD

Preliminary Statement on Police-Involved Shooting in the 2300 block of S. Sawyer Ave. @ChicagoCAPS10 #ChicagoPolice

Preliminary Statement on Police-Involved Shooting in the 2300 block of S. Sawyer Ave. @ChicagoCAPS10 #ChicagoPolice



NEWS RELEASE

Chicago Police Department

David G. Brown
Superintendent

For Immediate Release
March 29, 2021

Contact: Office of News Affairs
312-745-6110

**Preliminary Statement on Police-involved Shooting
In the 2300 block of S. Sawyer Ave.**

CHICAGO – On Monday, March 29, 2021, at approximately 2:36 a.m., officers responded to a ShotSpotter alert of multiple shots fired in the 2300 block of S. Sawyer. 10th District officers responded and observed two males in a nearby alley. One armed offender fled from the officers. A foot pursuit ensued which resulted in a confrontation in the alley of the 2300 block of S. Sawyer. The officer fired his weapon striking the offender in the chest. A weapon was recovered and the offender was pronounced deceased on scene.

Currently, the specifics of this incident, including the comprehensive use of force investigation, are being investigated by the Civilian Office of Police Accountability with the full cooperation of the Chicago Police Department. The Officer(s) involved will be placed on routine administrative duties for a period of 30 days.

This matter remains under investigation and all further inquiries can be directed to the Civilian Office of Police Accountability at (312) 745-3609.

312-745-6110 • 3510 South Michigan Ave., Chicago, IL 60653 • Fax 312-745-6996

9:15 PM • Mar 29, 2021

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Facial Recognition Failures Are Locking People Out of Unemployment Systems

ID.me's CEO says unemployment fraud is costing taxpayers \$400 billion, but his own company is denying claims because of problems

Out of Unemployment Systems

ID.me's CEO says unemployment fraud is costing taxpayers \$400 billion, but his own company is denying claims because of problems with its tech, users say.

TF By [Todd Feathers](#)

June 18, 2021, 7:27pm [Share](#) [Tweet](#) [Snap](#)



SCREENGRAB: ID.ME

People around the country are furious after being denied their unemployment benefits due to apparent problems with facial recognition technology that claims to prevent fraud.

Unemployment recipients have been complaining for months about the identity verification service ID.me, which uses a combination of biometric information and official documents to confirm that applicants are who they claim to be. The complaints reached another crescendo this week after Axios published a “deep dive” article about the threat of unemployment fraud based on statistics provided to the outlet by ID.me.



Some unemployment applicants have said that ID.me's facial recognition models fail to properly identify them (generally speaking, facial recognition technology is notoriously less accurate for women and people of color). And after their applications were put on hold because their identity couldn't be verified, many should-be beneficiaries have had to wait days or weeks to reach an ID.me “trusted referee” who could confirm what the technology couldn't.

On Twitter, there are dozens of complaints about ID.me now, and local

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NYPD's Sprawling Facial Recognition System Now Has More Than 15,000 Cameras



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verified, many should-be beneficiaries have had to wait days or weeks to reach an ID.me “trusted referee” who could confirm what the technology couldn’t.

On Twitter, there are dozens of complaints about ID.me per day, and local news articles all over the country have detailed the problem over the course of months. In California, 1.4 million unemployment beneficiary accounts were abruptly suspended on New Year’s Eve and the beneficiaries were required to re-verify their identity using ID.me, a process which many found difficult and resulted in them waiting for weeks to reactivate their accounts while they struggled to make ends meet.



In Colorado, benefit recipients who had no problem establishing their identity before ID.me took over were suddenly rejected and went months without receiving the payments they were eligible for.

The story is similar in Florida, North Carolina, Pennsylvania, Arizona, and many other states.

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ID.me CEO Blake Hall told Motherboard that the company’s facial recognition technology does one-to-one matching—comparing one face against a picture of that same face (from a driver’s license, say)—whereas other applications of facial recognition attempt to find a match for a face in a large dataset of faces, known as one-to-many matching.

“The algorithms used for Face Match operate ~99.9% efficacy,” Hall wrote in an email to Motherboard. “There is in fact no relationship between skin tone and Face Match failure on a 1:1 basis” according to a regression analysis the company performed.

That doesn’t mesh with the experiences being shared on Twitter by people

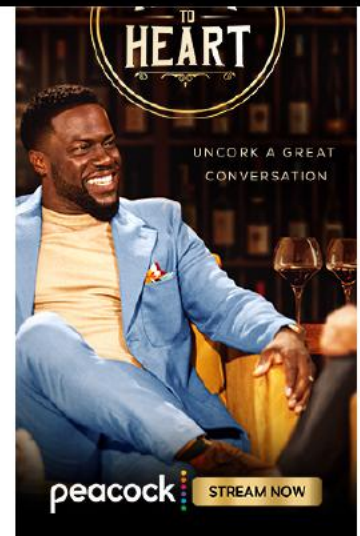


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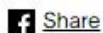
Gig Work Sucks, Just Ask Uber and Lyft Drivers

Uber and Lyft drivers across the country are striking for better pay, this is why.



By [Matthew Gault](#)

July 30, 2021, 1:00pm



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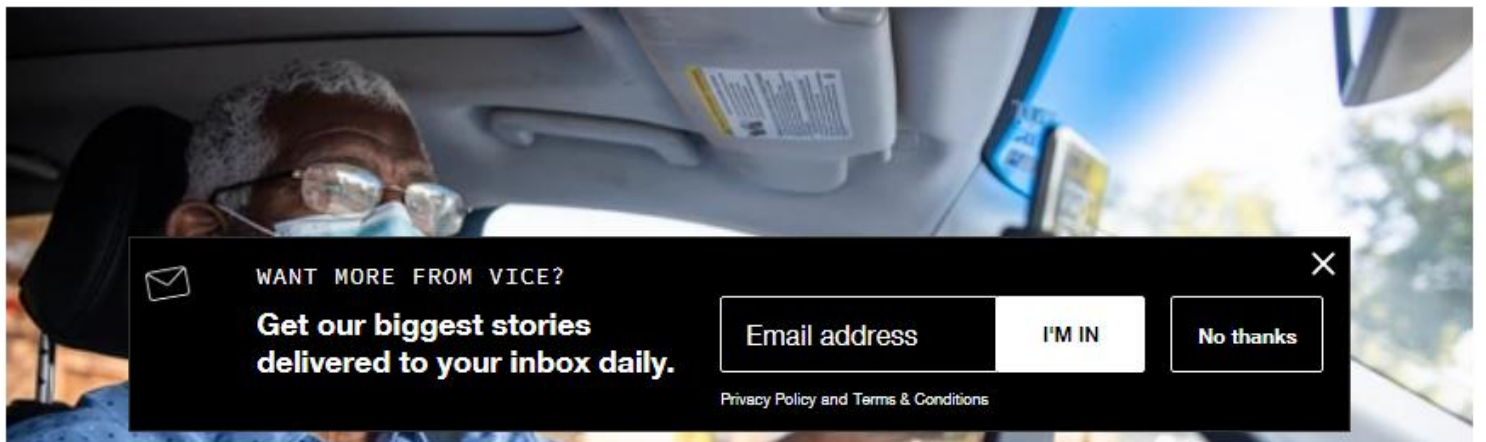





IMAGE: GETTY IMAGES

If you've tried catching an Uber recently you may have noticed that prices and wait times are worse than they've ever been. Rideshare companies like Uber and Lyft didn't fare well during the pandemic and now that restrictions are easing, drivers just aren't coming back.

Motherboard Staff Writer Edward Ongweso Jr spent some time talking to Uber drivers to find out what's going on. He's here to tell us what he found out, but here's a preview: Uber and Lyft Can't Find Drivers Because Gig Work Sucks.



CYBER

Gig Work Sucks, Just Ask Uber and Lyft Drivers

Acast

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Hacking. Disinformation. Surveillance. CYBER is Motherboard's podcast and reporting on the dark underbelly of the internet.

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Also on the pod this week, Lorenzo teaches us a ShotSpotter, the AI system some cities are using to detect gunshots, the coming age of malware hidden in neural networks, and why Facebook said it was OK to post "Death to Khamenei" for the next two weeks.

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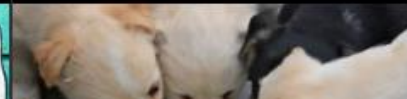
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Gig Work Sucks
July 29, 2021

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Gig Work Sucks, Just Ask Uber and Lyft Drivers

7/29/2021

<https://www.vice.com/en/article/g5gkvx/gig-work-sucks-just-ask-uber-and-lyft-drivers>

1 SPEAKER: If you'd tried catching an Uber
2 recently, you may have noticed that prices and wait
3 times are worse than they've ever been. Ride share
4 companies like Uber and Lyft didn't fare well during the
5 pandemic and now that restrictions are easing drivers
6 aren't coming back.

7 SPEAKER: Ride share companies like Uber and
8 Lyft are pumping millions into new and return employee
9 incentives.

10 SPEAKER: If I don't accept a Door Dash order
11 I'm not penalized like Uber would be. So if you don't
12 accept so many Uber trips, Uber like to penalize you.
13 Honestly, I don't think I'll ever go back to Uber unless
14 they pay their drivers more.

15 SPEAKER: But as more drivers like Selesky
16 (phonetic) switch over, those who bank on a ride home
17 from apps like Uber and Lyft are finding themselves
18 stranded.

19 BEN MAKUCH: Motherboard staff writer Edward
20 Ongweso, Jr. spent some time talking to Uber drivers to
21 find out what's going on. He's here with us today to
22 tell us what he found out. Here's a preview. Uber and
23 Lyft can't find drivers because gig work sucks by
24 Matthew Gault and this is Cyber.

25 Ed, thank you so much for being on the show

1 EDWARD ONGWESO, JR.: Thanks for having me on
2 the show.

3 BEN MAKUCH: So why are gig workers checking
4 out?

5 EDWARD ONGWESO, JR.: It really comes down to
6 the word sucking, like working conditions are horrible,
7 the pay is horrible, and before the pandemic workers
8 were checking out because of concerns about safety,
9 concerns about pay, concerns about stability, their own
10 mental and physical health. And then as the pandemic
11 started to rage, as the company failed to provide PPE,
12 as it, you know, fumbled its sick pay policies and tried
13 to deny extension of relief to workers as they felt
14 overwhelmed with whether they were going to qualify for
15 unemployment as something that Uber and Lyft have
16 opposed in courts previously, they simply said that it
17 was not worth it, and a lot of workers ended up not
18 coming back, and this is on top of the fact that most
19 drivers leave Uber and Lyft every year.

20 BEN MAKUCH: There's a lot to unpack there,
21 but I want to kind of lay this foundation at the top.
22 So there's a reason that Uber was so cheap for so long,
23 right, and it's part of the company's long-term growth
24 model. This is something you've written about
25 extensively. Will you kind of give us the cliff notes

1 version of that?

2 EDWARD ONGWESO, JR.: Right. Uber and Lyft,
3 ride hail companies in general where when they entered
4 the market were faced with a problem, right. Taxi
5 services already exist, and they provide rides at a
6 price that's regulated. How are we supposed to
7 undermine them if it's going to cost you probably more
8 to do those rides if it's not going to have a guarantee
9 by the state to have them priced at that point or have
10 the cost come in at that point.

11 So they got venture capital subsidies,
12 money from investors to provide rides at lower
13 prices, for a short amount of time provide drivers
14 with more money than they would normally get on
15 average working, and the goal was we are going to use
16 these below cost prices, predatory prices to attract
17 customers at an unnatural rate, and we are going to
18 use it to undermine competitors who don't have
19 billions of dollars investment money backing them so
20 that we can get rid of them. And when all is said
21 and done, we'll be able to hike prices and the
22 customers will have nowhere to go and we can end the
23 subsidies. We can finally earn a profit.

24 BEN MAKUCH: But nobody saw a global pandemic
25 coming. It's a little disruptive to that, right?

1 EDWARD ONGWESO, JR.: Right.

2 BEN MAKUCH: So how did the pandemic affect --
3 you've already talked about it a little bit, but how did
4 the pandemic affect I think the drivers primarily I'm
5 interested in? How did it affect the drivers?

6 EDWARD ONGWESO, JR.: Yeah. You know, a lot
7 of drivers that I spoke to and have spoken to since the
8 pandemic started just felt that like Uber and Lyft
9 didn't really care about them. They were not getting
10 PPE. The main places where they would have green light
11 hubs, green light centers where you go to get onboarded,
12 where you go to have questions, where it's really the
13 only place you're likely to interface with a human being
14 were closed. And then the companies announced that they
15 were closing a significant amount of them permanently.
16 So you're not providing PPE for drivers, you're not
17 providing new guidance or input, you're giving them
18 delayed messaging about CDC guidelines to be followed
19 and sometimes contradictory. You're also not providing
20 for them adequate relief so that they don't have to
21 drive. A lot of drivers felt like their options were to
22 starve or to risk infection, right, because there was no
23 paid sick leave and when there was, it was incredibly
24 low paltry sums. You know, I had drivers who talked to
25 me about how if they calculated everything that Uber

1 took from them over the years, one driver's example, it
2 was like 60,000 pounds over six years, and they were
3 only getting offered a few hundred dollars for paid sick
4 leave. It was nowhere near enough needed to make ends
5 meet, let alone not be forced to keep working. And so a
6 lot of drivers were considering leaving left because of
7 frustration, left because of inability to actually, you
8 know, stomach staying around or risk infection. Some of
9 them reported highlighting the Cares Act and the
10 guidelines that allowed for independent contractors like
11 Uber and Lyft drivers as they are currently
12 misclassified to claim helped, you know, make that final
13 push that a lot of drivers needed, even though they knew
14 it was unsafe, even though they knew they were at risk,
15 they could not bring themselves to quit because they
16 were making money. They were the primary, you know,
17 wage earner for their household or the caregiver for
18 their family. They needed that job even though it could
19 kill them.

20 BEN MAKUCH: Is Uber doing anything now or
21 Lyft doing anything now to try to lure drivers back?

22 EDWARD ONGWESO, JR.: Yeah. They're rolling
23 out incentives, right, and this is an interesting thing
24 because for a long time the companies already -- they
25 were spending hundreds of millions of dollars in

1 incentives for drivers, and they've cut those incentives
2 over the years in addition to cutting the base pay raise
3 for drivers. So this massive incentive program is
4 actually just like a return, not even really a return to
5 the norm, but could be seen as like an attempt to get
6 back to what drivers might have been compensated if the
7 base rates weren't cut, but if they also didn't have
8 those stupendous driver incentives that were around for
9 the first few years of Uber and Lyft.

10 BEN MAKUCH: Sort of these weird stories where
11 so much of Uber's behavior, I guess, just doesn't make
12 any sense to me, maybe because I've worked for a living
13 too long. So another aspect of this that I thought was
14 really strange was that in New York City Uber recently
15 actually locked out employees from using the app.

16 EDWARD ONGWESO, JR.: Right. In 2019 going
17 into 2020, the early parts of the pandemic Uber and Lyft
18 via I believe at the time when it was still around were
19 faced with a predicament which is that New York City
20 passed a bunch of rules that to put a wage floor, put a
21 cap on licenses but not cars. And so as a result they
22 were also required to reduce the amount of dead head
23 time, the amount of time drivers spent without a
24 customer in the back. All of this would result in an
25 increase in driver working conditions and pay, but that

1 goes against the point of Uber, Lyft and other ride hail
2 companies which is they're operating at a loss, right,
3 not in the hope that one day they'll be able to make a
4 profit because they've locked in the customers, so they
5 need to reduce drive costs and labor costs as much as
6 possible. So they came up with a pretty ridiculous and
7 exhaustive quota system that would dictate the terms in
8 which you were allowed to go online by forcing you to
9 make X amount of trips, and if you do the math, the
10 trips would basically come out to you having to drive 60
11 hours a week with a significant amount of those hours
12 during peak traffic times for you to be able to get the
13 privilege to schedule next week's hours at ideal driving
14 times so then you would be able to rest easy a little
15 bit, and a lot of drivers were simply unable to do that,
16 got locked out, and by locked out basically the app does
17 not allow you to drive during hours that others would
18 drive because they've set those hours. And so you're
19 just given or relegated with low need, undesirable hours
20 where you're not going to get much business and
21 effectively fired because if you're going to be driving,
22 you know, for this company, you're doing it because you
23 have a good idea of when to drive, where to drive, how
24 you'll make that money back. But if you're being forced
25 to drive at certain times and you're not making ends

1 meet and you're just piling up costs on your car you
2 quit, all right. And so they didn't fire tens of
3 thousands of drivers, but they forced tens of thousands
4 of drivers to quit because the other option was to just,
5 you know, put miles on the car and eat into the gas tank
6 every single day.

7 BEN MAKUCH: So where do Uber drivers and Lyft
8 drivers go after this?

9 EDWARD ONGWESO, JR.: You know, that is a good
10 question because one of the problems is -- one of the
11 problems remains that since we don't actually have in
12 this country a real social safety net, we don't actually
13 have any real mechanism to absorb people into jobs that
14 would give them dignified working conditions and pay,
15 many of them may ultimately end up going back into the
16 work and they're scared of that. A lot of the drivers
17 spoke to or insisted that they would never return,
18 right, but also these are people who over the years have
19 wrestled with quitting and not quitting and ultimately
20 may not have to return because they have families at
21 home and also families overseas that they're sending the
22 money to, right, so a lot of them will try to do work
23 elsewhere in ways I think mirrors the mass -- I don't
24 know if it's a mass exodus, but the amount of people
25 quitting, right, the large numbers of people quitting

1 retail jobs, restaurant jobs and not wanting to come
2 back.

3 The question, I think the real question is,
4 okay, if you don't come back, then what are you going
5 to do. A lot of people drive also because they love
6 it, right. You know, a lot of people in New York
7 City and San Francisco and these major cities, they
8 drive because they enjoy talking to people or they
9 enjoy the sort of freedom that you might have.
10 You're just cruising around with someone and you're
11 picking people up and dropping them off. To lose
12 that is going to be devastating for a lot of people.
13 They may try to work with other apps, may try to work
14 with taxi companies, may try to work with the company
15 later, or they may try to exit into another industry.
16 But then there's also the concern this is a problem
17 across the economy. You're allowed to be treated
18 like shit and paid like shit.

19 BEN MAKUCH: Yeah. I mean, this is one of the
20 reasons I really wanted to talk to you about, that this
21 is a phenomenon that's not relegated to just Uber,
22 right? We've got this gig work epidemic in the country
23 that is really -- I mean, as somebody that worked retail
24 for ten years, I look at gig work and I'm like I can't
25 even -- I was already scraping by and barely able to do

1 it, you know, 40 or 50 hours a week when I was a retail
2 employee, and they treat people like shit. I can't
3 imagine working for one of these companies, like
4 technically not even being an employee, right.

5 So one of the threads here I've been seeing
6 in the coverage of this, this is part of the bigger
7 story in the American economy. Millions of Americans
8 have survived the pandemic and realized for one
9 reason or another what we were doing for a living for
10 one reason or another was not working out. So where
11 do you see this going in the next year?

12 EDWARD ONGWESO, JR.: It really depends on the
13 decisions that are made to either increase wages or give
14 people a chance to choose jobs that they want and enter
15 industries that they want or to change labor laws so
16 that people are not being treated like shit at their
17 workplaces. I mean, there are a lot of jobs right now
18 that the way they're constructed and the way that the
19 law has eroded, managers and employees think it is fine
20 for the conditions to be horrible and for the pay to be
21 horrible and for the turnover to be high, right.

22 We don't have to have warehouse jobs or
23 front facing retail jobs or, you know, restaurant
24 jobs that pay you starvation wages and work your body
25 to the bone to the point where you cannot work there

1 because you will get an injury or because you'll have
2 a breakdown or some other problem, right. But the
3 question is, is there any interest in doing that? I
4 think a lot of people do view these sort of
5 conditions as immutable, as facts in life, right.
6 Part of working retail, you know, is getting harassed
7 where people are getting dominated or submitting to
8 the domination by a boss. Restaurants, I worked at
9 restaurants for awhile, and that is pretty much like
10 you accept that that's just how it's going to be,
11 right. For the duration of the time you're working
12 you put your head down. It doesn't have to be that
13 way. But I also don't know if we're going to be able
14 to change those sort of larger issues structurally
15 right now, things like the proactive stalled and it
16 doesn't look like there's a way to get it passed in
17 the senate because a lot of the legal reforms could
18 also be struck down in the courts which are dominated
19 by right wing reactionary judges or case precedent
20 that is anti-worker in general and because we also
21 have a supreme court where it would end up ultimately
22 that is pretty anti-worker.

23 There are ways that I can envision ways,
24 laws, reform that we can pass, questions like one,
25 can they actually get passed in Congress, and then

1 two, can they survive scrutiny in the courts. At
2 this time right now that may not actually be the
3 case.

4 BEN MAKUCH: There's something that I hear,
5 the argument on the other side that I often hear, and
6 it's usually the one coming from somebody grilling.
7 People are staying home because unemployment benefits
8 are too good. What do you make of this argument?

9 EDWARD ONGWESO, JR.: I mean, that's a weird
10 way to say that people are staying home because their
11 pay is so bad. I mean, that's really what you're
12 saying.

13 BEN MAKUCH: Right.

14 EDWARD ONGWESO, JR.: If unemployment is too
15 good that means that you're getting paid like shit, and
16 it's not high enough for you to consider going back, and
17 that is not -- it doesn't -- I don't understand why when
18 people think that they don't think like that isn't the
19 immediate thought that occurs to them because then the
20 question is we don't have a particularly generous
21 welfare system, so why are you getting paid more on
22 unemployment, which is a system that has been subjected
23 to horrendous cuts than the tax by conservatives and
24 right wingers and even liberals over the past few
25 decades. I think it's a stupid take.

1 BEN MAKUCH: I also think people don't
2 understand how much goes into just being on
3 unemployment, like how much of a job it actually is.
4 That's a whole different podcast.

5 EDWARD ONGWESO, JR.: No, but I think you're
6 right. It is -- like these are -- it's a process that
7 demeans you each time, the constant paperwork, the
8 constant need to prove that you're actually looking for
9 a job, right. Also the restrictions for people who are
10 on other welfare programs, like food stamps. There are
11 restrictions what you can actually use them for. I
12 mean, all of this, it's not like just free money that's
13 being doled out. I think that's another thing that
14 people who have never been on it don't get.

15 BEN MAKUCH: Yeah. All right. So to bring
16 this back around to Uber, does Uber ultimately survive
17 this labor shortage do you think, or do they have to
18 change, do they have to give people more money and they
19 have to go more into the red?

20 EDWARD ONGWESO, JR.: It's interesting because
21 I think it's pretty clear that investors don't really
22 care about risk finances, nor does Uber really care
23 about pretending like there's a real act of
24 profitability that doesn't involve massive amounts of
25 wealth transfer from the workers and consumers, right.

1 But there is a real question of like if it can turn
2 around the labor shortage, right, can it, you know, what
3 Uber might think it needs to do is increase incentives,
4 right, and that might increase, you know, drivers and
5 retain drivers a little bit longer, but will that
6 actually get more people hired, I don't know. And
7 there's also the question of, you know, Uber has a
8 turnover rate that's above 95 percent and it's had that
9 for almost every single year it's existed. What if it
10 has just actually depleted the labor pool of people who
11 are willing to work for it. That's a question that I
12 don't know if we are going to be able to answer until it
13 actually happens, right. But, I mean, Uber could
14 survive it. Uber has survived pretty horrendous
15 scandals, crises in every step of its existence, mainly
16 because of how promising the returns are going to be for
17 investors if it does get a monopoly.

18 BEN MAKUCH: All right. Thank you so much for
19 coming onto Cyber and walking us through this. His
20 latest article on this is Uber Lyft, can't find drivers
21 because gig work sucks.

22 EDWARD ONGWESO, JR.: Thanks for having me on.
23 It was great talking with you.

24 (Music)

25 BEN MAKUCH: Hello, everyone. I am Matthew

1 Gault and this is Cipher. It's that part of Cyber where
2 we decipher the week's biggest tech stories. With me as
3 always is staff writer Lorenzo Franceschi-Bicchierai.

4 Sir, how are you doing?

5 LORENZO FRANCESCHI-BICCHIERAI: I'm doing
6 well, thanks. How are you, Matt?

7 BEN MAKUCH: I'm doing all right. I got a
8 little bad news about a sick cat yesterday, but I'm
9 doing okay. I don't want to bring the show down, so
10 let's jump right into these oh, these stories are all
11 kind of depressing.

12 All right. So let's just get into it. So
13 police are telling ShotSpotter to alter evidence from
14 gunshot detecting AI. Lorenzo, what is ShotSpotter?

15 LORENZO FRANCESCHI-BICCHIERAI: Oh, that's a
16 very good question because that's really the heart of
17 this story. What is ShotSpotter, how reliable it is and
18 should police use it for court cases.

19 My understanding of ShotSpotter is that
20 it's technology that relies on sort of a network of
21 microphones installed in neighborhoods which previous
22 models were reporting has shown that they are
23 predominantly black and latino communities, you know,
24 showing clear bias from the police on where to put
25 these systems, and this network of microphones

1 records, you know, ambient noise and is designed to
2 detect when a gunshot goes off.

3 The technology relies on algorithms.
4 There's also some human review which is, you know,
5 not automatic. I think it just comes into play if
6 there's some issue and this is the story here.

7 This story centers around the case in
8 Chicago where a 60-year-old man is accused of
9 murdering a 25-year-old. The accused claims that he
10 wasn't, you know -- the other man was shot in a
11 drive-by shooting and he just picked him up and
12 brought him to the hospital, and the key evidence in
13 the case is a report from a ShotSpotter that places
14 the shooting at a certain location. But it turns out
15 that the shooting was a little bit further, and the
16 defendant's lawyer essentially is arguing that this
17 technology is not reliable, should not be entered
18 into the case, and it's completely moot. And what's
19 interesting here is that the prosecutors essentially
20 said you know what, we're not going to use this
21 evidence anymore. You know, let's drop the evidence
22 which, you know, some of the experts interviewed in
23 the piece essentially argue that this is a clear sign
24 that the police does not want to talk about how this
25 technology works, does not want to really get into

1 how it was used in this case because if this was
2 entered into evidence, then the defense would have
3 had the right to really see all the nitty and gritty
4 of how this worked.

5 And to Motherboard and Cyber listeners,
6 this may sound familiar. Years ago there were a lot
7 of stories about sting rays, which are surveillance
8 devices that the police uses to intercept text
9 messages and locate people using cell phones, and
10 years ago there were many cases where the police also
11 dropped this kind of evidence in an attempt not to
12 disclose how the technology actually worked.

13 BEN MAKUCH: Yeah, and I want to highlight
14 something very specific from this story too that I
15 thought was really interesting. It's not just that they
16 backed away -- in this particular case that they backed
17 away from using the evidence. It appears based on
18 documents that the man's public defender was able to
19 turn up that someone had accessed the ShotSpotter data
20 and altered it so that something that had been
21 registered as a firework in the database was then called
22 a gunshot later, and they had also moved -- you said
23 this, but they specifically moved the location at which
24 that shot was heard. And then as soon as someone called
25 them on it, they abandoned it completely.

1 It's interesting when we have these new
2 technologies, especially with forensic science where
3 we have something that supposedly is going to tell us
4 objectively what occurred and where we have to be
5 very careful, especially when we're talking about
6 sending people to jail for a very long time.

7 LORENZO FRANCESCHI-BICCHIERAI: Yeah. And
8 it's important to note that this is not the only case
9 where evidence has been withdrawn and Todd, the author
10 of the piece, also delves into another case where a jury
11 acquitted a defendant because, you know, citing
12 ShotSpotter's unreliability. So, you know, there's a
13 history of controversial use of this evidence.

14 BEN MAKUCH: All right. Let's move on to the
15 next story. Everyone loves AI, everyone hates malware.
16 Soon you may have malware in your AI if you don't
17 already.

18 Researchers hid malware inside an AI's
19 neurons and it worked scarily well. What's going on
20 here, Lorenzo?

21 LORENZO FRANCESCHI-BICCHIERAI: Yeah. This is
22 really interesting research from a Chinese university,
23 the University of Chinese Academy of Sciences. The
24 researchers there found that they were able to
25 essentially embed malware with steganography, which I

1 think we talked about last week, into a neural network.
2 So the idea here is that a hacker or a hacking group
3 could recompile some sort of neural network model, add
4 the malware in and hide it in and the model would still
5 work. You know, the AI would do the job it was designed
6 to do, but the user would get infected with malware.
7 And the researcher showed this by creating malware like
8 this, and they ran it through some anti-virus scans that
9 could not detect it, so their hypothesis is that this
10 could be one day maybe one way to infect people with
11 malware.

12 BEN MAKUCH: Right. The idea here is kind of
13 these programs are so big and made up of so many
14 component pieces that it's fairly easy to slip in pieces
15 of bad code and remain undetected, right?

16 LORENZO FRANCESCHI-BICCHIERAI: Yeah. That's
17 correct. It's just another way to, you know, trick
18 people into running malware essentially and, you know, I
19 think it relies on the fact that more and more companies
20 and developers are using this kind of software, and
21 perhaps they not as careful in checking into whether
22 it's malicious. So as the researchers know, this could
23 be another avenue for interesting supply chain attacks.

24 BEN MAKUCH: Yeah. I really enjoy -- you
25 don't really get pretty definitive statements from

1 researchers in a paper like this, but this stuck out to
2 me. As neural networks become more widely used, this
3 method will be universal when delivering malware in the
4 future.

5 LORENZO FRANCESCHI-BICCHIERAI: Yeah. That
6 remains to be said. Rathamali de Leon, the author of
7 the piece quotes an expert saying this may be a little
8 overkill. There are other ways to do it. But, you
9 know, if anything we've learned from this from cyber
10 securities that if it's possible and if researchers say
11 it's possible, eventually someone will use it. It's
12 just a matter of time.

13 BEN MAKUCH: All right. Let's move on to the
14 last story which is the one I really wanted to talk
15 about and is written by you. Facebook says Death to
16 Khamenei posts are okay for the next two weeks, and this
17 is based on stuff that's going on in Iran. Lorenzo, can
18 you kind of set this one up?

19 LORENZO FRANCESCHI-BICCHIERAI: Yeah. So last
20 week a lot of Iranians took to the streets to protest a
21 water shortage in a southwestern region in Iran. These
22 protests then sparked more protests in Tehran over, you
23 know, the usual complaints that Iranians have which is,
24 you know, they're under authoritarian regime and a lot
25 of them were like chanting death to Khamenei, which is a

1 very common chant and, you know, while in Farsi it
2 literally means death to Khamenei, given the context in
3 English it would be more like down with, you know, down
4 with Khamenei, fuck Khamenei.

5 So what was happening here was that
6 Instagram was taking down a lot of posts that
7 mentioned this chant or had the hashtag of the chant,
8 and a bunch of internet activists and researchers
9 that focused specifically on Iran noticed this and
10 reached out to Facebook and said hey, what's going on
11 here, you know. Your content and moderation filters
12 are taking down important documentation of protests
13 in Iran.

14 And Facebook's response was interesting
15 because they were like oh, yeah. Our bad. We are
16 reinstating the posts. We understand that the chants
17 are, you know, in the context of protests are not
18 actually incitement of violence which is what
19 Facebook initially flagged this for, and then they
20 had this like really funny policy of saying yeah,
21 users can say death to Khamenei for the next two
22 weeks, but then we'll go back to the usual policy.

23 BEN MAKUCH: Is it possible that Facebook
24 would allow an extension to the death to Khamenei meme
25 if perhaps protests continued to pace for more than two

1 weeks?

2 LORENZO FRANCESCHI-BICCHIERAI: Yeah. They
3 said that, you know, it's subject to review. What's
4 really like the big question here is if Facebook really
5 knew that these chants were okay, why did they not catch
6 this earlier. They also in the email that we got which
7 was sent to these activists, Facebook said that they had
8 made this exception, this specific exception for death
9 to Khamenei chants before. So again at some point in
10 their moderation filters, at some point in the process
11 maybe the algorithms flagged this, maybe a moderator
12 with not a lot of experience flagged this but, you know,
13 it seems like it's a small mistake but, you know, we
14 have to remember that Iran is a very closed society in
15 terms of internet access. The government has a lot of
16 control over what people can do and cannot do on the
17 internet, and users turning to Instagram is one of the
18 very only ways for them to get some of this information
19 out which is heavily censored and you know, it's heavily
20 censored by the government usually. In this case it was
21 censored by Instagram.

22 BEN MAKUCH: So I just want to highlight a
23 couple of things about this story. I think it was
24 probably my favorite story of last week because it
25 touches on so many of the things that I'm constantly

1 thinking about, one of them being that we do live in a
2 world where these big tech companies like Facebook, like
3 Twitter have a certain amount of control over what the
4 discourse is going to be like and how you're going to
5 talk. And here in the west, in America specifically we
6 love to rail against this while simultaneously
7 complaining that social media is ruining our lives even
8 though we're all addicted to it and we're all using it.

9 In the view from an activist in Iran using
10 Facebook, using Instagram is much, much different I
11 think. This is something we saw kind of starting in
12 the Arab spring and has continued on that the way
13 that people in Libya, in Iran and, you know, Eritrea,
14 I don't know if anyone is following what's going on
15 there right now, use the social media platforms is
16 much different in their relationship to censorship
17 and how Facebook moderates its content is much, much,
18 much different in other parts of the world. And then
19 you also have this aspect to where like Facebook is
20 making political calculations when it decides what to
21 censor and what not to censor, right.

22 It has to, to a certain extent, play nice
23 with Tehran, but it also knows that it gets a bunch
24 of juice and traffic from these activists. So I just
25 think all of this stuff is very complicated and very

1 interesting, and there's not really easy answers.
2 It's one of these areas where we are defining the
3 bounds of what is acceptable in the moment every day.

4 LORENZO FRANCESCHI-BICCHIERAI: Yeah. Those
5 are really great points, and I think they're really
6 relevant here because again for Iranians Instagram and
7 Twitter, you know, back in the day during the so called
8 green revolution, they were really tools to document
9 what was happening, to show the world the atrocities of
10 the regime that otherwise were not coming out because,
11 you know, there's very few western journalists in Iran,
12 and the few that are there were either kicked out or,
13 you know, heavily censored. So for them this is not
14 really just about political speech it's about, you know,
15 documenting crimes and abuse of power. And all these
16 posts, all this documentation can just be taken offline
17 because Facebook does not know the context and the
18 political context of these posts.

19 BEN MAKUCH: Yeah. I mean content moderation
20 for Facebook and Twitter I think is just a nightmare
21 they didn't really see coming, right, because like you
22 said the context in each individual country is so
23 completely different that it can be hard as a bay area
24 company to navigate all this stuff.

25 LORENZO FRANCESCHI-BICCHIERAI: Yeah. And

1 it's very jarring that Facebook was basically like, you
2 know, I think this chant is okay because the
3 circumstances on the ground are bad. But like some of
4 the circumstances on the ground in Iran are bad all the
5 time, so why shouldn't activists and opponents to the
6 regime not be able to voice, you know, their anger
7 online.

8 BEN MAKUCH: Yeah. You know, I'll have to
9 punch out here because before I start talking about the
10 rohingya and get us into real trouble. So with that,
11 Lorenzo, thank you so much for coming onto Cipher again
12 and walking us through all of last week's best tech
13 stories.

14 LORENZO FRANCESCHI-BICCHIERAI: Thanks, man.
15 Always a pleasure.

16 (End of recording.)
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CERTIFICATE OF REPORTER

I, Charlotte Crandall, certify that I was authorized to and did transcribe the foregoing audio recorded proceedings and that the transcript is a true and complete record of my stenographic notes from an audio recording and was transcribed to the best of my ability.

Dated this 30th day of September, 2021.

A handwritten signature in cursive script that reads "Charlotte Crandall". The ink is dark and the signature is fluid, with a large initial 'C'.

Charlotte Crandall
Registered Professional Reporter

	addicted 24:8	awhile 12:9	
2	AI 16:14		C
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25-year-old	AI's 19:18		calculations
17:9	algorithms	back 10:2,4	24:20
	17:3 23:11	13:16 14:16	called 18:21,
4	allowed 10:17	22:22 25:7	24 25:7
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