

IN THE SUPREME COURT OF THE STATE OF DELAWARE

KWESI HUDSON,	§	
	§	No. 303, 2022
Defendant Below,	§	
Appellant,	§	Court Below—Superior Court
	§	of the State of Delaware
v.	§	
	§	Cr. ID No. 1809009750(N)
STATE OF DELAWARE,	§	
	§	
Appellee.	§	

Submitted: October 11, 2023

Decided: January 9, 2024

Before **SEITZ**, Chief Justice; **TRAYNOR** and **GRIFFITHS**, Justices.

Upon appeal from the Superior Court. **AFFIRMED.**

Raymond D. Armstrong, Esquire, OFFICE OF DEFENSE SERVICES,
Wilmington, Delaware, *for Appellant Kwesi Hudson.*

Brian L. Arban, Esquire, DELAWARE DEPARTMENT OF JUSTICE,
Wilmington, Delaware, *for Appellee State of Delaware.*

GRIFFITHS, Justice:

Kwesi Hudson was found guilty of first-degree kidnapping, first-degree robbery, second-degree rape, and several other crimes stemming from a trio of violent incidents in New Castle County, Delaware. He raises two issues on appeal, both of which are matters of first impression.

First, Hudson challenges an October 15, 2021 decision of the Superior Court denying his pre-trial motion *in limine* to exclude the State's proffered expert testimony on DNA mixture interpretation and technology. The lab that processed the DNA used STRmix, a probabilistic genotyping software program. Hudson challenged the State's expert report on the ground that STRmix was not scientifically reliable under Delaware Rule of Evidence 702 and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*¹

Second, Hudson appeals from a November 23, 2021 decision of the Superior Court denying his motion to suppress cell-site location information collected from cell tower dumps pursuant to ten search warrants. The information collected was not specific to Hudson; rather, it related to phone activity from all cell phones that used specific cell towers during certain limited periods. Hudson argues that these warrants violated his rights under the Fourth Amendment to the United States Constitution, Article I, Section 6 of the Delaware Constitution, and Delaware statutory law.

¹ 509 U.S. 579 (1993).

We find Hudson’s challenges to be without merit. We therefore affirm his convictions and the decisions of the Superior Court.

I. RELEVANT FACTUAL AND PROCEDURAL BACKGROUND

A. The February 13 Attack

On February 13, 2017, L.M.² drove home to her residence at Top of the Hill Apartments near Claymont, Delaware. As she walked toward her building, a man pressed his gloved hand over her face and shoved a gun into her stomach. She described the man as having a lighter complexion, gray or hazel eyes, being short in stature, and weighing around 180 pounds. She found his voice to be “unique,” with a “twanging or . . . general accent that . . . seemed very distinguishable.”³ He wielded a black gun, was dressed entirely in black, and wore a black ski mask.

The assailant grabbed her phone, forced L.M. to return to her vehicle, and told her that he was going to force her to withdraw money from an ATM. He ordered her to kneel on the passenger seat while facing the rear of the vehicle and to remove her pants and underwear. During a brief struggle, he punched L.M. in the face.

² This Court has *sua sponte* assigned each victim a pseudonym under Rule 7(d).

³ App. to Opening Br. at A95 (Trial Tr.).

The assailant drove them out of the apartment complex down Silverside Road toward Marsh Road. He first drove to a nearby TD Bank branch but did not like the location because it had too much light. After forcing her to commit sexual acts, he drove to a PNC bank branch on Marsh Road and made L.M. withdraw money from the ATM. The assailant then drove them back to her apartment complex, exited her car, and told her not to move. After the assailant fled, L.M. drove to her boyfriend's apartment in Pennsylvania. He immediately drove her to the hospital to address her injuries.

After her attack, detectives from the New Castle County Police Department ("NCCPD") had L.M. ride along with them to identify the various locations where the incident took place in hopes of obtaining surveillance footage. The detectives secured security footage from the PNC Bank branch showing L.M.'s ATM withdrawal, and they processed L.M.'s vehicle for fingerprints and DNA evidence.

B. The February 19 Attack

On February 19, 2017, S.C. drove home to her residence at Arundel Apartments near Pike Creek, Delaware. As she walked toward the building, a man grabbed her from behind, shoved her against the building, and pressed a gun to her back. She noticed that the man was wearing dark clothing, including a hoodie, ski mask, and gloves. She described him as having dark brown skin,

being about six feet tall, and weighing around 200 pounds. She also observed that he was muscular, possibly in his thirties, and had an accent that sounded “somewhat foreign to [her].”⁴

The assailant forced her to return to her apartment. Once in her apartment, he demanded money and valuables and forced S.C. to remove her pants and underwear. He raped S.C. and then made her return to her vehicle to drive to a bank to force her to withdraw money from an ATM. Once inside the vehicle, he directed S.C. to kneel on the passenger seat while facing the rear of the vehicle.

The assailant first drove them to a PNC Bank branch on Limestone Road, where S.C. withdrew money from an ATM at gunpoint. They then drove to another bank, where a subsequent ATM withdrawal failed. They then drove to an Artisans Bank branch on New Linden Hill Road, where S.C. managed to escape by leaping out of the car window and running into a nearby bar. S.C. was eventually taken to a hospital where she was examined by a forensic nurse and treated for her injuries.

After the attack, NCCPD detectives collected footage from the PNC Bank branch on Limestone Road and the Artisans Bank branch on New Linden Hill Road. They also collected physical evidence and processed S.C.’s apartment

⁴ App. to Opening Br. at A177 (Trial Tr.).

building's exterior, her apartment, and her vehicle for fingerprints and possible DNA evidence.

C. The March 6 Attack

On March 6, 2017, J.B. took her dog for a walk in The Bluffs Apartments complex where she lived near Newark, Delaware. When she entered the building, a man pointed a gun at her head and told J.B. that he was going to rob her. She stated that the assailant was wearing a dark hoodie, black gloves, and a black mask covering his entire face. She described him as bulky, approximately 5'8" tall, and thought he was somewhere in his thirties. She observed that he "sounded [B]lack."⁵

The assailant forced J.B. to take him to her apartment. When they arrived, her boyfriend opened the door and she whispered that he was trying to rob her. Her boyfriend chased after the man. She ran to a neighbor's house for help and the neighbor called 911. Her boyfriend described the man as having a husky build, wearing a ski mask and dark attire, and being short in stature (approximate 5'6" to 5'8" tall).

After J.B.'s attack, NCCPD officers tried to track the perpetrator's movements using a K-9 unit. Though unsuccessful, they found a pair of vice grips in the grassy area near the apartment building. They tested the vice grips

⁵ App. to Opening Br. at A379 (Trial Tr.).

and the building's exterior for fingerprints and DNA evidence. They did not find any surveillance footage of evidentiary value.

D. The Collection of Cell-Site Location Information Pursuant to Cell Tower Dumps

As part of their investigation into the three incidents, which were investigated together given their similarities, NCCPD officers obtained ten search warrants directed to five cell phone carriers for cell-site location information from cell towers in the area of the incidents.⁶ The first set of warrants, five warrants obtained on February 20, 2017 (the “February Cell Tower Warrants”), requested the following information:

[C]all detail records (CDRs) for all cellular telephone activity – whether incoming or outgoing and whether voice, data[,] or SMS related – that traversed the [cell phone carrier's] cell site(s) that service(s) Arundel Apartments at 3009 Crossfork Dr.[,] Wilmington, DE 19808 (39.735870, -75.672117) during the time period on 02/19/17 from 1930-2100 hours EST; Top of the Hill Apartments at 2101 Prior Rd., Wilmington DE 19809 (39.796276, -75.485160) during the time period on 02/13/17 from 1930-2130 hours EST; PNC [B]ank at 1704 Marsh Rd., Wilmington DE 19810 (39.801042, -75.505922) during the period on 02/13/17 from 2030 to

⁶ See App. to Answering Br. at B1–7 (February 20, 2017 AT&T Cell Tower Warrant); *id.* at B8–14 (February 20, 2017 Metro PCS Cell Tower Warrant); *id.* at B15–22 (February 20, 2017 Sprint Cell Tower Warrant); *id.* at B23–29 (February 20, 2017 T-Mobile Cell Tower Warrant); *id.* at B30–37 (February 20, 2017 Verizon Cell Tower Warrant); *id.* at B38–44 (March 7, 2017 AT&T Cell Tower Warrant); *id.* at B45–51 (March 7, 2017 Metro PCS Cell Tower Warrant); *id.* at B52–58 (March 7, 2017 Sprint Cell Tower Warrant); *id.* at B59–65 (March 7, 2017 T-Mobile Cell Tower Warrant); *id.* at B66–72 (March 7, 2017 Verizon Cell Tower Warrant). The February Cell Tower Warrants are substantively identical, with the exception of the name of the cell phone carrier. The March Cell Tower Warrants are also substantively identical in the same manner.

2130 hour EST; Artisans [B]ank at 4551 New Linden Hill Rd[.], Wilmington DE 19808 (39.735290, - 75.690970) during the time period on 02/19/17 from 2000-2100 hours EST[.]⁷

In sum, the warrants sought call detail records from all cell phones that used the following cell towers on the following dates during the following times:

- February 13, 2017 – Activity from the cell tower servicing Top of the Hill Apartments for a two-hour period (7:30-9:30 p.m.)
- February 13, 2017 – Activity from the cell tower servicing Marsh Road PNC Bank branch for a one-hour period (8:30-9:30 p.m.)
- February 19, 2017 – Activity from the cell tower servicing the Arundel Apartments for a one-and-a-half-hour period (7:30-9:00 p.m.)
- February 19, 2017 – Activity from the cell tower servicing the New Linden Hill Road Artisans Bank branch for a one-hour period (8:00-9:00 p.m.)

The second set of warrants, five warrants obtained on March 7, 2017 (the “March Cell Tower Warrants” and collectively with the February Cell Tower Warrants, the “Cell Tower Warrants”), requested the following information:

[C]all detail records (CDRs) for all cellular telephone activity – whether incoming or outgoing and whether voice, data[,], or SMS related – that traversed the [cell phone carrier’s] cell site(s) that service(s) The Bluffs Apartments at 1913 Sheldon Dr[.], Newark, DE 19711

⁷ App. to Answering Br. at B1 (February 20, 2017 AT&T Cell Tower Warrant); *id.* at B8 (February 20, 2017 Metro PCS Cell Tower Warrant); *id.* at B15 (February 20, 2017 Sprint Cell Tower Warrant); *id.* at B23 (February 20, 2017 T-Mobile Cell Tower Warrant); *id.* at B30 (February 20, 2017 Verizon Cell Tower Warrant).

(39.727713, -75.704499) during the time period on 03/06/17 from 1730-1900 hours EST[.]⁸

In other words, the March Cell Tower Warrants sought call detail records from all cell phones that used the cell tower servicing the area around The Bluffs Apartments on March 6, 2017 during a one-and-a-half-hour period (5:30-7:00 p.m.).

E. The Pennsylvania Incidents & Subsequent Warrants

In May 2017, Pennsylvania police informed NCCPD officers about an armed robbery that occurred at a Walgreens in Chichester Township. After the incident, Pennsylvania police found a BB gun and a black ski mask stuffed with cash in a nearby area. The black ski mask underwent DNA testing in Pennsylvania, and the DNA profile from the mask matched Hudson's DNA profile. Pennsylvania police also recovered a Wells Lamont left-handed glove from Hudson's vehicle. After obtaining the BB gun and the glove from the Pennsylvania police, NCCPD officers swabbed both the glove and BB gun for DNA evidence. Pennsylvania police also provided NCCPD investigators with Hudson's cellphone number, though they had already separately obtained the number.

⁸ App. to Answering Br. at B38 (March 7, 2017 AT&T Cell Tower Warrant); *id.* at B45 (March 7, 2017 Metro PCS Cell Tower Warrant); *id.* at B52 (March 7, 2017 Sprint Cell Tower Warrant); *id.* at B59 (March 7, 2017 T-Mobile Cell Tower Warrant); *id.* at B66 (March 7, 2017 Verizon Cell Tower Warrant).

After NCCPD investigators cross-referenced Hudson's cell phone number with the numbers obtained from the Cell Tower Warrants, they obtained a search warrant for Hudson's cell-site locations specific to his phone number.⁹ NCCPD officers, with assistance from the Federal Bureau of Investigation, learned that on February 13, 2017, Hudson's phone twice used the cell tower pointing toward the crime scene between approximately 6:30 and 8:00 p.m. On February 19 and March 6, 2017, Hudson's phone used cell towers near areas around the crimes and his Wilmington residence, but not any cell towers directed toward the crime scenes.

F. DNA Labs International's Report Utilizing STRmix

NCCPD investigators sent several evidence and reference swabs to the Delaware Division of Forensic Science for traditional DNA analysis. The Division found that Hudson did not contribute to the DNA found on the exterior door of J.B.'s apartment building, but that he was a major contributor to the DNA found on the Wells Lamont left-handed glove that Pennsylvania police found. It also found that swabs of certain evidentiary items, such as the BB gun, produced mixed DNA profiles from which the Division could not draw any official conclusions about the identities of the individual contributors. Upon the Division's recommendation,

⁹ App. to Answering Br. at B99–107 (April 19, 2018 MetroPCS K. Hudson Cellphone Warrant). This warrant is not at issue on appeal.

NCCPD investigators sent DNA swabs from the victims and the BB gun to DNA Labs International (“DNA Labs”) for probabilistic genotyping analysis using STRmix software.

Alicia Cadenas, a senior DNA analyst with DNA Labs at the time, used STRmix to analyze a mixture of DNA samples from the three victims and the BB gun taken from Hudson.¹⁰ The resulting profile (the “DNA Labs Report”) indicated “a mixture of at least three individuals with at least one male contributor.”¹¹ The three victims “could not be ruled out as possible contributors to this mixed DNA profile” and the most significant finding was as follows:

The DNA profile obtained from the extract is approximately 320 trillion times more probable if the sample originated from [S.C.] (Contributor #1) and two unknown persons than if it originated from three unknown persons. Therefore, there is extremely strong support that [S.C.] and two unknown persons contributed to this DNA profile, rather than three unknown persons.¹²

In other words, Cadenas opined that it was extremely likely that the DNA extracted from the BB gun originated in part from S.C.

G. The Indictment and Pre-Trial Motions

On September 24, 2018, a Superior Court grand jury indicted Hudson on two counts each of first-degree kidnapping, first-degree robbery, and terroristic

¹⁰ App. to Answering Br. at B158–60 (August 15, 2018 DNA Labs Report).

¹¹ *Id.* at B158 (August 15, 2018 DNA Labs Report).

¹² *Id.*

threatening, as well as one count each of aggravated menacing, first-degree assault, third-degree assault, first-degree burglary, home invasion, attempted second-degree kidnapping, second-degree rape, attempted first-degree robbery, and first-degree unlawful sexual contact.

Before trial, Hudson filed a motion *in limine* to exclude the State's proffered expert testimony on DNA testing results—the DNA Labs Report—and sought a *Daubert* hearing to test its admissibility.¹³ The Superior Court denied Hudson's motion, finding that the DNA Labs Report was sufficiently reliable and that a *Daubert* hearing was unnecessary on the record before it.¹⁴

Hudson also filed a motion to suppress evidence collected pursuant to the Cell Tower Warrants.¹⁵ The Superior Court also denied this motion, finding that the Cell Tower Warrants were constitutional and were supported by probable cause.¹⁶

H. Trial, Sentencing, and Appeal

Hudson's case proceeded to trial on December 6, 2021. On December 15, 2021, the jury convicted him of all charges following a seven-day trial. On July 29, 2022, the Superior Court sentenced Hudson to a total of 162 years of Level

¹³ *State v. Hudson*, Cr. ID No. 1809009750, Docket Entry No. 36 (Del. Super. Aug. 27, 2021).

¹⁴ *State v. Hudson*, 2021 WL 4851971, at *6 (Del. Super. Oct. 15, 2021).

¹⁵ *State v. Hudson*, Cr. ID No. 1809009750, Docket Entry No. 34 (Del. Super. July 30, 2021). This motion also sought the suppression of evidence collected as a result of searches pursuant to other warrants, none of which are at issue on appeal.

¹⁶ *State v. Hudson*, 2021 WL 5505109, at *8 (Del. Super. Nov. 23, 2021).

V imprisonment, suspended after 150 years for probation. Hudson filed his notice of appeal on August 25, 2022.

II. STANDARD OF REVIEW

We review a trial court’s decision to admit or exclude evidence for abuse of discretion.¹⁷ We review alleged constitutional violations *de novo*.¹⁸ We also apply *de novo* review to the Superior Court’s legal conclusions when reviewing the denial of a motion to suppress.¹⁹

III. ANALYSIS

For the reasons set forth below, we conclude that Hudson’s challenges to the Superior Court’s motion *in limine* and motion to suppress decisions are without merit. Accordingly, we affirm Hudson’s convictions and sentence.

A. Hudson’s Motion in Limine Challenge

The Superior Court did not err when it: (1) found the State’s proffered expert testimony on DNA mixture interpretation and technology—the DNA Labs Report that utilized STRmix software—to be sufficiently reliable; and (2) denied Hudson’s

¹⁷ *Miller v. State Farm Mut. Auto. Ins. Co.*, 993 A.2d 1049, 1053 (Del. 2010). “This deferential standard of review is simply a recognition that trial judges perform an important gatekeeping function and, thus, must have considerable leeway in deciding in a particular case how to go about determining whether particular expert testimony is reliable.” *Bowen v. E.I. DuPont de Nemours & Co.*, 906 A.2d 787, 795 (Del. 2006) (internal quotations and citations omitted).

¹⁸ *Wheeler v. State*, 135 A.3d 282, 295 (Del. 2016).

¹⁹ *Id.*

request for a *Daubert* hearing. Delaware Rule of Evidence 702 governs the admissibility of expert opinion testimony.²⁰ The Rule provides that:

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: (a) the expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue; (b) the testimony is based on sufficient facts or data; (c) the testimony is the product of reliable principles and methods; and (d) the expert has reliably applied the principles and methods to the facts of the case.²¹

Rule 702 is substantively similar to its federal counterpart, Federal Rule of Evidence 702, and we follow the United States Supreme Court’s interpretation of F.R.E. 702 in *Daubert*.²² F.R.E. 702 requires trial judges to “ensure that any and all scientific testimony . . . is not only relevant, but reliable.”²³ The Rule 702 inquiry is a flexible one.²⁴

On appeal, Hudson appears to challenge the State’s expert testimony on the grounds that it is not the product of reliable principles and methods and that it is not based on sufficient facts or data, calling the DNA Labs Report “unfounded and unsupported pseudoscience.”²⁵ Specifically, Hudson argues that the report has an “interpretation [that] includes unknown mathematical computation that varies

²⁰ *M.G. Bancorporation, Inc. v. Le Beau*, 737 A.2d 513, 521 (Del. 1999).

²¹ D.R.E. 702.

²² *Bowen*, 906 A.2d 787, 794 (Del. 2006) (citing *Daubert*, 509 U.S. at 592).

²³ *Daubert*, 509 U.S. at 589.

²⁴ *Kuhmo Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 150 (quoting *Daubert*, 509 U.S. at 594).

²⁵ Opening Br. at 20.

widely from laboratory to laboratory” and that Cadenas “premise[d] [the DNA Labs Report’s] results on ‘if’ and likelihood ratios containing no concrete and scientifically accepted practices.”²⁶ Hudson also argues that a *Daubert* hearing was necessary to test the admissibility of the State’s proffered expert opinion. We disagree and address both in turn.

1. DNA-Sorting Evidence, Probabilistic Genotyping, and STRmix

Numerous state and federal courts have grappled with the reliability of DNA-sorting evidence, including STRmix software, which uses probabilistic genotyping.²⁷ Probabilistic genotyping entails “the use of biological modeling, statistical theory, computer algorithms, and probability distributions to calculate likelihood ratios . . . and/or infer genotypes for the DNA typing results of forensic samples[.]”²⁸ STRmix is one of several types of probabilistic genotyping software.²⁹ This software “assists analysts in calculating a statistic called a ‘likelihood ratio.’”³⁰ Likelihood ratios “help[] analysts determine the probability that any one specific person contributed to a DNA sample.”³¹

²⁶ *Id.*

²⁷ For an informative and fulsome discussion of the admissibility of DNA evidence, and DNA-sorting evidence in particular, see *United States v. Gissantaner*, 990 F.3d 457, 460–63 (6th Cir. 2021).

²⁸ See Scientific Working Group on DNA Analysis Methods, *Guidelines for the Validation of Probabilistic Genotyping Systems*, (2015), <https://perma.cc/7EJS-ERKH>.

²⁹ *Id.*

³⁰ *United States v. Washington*, 2020 WL 3265142, at *1 (D. Neb. June 16, 2020).

³¹ *Id.*

2. *STRmix Is Reliable under D.R.E. 702 and Daubert*

On this record, the State’s proffered expert testimony is reliable under Delaware Rule of Evidence 702 and *Daubert*. A trial court must examine whether the “reasoning or methodology underlying the testimony is scientifically valid[.]”³² The trial court relies, non-exclusively, on four inquiries to do so: “Is the technique testable? Has it been subjected to peer review? What is the error rate and are there standards for lowering it? Is the technique generally accepted in the relevant scientific community?”³³ “The same set of questions applies to . . . science-based test results.”³⁴

We first look to whether STRmix is testable. This is so, because, “[o]rdinarily, scientific testing is a key consideration for a trial judge in determining reliability because testing a hypothesis separates science from other fields of human inquiry.”³⁵ Indeed, if there is no way to show whether a technology is testable, there is no way to demonstrate whether it works or to accord it “scientific status.”³⁶

STRmix is testable. In fact, before labs can use STRmix, they must perform an internal validation of the software.³⁷ DNA Labs “has fulfilled the [Scientific

³² *Daubert*, 509 U.S. at 592–93.

³³ *Gissantaner*, 990 F.3d 457, 463 (6th Cir. 2021) (citing *Daubert*, 509 U.S. at 593–94); *see also Bowen*, 906 A.2d at 794.

³⁴ *Gissantaner*, 990 F.3d at 463.

³⁵ *Gen. Motors Corp. v. Grenier*, 981 A.2d 531, 545 (Del. 2009) (citing *Daubert*, 509 U.S. at 593).

³⁶ *Daubert*, 509 U.S. at 593.

³⁷ App. to Answering Br. at B163 (September 24, 2021 Affidavit to August 15, 2018 DNA Labs Report). The Scientific Working Group on DNA Analysis Methods defines an internal validation

Working Group on DNA Analysis Methods’s] guidelines for validation of probabilistic genotyping systems as well as satisfied the validation requirements set forth by the laboratory’s accrediting body” and completed its internal validation in 2017.³⁸ Results from the lab’s internal validation were consistent with those included in a Federal Bureau of Investigation publication—“Internal Validation of STRmix for the interpretation of single source and mixed DNA profiles”—which examined five person DNA mixtures.³⁹ DNA Labs also participated in a multi-lab internal validation study that was published in the scientific journal *Forensic Science International* in which nearly 3,000 samples of three to six person mixtures were evaluated.⁴⁰ In sum, “[f]oundational validity has been established for STRmix[] probabilistic genotyping software through the developmental validation and subsequent internal validations conducted by multiple laboratories.”⁴¹ And state and federal courts across the country have repeatedly held that STRmix is testable.⁴²

as “the accumulation of test data within the laboratory to demonstrate that established methods and procedures perform as expected in the laboratory.” *Id.*

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² See, e.g., *Gissantaner*, 990 F.3d at 464 (“STRmix can be tested. Using ‘lab-created mixtures,’ in which the actual contributors of the DNA samples are known, scientists have tested STRmix to gauge the reliability of the technology. . . . The record from the evidentiary hearings in this case provides a long proof that STRmix is testable and refutable. Almost all of the evidence in the hearings went to these points: How often is it accurate? How often is it not? . . . STRmix indeed ‘(has been) tested’ many times before[.]”); *United States v. Christensen*, 2019 WL 651500, at *2 (C.D. Ill. Feb. 15, 2019) (“At the evidentiary hearing, the United States called Ms. Jerrilyn Conway, a forensic examiner for the FBI, who testified that STRmix has been validated internally by the FBI and also by numerous studies conducted by employees of the company that produced

We next look to whether STRmix has been subjected to peer review and publication.⁴³ “Publication in a peer-reviewed journal typically satisfies this consideration,”⁴⁴ as “readership and citation are pivotal when it comes to legal scholarship and why publication itself is noteworthy in scientific scholarship—and ultimately why publication in a peer-reviewed journal alone typically satisfies this *Daubert* inquiry.”⁴⁵ STRmix ably clears this hurdle as it has been subjected to extensive peer review and publication.⁴⁶

We also look to STRmix’s error rate and the standards to lower it. This consideration “looks to the error rate of the technology and to whether the scientific community has established standards that forensic scientists can use to mitigate the risk of error.”⁴⁷ STRmix boasts a very low error rate,⁴⁸ due in part, perhaps to the

it. . . . The evidence shows that STRmix has been repeatedly tested[.]”); *United States v. Washington*, 2020 WL 3265142, at *2 (D. Neb. June 16, 2020) (“[C]ourts have recognized that STRmix software has been thoroughly tested and reviewed.”); *United States v. Russell*, 2018 WL 7286831, at *7 (D.N.M. Jan. 10, 2018) (“Ms. Smith testified that STRMix had been validated both by the developers and by the FBI in two different published, peer-reviewed studies, and that STRMix is generally considered reliable in the field.”); *see also* App. to Answering Br. at B163 (September 24, 2021 Affidavit to August 15, 2018 DNA Labs Report).

⁴³ *Daubert*, 509 U.S. at 593.

⁴⁴ *Gissantaner*, 990 F.3d 457 at 464 (citing *Daubert*, 509 U.S. at 594).

⁴⁵ *Id.* at 464–65 (6th Cir. 2021) (citing cases).

⁴⁶ *See, e.g.*, App. to Answering Br. at B162–63 (September 24, 2021 Affidavit to August 15, 2018 DNA Labs Report) (noting that likelihood ratios have been the subject of peer-reviewed studies for decades); *id.* at B164 (noting that the underlying mathematical computations have also been the subject of rigorous peer review); *see also* *Gissantaner*, 990 F.3d at 465 (citation omitted) (“At the time of the *Daubert* hearing in the district court, more than 50 published peer-reviewed articles had addressed STRmix. According to one expert, STRmix is the ‘most tested and most . . . peer reviewed’ probabilistic genotyping software available.”).

⁴⁷ *Gissantaner*, 990 F.3d at 465 (citing *Daubert*, 509 U.S. at 594).

⁴⁸ *See id.* (“How often, then, does STRmix falsely suggest a suspect matches a DNA sample? Not often, the evidence suggests. When examining ‘false inclusions,’ one peer-reviewed study

existence of standards to guide the use of STRmix and other probabilistic genotyping software.⁴⁹ Indeed, recent studies have shown that STRmix has become “increasingly reliable, even with DNA samples with more than three contributors.”⁵⁰

We finally look to whether there is general acceptance in the scientific community for STRmix. This inquiry focuses on whether the relevant scientific community accepts the software.⁵¹ This, too, can be answered in the affirmative.⁵² STRmix is in widespread use in labs at the local, state, federal, and international levels.⁵³

In answering “yes” to D.R.E. 702 and *Daubert*’s four inquiries as related to reliability, we conclude that the Superior Court properly admitted the DNA Labs Report.

concluded, based on an analysis of the DNA of 300,000 people who were known not to be in a mixture, that STRmix had accurately excluded the non-contributors 99.1% of the time. Just 1% of the time, in other words, it gave a likelihood ratio suggesting that someone was included in the mixture who was not actually included in it.”).

⁴⁹ *Id.* at 466.

⁵⁰ *United States v. Washington*, 2020 WL 3265142, at *4 (D. Neb. June 16, 2020).

⁵¹ *See Daubert*, 509 U.S. at 594.

⁵² *See, e.g., Gissantaner*, at 466 (citation omitted) (“[STRmix] has garnered wide use in forensic laboratories across the country. More than 45 laboratories use it, including the FBI and many state law enforcement agencies. At this point, STRmix is the ‘market leader in probabilistic genotyping software.’”)

⁵³ *See App. to Answering Br. at B162–63* (September 24, 2021 Affidavit to August 15, 2018 DNA Labs Report) (noting that STRmix “has been used to interpret DNA evidence in more than 100,000 cases around the world” and “is currently being used by forensic laboratories at sixty-eight U.S. agencies including the FBI and the Bureau of Alcohol, Tobacco, and Firearms”).

3. No Daubert Hearing Was Necessary

Hudson separately argues that the Superior Court abused its discretion by failing to hold a *Daubert* hearing. He argues that, had a hearing been held, he would have shown myriad reasons why the State’s proffered expert testimony would have been deemed inadmissible. In support, he points to numerous portions of Cadenas’s trial transcript, which, in his view, show why the expert testimony is problematic and does not pass muster under D.R.E. 702 and *Daubert*.⁵⁴ After analyzing *Daubert* and D.R.E. 702’s reliability requirements and Cadenas’s qualifications, the Superior Court concluded a hearing was unnecessary. We agree.

As an initial matter, these hearings are discretionary.⁵⁵ Trial courts have considerable leeway “in assessing the relevance and reliability of expert testimony” and in performing their “gatekeeping function.”⁵⁶ Inherent in such latitude is the ability to determine the appropriate form of proceedings that are needed to investigate reliability.⁵⁷ As long as the trial judge can gather sufficient information

⁵⁴ See, e.g., Opening Br. at 17–20.

⁵⁵ See, e.g., *Taylor v. Green Acres Farm, Inc.*, 2018 WL 2128663, at *3 (Del. Super. May 7, 2018), *aff’d*, 198 A.3d 176 (Del. 2018) (citing *Kuhmo Tire Company v. Carmichael*, 526 U.S. 137, 152 (1999); *Minner v. American Mortgage & Guaranty Company*, 791 A.2d 826, 844–45 (Del. Super. 2000)) (“Quite simply, a party is not entitled to a *Daubert* hearing in every case that involves expert testimony. The Court still retains discretion as to whether to grant or deny such a request depending on the circumstances.”).

⁵⁶ *Kumho Tire Co., Ltd.*, 526 U.S. at 152; see also *United States v. Alatorre*, 222 F.3d 1098, 1100 (9th Cir. 2000).

⁵⁷ See *Alatorre*, 222 F.3d at 1100.

to fulfill its gatekeeping duties, the form of the proceeding is within their discretion.⁵⁸

Based on this record, the Superior Court acted within its sound discretion in ruling on the admissibility of the State’s proffered expert testimony without first holding a *Daubert* hearing. The trial judge had a sufficient record upon which to rely; namely, the expert report itself, a robust affidavit from DNA Labs employees Rachel Oeflein and Cristina Rentas detailing STRmix’s scientific reliability,⁵⁹ and the parties’ submissions.⁶⁰

⁵⁸ See, e.g., *Minner* at 845–46 (quoting *Weinstein’s Federal Evidence 2d* § 702.5(2)(a)) (“The latitude provided by *Kumho Tire* allows the Court to decide ‘what proceedings, if any, are needed to investigate reliability.’”); *United States v. Alatorre*, 222 F.3d 1098, 1103–04 (9th Cir. 2000) (holding trial court did not abuse its discretion when it allowed a defendant to test reliability of expert opinion only through *voir dire*); *O’Conner v. Commonwealth Edison Co.*, 13 F.3d 1090, 1094 (7th Cir. 1998) (upholding a trial court’s *sua sponte* consideration of the admissibility of expert testimony); cf. *United States v. Velarde*, 214 F.3d 1204, 1209–11 (10th Cir. 2000) (holding trial court exceeded its discretion by failing to conduct any reliability determination regarding challenged expert testimony).

⁵⁹ App. to Answering Br. at B162–65 (September 24, 2021 Affidavit to August 15, 2018 DNA Labs Report).

⁶⁰ See, e.g., *Oddi v. Ford Motor Company*, 234 F.3d 136, 154–55 (3d Cir. 2000) (explaining that a *Daubert* hearing is not required where the trial court already possessed the parties’ submissions, including the experts’ affidavits, and the plaintiff did not explain how a “hearing would have advanced his position.”); *Antonio v. Progressive Ins. Co.*, 795 F. App’x 128, 131 (3d Cir. 2020) (citing *Oddi* with approval and upholding district court’s decision that a *Daubert* hearing was unnecessary because the trial court had a sufficient record to rely upon, including the expert report itself and the parties’ submissions, and because movant failed to explain how a hearing would have benefited consideration of the issue); see also *Minner*, 791 A.2d at 845 (“While the matter is always discretionary, absent a special reason and need to have the hearings, requests for them should generally be denied. The discovery record should, in a contested case, normally supply a satisfactory basis for a ruling.”).

Accordingly, the State’s expert opinion testimony was properly admitted as scientifically reliable, and the Superior Court did not err in denying Hudson’s motion *in limine* and declining to hold a *Daubert* hearing.

B. Hudson’s Motion to Suppress Challenge

The Superior Court did not err when it found that the Cell Tower Warrants passed constitutional muster and that the affidavits supporting issuance of the warrants established requisite probable cause. On appeal, Hudson argues that the Cell Tower Warrants are unconstitutional under the United States Constitution and Article 1, Section 6 of the Delaware Constitution, as well as Delaware statutory law. He also claims that the affidavits did not establish probable cause sufficient for the warrants to issue, nor were they sufficiently particular. To support his arguments, Hudson largely relies on a recent United States Supreme Court decision, *Carpenter v. United States*.⁶¹ We find that *Carpenter* does not apply to the tower dump warrants issued here. We also find Hudson’s other arguments to be without merit.

1. Cell Sites, Cell-Site Location Information, and Tower Dumps

Before we address Hudson’s substantive claims, a brief primer on cell-site location information (“CSLI”) and tower dumps is merited. *Carpenter* provides a useful overview of the relationship between cell sites, CSLI, and tower dumps:

⁶¹ 585 U.S. —, 138 S.Ct. 2206 (2018).

Cell phones perform their wide and growing variety of functions by connecting to a set of radio antennas called “cell sites.” Although cell sites are usually mounted on a tower, they can also be found on light posts, flagpoles, church steeples, or the sides of buildings. Cell sites typically have several directional antennas that divide the covered area into sectors.

Cell phones continuously scan their environment looking for the best signal, which generally comes from the closest cell site. Most modern devices, such as smartphones, tap into the wireless network several times a minute whenever their signal is on, even if the owner is not using one of the phone’s features. Each time the phone connects to a cell site, it generates a time-stamped record known as cell-site location information (CSLI). The precision of this information depends on the size of the geographic area covered by the cell site. The greater the concentration of cell sites, the smaller the coverage area. As data usage from cell phones has increased, wireless carriers have installed more cell sites to handle the traffic.⁶²

Tower dumps are “download[s] of information on all the devices that connected to a particular cell site during a particular interval.”⁶³

2. Hudson’s Fourth Amendment Claim

Hudson challenges the Cell Tower Warrants under the Fourth Amendment to the United States Constitution, Article I, Section 6 to the Delaware Constitution, and Delaware statutory law. The Fourth Amendment provides:

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue,

⁶² *Carpenter v. United States*, 138 S. Ct. at 2211–12.

⁶³ *Id.* at 2220.

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.⁶⁴

Though Hudson mentions in cursory fashion that Article 1, Section 6 to the Delaware Constitution provides greater protection than the United States Constitution when it comes to determining whether a seizure has occurred, we find that he has not fairly presented a separate argument under the Delaware Constitution.

As we recently reaffirmed in *Thomas v. State*:

[T]he proper presentation of an alleged violation of the Delaware Constitution should include a discussion and analysis of one or more of the following criteria: textual language, legislative history, pre-existing state law, structural differences, matters of particular state interest or local concern, state traditions, and public attitudes or other applicable criteria.⁶⁵

Indeed, we do not “address state constitutional claims when a party ‘does not specifically brief an argument under the Delaware Constitution or indicate why the outcome would be different under the Delaware Constitution as opposed to the Fourth Amendment.’”⁶⁶ Consequently, we only address Hudson’s claims under the Fourth Amendment.

⁶⁴ U.S. Const. amend IV.

⁶⁵ *Thomas v. State*, — A.3d —, 2023 WL 6379829, at *9 (Del. Oct. 2, 2023) (quoting *Lloyd v. State*, 292 A.3d 10 n.48 (Del. 2023)).

⁶⁶ *Id.* at *9 (Del. Oct. 2, 2023) (quoting *Womack v. State*, 296 A.3d 882, 899 n.37 (Del. 2023)).

The warrant requirement has dual objectives: (1) to ensure that “searches deemed necessary [are] as limited as possible” and; (2) to eliminate “exploratory rummaging in a person’s belongings.”⁶⁷ Accordingly, a warrant must “describe the things to be searched with sufficient particularity and be no broader than the probable cause on which it is based.”⁶⁸ Here, we consider for the first time a challenge to search warrants for CSLI from tower dumps on these grounds.

3. Carpenter is Not Applicable to Warrants for CSLI Derived from Cell Tower Dumps

Hudson argues that the United States Supreme Court’s decision in *Carpenter* should frame our analysis on the constitutionality of the warrants at issue here. We find it does not, though it does contain important general principles related to the admissibility of data generated by and stored in smartphones. In *Carpenter*, the Supreme Court was tasked with determining a narrow issue: the application of the Fourth Amendment to the federal government’s collection of Timothy Carpenter’s historic CSLI. Specifically at issue was whether the federal government’s collection of Carpenter’s historic CSLI from two wireless carriers under the Stored

⁶⁷ *Wheeler v. State*, 135 A.3d 282, 298 (Del. 2016) (alteration in original) (quoting *Coolidge v. New Hampshire*, 403 U.S. 443 (1971)).

⁶⁸ *Wheeler v. State*, 135 A.3d at 299. The particularity requirement is also enshrined in Delaware law. See 11 Del. C. § 2307(a) (emphasis added) (“The warrant shall designate the house, place, conveyance or person to be searched, and shall describe the things or persons sought *as particularly as possible*.”)

Communications Act constituted a search under the Fourth Amendment.⁶⁹ Importantly, the Supreme Court held as a threshold matter that “an individual maintains a legitimate expectation of privacy in the record of his physical movements as captured through CSLI.”⁷⁰ It ultimately held that the CSLI obtained from Carpenter’s wireless carriers was a search under the Fourth Amendment and that “the [g]overnment must generally obtain a warrant supported by probable cause before acquiring such records.”⁷¹

But *Carpenter* is inapposite here. The Supreme Court itself acknowledged the specificity of its decision:

Our decision today is a narrow one. *We do not express a view on matters not before us: real-time CSLI or “tower dumps”* (a download of information on all the devices that connected to a particular cell site during a particular interval). We do not disturb the application of *Smith* and *Miller* or call into question conventional surveillance techniques and tools, such as security cameras. Nor do we address other business records that might incidentally reveal location information. Further, our opinion does not consider other collection techniques involving foreign affairs or national security.⁷²

⁶⁹ *Carpenter*, at 2212 (“Federal Magistrate Judges issued two orders directing Carpenter’s wireless carriers—MetroPCS and Sprint—to disclose ‘cell/site sector [information] for [Carpenter’s] telephone[] at call origination and at call termination for incoming and outgoing calls’ during the four-month period when the string of robberies occurred. . . . The first order sought 152 days of cell-site records from MetroPCS, which produced records spanning 127 days. The second order requested seven days of CSLI from Sprint, which produced two days of records covering the period when Carpenter’s phone was ‘roaming’ in northeastern Ohio. Altogether the Government obtained 12,898 location points cataloging Carpenter’s movements—an average of 101 data points per day.”)

⁷⁰ *Id.* at 2217. This is so “[w]hether the [g]overnment employs its own surveillance technology . . . or leverages the technology of a wireless carrier.” *Id.*

⁷¹ *Id.* at 2221.

⁷² *Id.* at 2220 (emphasis added).

And as a substantive matter, the information sought in *Carpenter* (by court order and pursuant to federal statute, geared specifically toward Carpenter, aimed at a four month period, and with no parameters on geographic location area) is very different from the information sought here (by search warrant, geared at all cell phone activity that utilized certain cell towers, aimed at an extremely limited and specific window of time, and for a limited geographic area).

4. The Cell Tower Warrants Are Constitutional under the Fourth Amendment

The Superior Court did not err in finding that the Cell Tower Warrants are constitutional because they are both particularized and are no broader than the probable cause on which they are based. We agree with the Superior Court's conclusion but, at the same time, note that it elides a more fundamental question: whether a search warrant is required to secure tower dump data in the form of CSLI covering limited periods of time in the specific vicinity of crime scenes. The State argued that the Fourth Amendment does not require a warrant under these circumstances, and Hudson offered no argument against that position. And there is ample authority, both before and after *Carpenter*, supporting the view that the Fourth Amendment is not violated when officers secure CSLI for particular places at specific, limited times under the Stored Communications Act,⁷³ and not by way of

⁷³ 18 U.S.C. §§ 2701–2713.

search warrants.⁷⁴ But the Superior Court in this case appears to have assumed that the Fourth Amendment applied to the officers’ conduct and analyzed the sufficiency of the warrants. In light of that, and in light of the parties’ marginal treatment in their briefing of the warrant requirement issue, we will assume, without deciding and with reservations, that the officers’ gathering of CSLI from the tower dumps here constitutes a search under the Fourth Amendment.

Hudson first claims that the Cell Tower Warrants lack particularity and are thus unconstitutional general warrants. This is so, he argues, because they “sought information from *all* cell phone providers . . . for *all* cell towers located in the area of *numerous* locations.”⁷⁵ He contends that the Cell Tower Warrants “approved [such] an exploratory rummaging of multiple person[]s belongings in their CSLI.”⁷⁶ We disagree.

The United States Constitution specifies two matters that must be described with particularity in a search warrant: (1) the place to be searched; and (2) the “persons or things” to be seized.⁷⁷ As we observed in *Wheeler*, “[s]atisfying the

⁷⁴*See, e.g., United States v. Adkinson*, 916 F.3d 605, 610–11 (7th Cir. 2019); *United States v. Rhodes*, 2021 WL 1541050, at *1–2 (N.D. Ga. Apr. 20, 2021); *United States v. Walker*, 2020 WL 4065980, at *7–8 (E.D.N.C. July 20, 2020), *affirmed on other grounds*, 32 F.4th 377 (4th Cir. 2022); *State v. Elias*, 990 N.W.2d 905, 912–14 (2023); *State v. Troconis*, 2023 WL 6121002, at *6 (Conn. Super. Ct. Sept. 11, 2023); *see also Commonwealth v. Kurtz*, 294 A.3d 509, 528–30 (2023), *appeal granted*, 2023 WL 7123941 (Pa. Oct. 30, 2023) (finding the same under Pennsylvania’s Wiretap Act).

⁷⁵ Opening Br. at 23 (emphasis in the original).

⁷⁶ *Id.* at 24.

⁷⁷ *Wheeler*, 135 A.3d at 299.

particularity requirement is difficult in the electronic search warrant context, given the commingling of relevant and irrelevant information and the complexities of segregating responsive files *ex ante*.”⁷⁸ And a non-particularized, general warrant is invalid because “it vests the executing officers with unbridled discretion to conduct an exploratory rummaging through [the defendant’s] papers in search of criminal evidence.”⁷⁹

The Cell Tower Warrants describe what investigating officers believed would be found in CSLI from a tower dump with as much specificity as possible under the circumstances.⁸⁰ First, the Cell Tower Warrants on their face make clear that their scope is limited to tower dumps from five cell sites in the areas around the incidents.⁸¹ Second, the CSLI sought from these tower dumps in the Cell Tower

⁷⁸ *Id.* at 299–300.

⁷⁹ *United States v. Yusuf*, 461 F.3d 374, 393 n.19 (3d Cir. 2006) (alteration in the original) (citation omitted).

⁸⁰ *See Thomas v. State*, 2023 WL 6379829, at *10 (Del. Oct. 2, 2023) (noting that in order for a warrant directed to computer-based or digital information to satisfy the particularity requirement, it must describe what investigating officers believe will be found on electronic devices with as much specificity as possible under the circumstances). Here, we acknowledge that warrants seeking CSLI from tower dumps are different from warrants seeking information from an individual’s cell phone, but we find these principles helpful to our analysis.

⁸¹ These include cell sites serving the areas of 3009 Crossfork Drive, in Wilmington, Delaware; 2101 Prior Road in Wilmington, Delaware; 1704 Marsh Road in Wilmington, Delaware; and 4551 New Linden Hill Road in Wilmington, Delaware in the case of the February Cell Tower Warrants, and the cell site serving 1913 Sheldon Drive in Newark, Delaware in the case of the March Cell Tower Warrants. *See* App. to Answering Br. at B1 (February 20, 2017 AT&T Cell Tower Warrant); *id.* at B8 (February 20, 2017 Metro PCS Cell Tower Warrant); *id.* at B15 (February 20, 2017 Sprint Cell Tower Warrant); *id.* at B23 (February 20, 2017 T-Mobile Cell Tower Warrant); *id.* at B30–37 (February 20, 2017 Verizon Cell Tower Warrant); App. to Answering Br. at B38 (March 7, 2017 AT&T Cell Tower Warrant); *id.* at B45 (March 7, 2017 Metro PCS Cell Tower Warrant); *id.* at B52 (March 7, 2017 Sprint Cell Tower Warrant); *id.* at B59 (March 7, 2017 T-Mobile Cell Tower Warrant); *id.* at B66 (March 7, 2017 Verizon Cell Tower Warrant).

Warrants is for time periods no greater than two hours—the opposite of the “boundless” warrants with which we took issue with in *Wheeler*.⁸² In addition, the type of record sought—“call detail records for all cellular telephone activity. . . whether incoming or outgoing and whether voice, data[,] or SMS related” that traversed the aforementioned cell sites—is also specifically described and not targeted toward the content of any communications.⁸³ Here, the CSLI sought was akin to what might have resulted from traditional law enforcement techniques, such as video surveillance. Accordingly, the Cell Tower Warrants were sufficiently particular.

The State established probable cause to believe that the offenses described in the Cell Tower Warrants had been committed. For a search warrant to issue under the Fourth Amendment, there must also “be more than just probable cause that a crime has been committed; there must also be, within the four corners of the affidavit, . . . facts adequate for a judicial officer to form a reasonable belief that . . . the property to be seized will be found in a particular place.”⁸⁴ We apply

⁸² See *Wheeler* at 305.

⁸³ App. to Answering Br. at B1 (February 20, 2017 AT&T Cell Tower Warrant); *id.* at B8 (February 20, 2017 Metro PCS Cell Tower Warrant); *id.* at B15 (February 20, 2017 Sprint Cell Tower Warrant); *id.* at B23 (February 20, 2017 T-Mobile Cell Tower Warrant); *id.* at B30–37 (February 20, 2017 Verizon Cell Tower Warrant); *id.* at B38 (March 7, 2017 AT&T Cell Tower Warrant); *id.* at B45 (March 7, 2017 Metro PCS Cell Tower Warrant); *id.* at B52 (March 7, 2017 Sprint Cell Tower Warrant); *id.* at B59 (March 7, 2017 T-Mobile Cell Tower Warrant); *id.* at B66 (March 7, 2017 Verizon Cell Tower Warrant).

⁸⁴ *Buckham v. State*, 185 A.3d 1, 16 (Del. 2018) (quoting *Sisson v. State*, 903 A.2d 288, 296 (Del. 2006)) (internal quotations and citations omitted).

a totality of the circumstances test in determining whether probable cause to obtain a search warrant exists.⁸⁵

The State clearly met the bar here with the Cell Tower Warrants. Both the February Cell Tower Warrants and the March Cell Tower Warrants identify a set of operative facts establishing probable cause that the offenses described in the warrants were committed (and that information related to the perpetrator could be found by tower dumps), namely by providing in their respective affidavits detailed explanations of the incidents, including the area in which the incidents took place (including the locations of the apartment complexes and the surrounding banks), the timing and length of such incidents, as well as other pertinent details.

Accordingly, the Cell Tower Warrants were valid under the Fourth Amendment, and the Superior Court did not err in so concluding.

IV. CONCLUSION

The judgment of the Superior Court is affirmed.

⁸⁵ *Sisson v. State*, 903 A.2d 288, 296 (Del. 2006).