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Case Number 230,2019

IN THE SUPREME COURT OF THE STATE OF DELAWARE

STEVEN PIERCE, Defendant-Below, Appellant, v. STATE OF DELAWARE, Plaintiff-Below, Appellee.	)	No. 230, 2019

ON APPEAL FROM THE SUPERIOR COURT
OF THE STATE OF DELAWARE

STATE'S ANSWERING BRIEF

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NATURE OF PROCEEDINGS

On October 7, 2016, the Delaware State Police arrested Steven Pierce for the murder of Heather Stamper.[1] A New Castle County grand jury subsequently indicted Pierce on two charges, murder in the first degree and possession of a deadly weapon during the commission of a felony ("PDWDCF").[2]

On July 7, 2017, Pierce filed a motion to suppress his statement to the police.[3] He filed a supplemental motion on August 7, 2017.[4] The Superior Court granted the motion in part and denied it in part.[5]

On June 5, 2018, Pierce sought leave to file a motion *in limine* to exclude expert testimony (the "*Daubert* Motion") out of time.[6] The Superior Court allowed Pierce to file the motion and held a *Daubert* hearing on November 27, 2018.[7] On March 6, 2019, the Superior Court denied the *Daubert* Motion.[8]

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[1] *See* A001, at D.I. 1. "D.I. __" refers to item numbers on the Superior Court Criminal Docket in S*tate v. Pierce*, ID No. 1610003829, included in the Appendix to Appellant's Opening Brief at A001–19.

[2] A001, at D.I. 2; A020.

[3] A005, at D.I. 22–23.

[4] A005, at D.I. 25.

[5] A007–09, at D.I. 30.

[6] A010, at D.I. 37; *see also* A021–32.

[7] A013, at D.I. 46, A015, at D.I. 56.

[8] *State v. Pierce*, 2019 WL 1077688 (Del. Super. Ct. Mar. 6, 2019).

Pierce's case proceeded to a jury trial on April 2, 2019, and lasted seven days.[9] The jury found Pierce guilty of both indicted charges.[10] The Superior Court sentenced Pierce on May 17, 2019: (i) for murder in the first degree, to life in prison; and (ii) for PDWDCF, to 25 years in prison.[11]

Pierce filed a timely notice of appeal on May 31, 2019, and an opening brief on December 6, 2019. This is the State's answering brief.

[9] A019, at D.I. 74.

[10] A019, at D.I. 74.

[11] A019, at D.I. 77; Opening Br. Ex. B, at 1.

SUMMARY OF ARGUMENT

I. The Appellant's argument is denied. At trial, Agent Anthony Vega offered expert testimony about the location of Pierce's cell phone on the night of Heather Stamper's murder. Agent Vega relied on geolocation information associated with Pierce's cell phone, including Wi-Fi location data supplied by Google. Google's underlying data was reliable evidence supporting Agent Vega's expert opinion. The accuracy of Google's Wi-Fi location data was subject to outside testing and verification, and those independent sources repeatedly verified the data's reliability. Wi-Fi positioning also has been subject to peer review and is generally accepted in the community. The Superior Court did not abuse its discretion by admitting that expert evidence at trial. Even if the Superior Court did err, however, that error was harmless.

STATEMENT OF FACTS

In early 2016, Steven Pierce ("Pierce") and Heather Stamper ("Heather") were in a romantic relationship.[12] Pierce was incarcerated on February 21, 2016, and remained in custody for about four months.[13] While Pierce was imprisoned, Heather had a dalliance with another man, Anthony Lyons ("Tony").[14] Tony ended the relationship with Heather before Pierce was released from prison.[15]

In July 2016, after Pierce's release from custody, Heather and Pierce lived together at 231 Adams Street, Unit B, in Delaware City.[16] They shared the home with Heather's son; Heather's mother, Mary Stamper ("Mary"); and Mary's parents.[17] Heather and Pierce occupied a bedroom in the basement.[18] Their neighbor, David King ("David"), lived in Unit A.[19]

Units A and B shared a common basement; residents could access it from either unit.[20] On occasions when Heather and Steve were locked out of their own

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[12] A595; B9.

[13] A582.

[14] B8–9.

[15] B9.

[16] A595; B16.

[17] A595.

[18] A595.

[19] A595.

[20] A603.

home, Unit B, they would knock on David's door and go to the basement through his home, Unit A.[21]

On the afternoon of July 8, 2016, Heather and Pierce took Heather's son to the waterfront area at the end of town.[22] According to Mary, they returned home around 6:30 p.m., left the child with Mary, and then left again together.[23]

Call-detail records for Pierce's cell phone captured three calls to or from his phone at 6:37 p.m. and 6:38 p.m.[24] The associated cell-site location information ("CSLI")[25] showed that Pierce's cell phone was in an area that encompassed both 231 Adams Street and 30 Clinton Street, Delaware City.[26] Thirty Clinton Street is the address for a restaurant adjacent to the waterfront.[27]

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[21] A603.

[22] A596.

[23] A596.

[24] As part of the investigation into Heather's murder, Detective Mark Csapo ("Detective Csapo") of the Delaware State Police ("DSP") obtained call-detail records from T-Mobile and other location information from Google associated with Pierce's cell phone. *See* B15, B18. He submitted this information to Agent Anthony Vega of the Philadelphia Police Department and the FBI's Cellular Analyst Survey Team ("CAST") for analysis. A623; B15, B18.

[25] CSLI indicates the tower to which the cell phone connected and the sector or direction from which it came. *See Everett v. State*, 186 A.3d 1224, 1235 n.5 (Del. 2018) (discussing CSLI in the context of the Fourth Amendment).

[26] B17, B19.

[27] B16.

Surveillance video showed Pierce's Volkswagen Jetta driving up and down Clinton Street several times over the next hour. For example, surveillance showed his vehicle on Clinton Street at 7:34 p.m.—with no one in the front passenger seat.[28] Location information derived from the Wi-Fi activity ("Wi-Fi location data") of Pierce's cell phone,[29] timestamped at 7:33 p.m. and 7:35 p.m., indicated that the phone was traveling on Clinton Street, away from the waterfront.[30]

According to Mary, Pierce returned to 231 Adams Street around dusk—alone and mad.[31] He told Mary that Heather was at the bar with Tony.[32] He said that he was collecting his belongings and leaving.[33] He went to the basement for no more than 10 minutes and then left.[34] Google's Wi-Fi location data showed Pierce's cell phone at or near 231 Adams Street at 7:35 p.m. and 7:47 p.m.[35]

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[28] B7.

[29] In contrast to the CSLI in call-detail records, Google's location information is sourced from technology such as global positioning systems ("GPS") and Wi-Fi positioning. B20.

[30] A637–38.

[31] A596.

[32] A597.

[33] A596.

[34] A597.

[35] A638.

By 8:31 p.m. (according to text messages), Pierce traveled to and arrived at 1501 New Jersey Avenue, New Castle—the home of Giancarlo Falcone ("Giancarlo"), Shirley E. Blunt ("Cheryl"), and Cheryl's mother, Shirley A. Blunt ("Shirley").[36] Pierce knocked on the door and Shirley answered.[37] Pierce, with a beer in his hand and a "distant" or "blank" expression, asked her if Giancarlo and Cheryl were home.[38] Even though Shirley told him they were not, Pierce pushed his way inside.[39] Shirley observed that Pierce was angry one minute and then upset and crying the next.[40] Giancarlo returned home, and he and Pierce went to the bedroom to talk.[41] From the living room, Shirley overheard Pierce ask Giancarlo for his gun.[42]

Cheryl returned home sometime after 8:53 p.m. (according to text messages) and joined Pierce and Giancarlo.[43] Eventually, they left together to go to the liquor

[36] A586, A589, A591; B16.

[37] A589–90.

[38] A589–90.

[39] A589–90.

[40] A590.

[41] *See* A590.

[42] A590.

[43] A591.

store.[44] Surveillance video from Manor Park Liquor, 1415 North DuPont Highway, New Castle, showed them at the store around 9:50 p.m.[45]

Pierce's call-detail records showed two "transactions"— events in which his cell phone connected to a cell tower—at 9:55 p.m.[46] The associated CSLI indicated that his cell phone was in an area that encompassed both 1501 New Jersey Avenue and 1415 North DuPont Highway.[47] Also, several Wi-Fi-sourced location hits between 9:46 p.m. and 9:57 p.m. indicated that Pierce's cell phone was at or near 1415 North DuPont Highway.[48]

Cheryl and Pierce bought and shared a pint of watermelon vodka, with each drinking about half of the bottle.[49] Later that night, they went back to the liquor store to buy another bottle of liquor, which they again shared when they returned to the Blunts' home.[50] Manor Park Liquor's surveillance captured them in the store around 10:46 p.m.[51]

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[44] A591.

[45] *See* A639.

[46] A633.

[47] A633; B16.

[48] A639.

[49] B10.

[50] A588, A591.

[51] A639.

Three Wi-Fi-sourced location hits between 10:01 p.m. and 10:37 p.m. showed Pierce's cell phone at or near 1501 New Jersey Avenue.[52] Next, multiple Google location data points between 10:39 p.m. and 10:49 p.m. showed his cell phone in the area of 1415 North DuPont Highway.[53] Then, several Wi-Fi sourced location hits between 11:05 p.m. and 12:18 a.m. showed his cell phone back in the area of 1501 New Jersey Avenue.[54]

Before Pierce left the Blunts' home that evening, he came out to the living room to talk to Shirley.[55] Pierce was drunk and upset, with tears in his eyes.[56] He told Shirley that it will probably be the last night she sees him because, after tonight or tomorrow, he will be "doing a life sentence."[57] Google's location data showed Pierce's cell phone traveled from New Castle to Delaware City between 12:20 a.m. and 12:37 a.m.[58]

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[52] A639.

[53] A639.

[54] A639–40.

[55] A591–92.

[56] A592.

[57] A592.

[58] A640.

Meanwhile, around 8:57 p.m., David rode bikes with his grandson to get ice cream on Clinton Street.[59] When they returned home, David found Heather asleep against his front door.[60] She smelled of alcohol.[61] David woke her up, and she went to his back porch to smoke a cigarette.[62] When she came inside, she went to the basement door.[63] Because she was intoxicated, David attempted to help her downstairs, but she told him, "Don't fucking touch me."[64] She went downstairs by herself, and David monitored her from the top of the stairs until she made it inside her bedroom.[65] David returned to his own bedroom, where his grandson was sleeping, to watch television.[66]

Later that night, Pierce knocked on David's door and said he needed to get inside.[67] David let him in.[68] Pierce was staggering and smelled of alcohol.[69]

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[59] A604, A610.

[60] A604.

[61] A604.

[62] A604.

[63] A604.

[64] A604, A609.

[65] A604.

[66] A605.

[67] A605.

[68] A605.

[69] A605.

Pierce asked him if Heather was downstairs, and David told him she was.[70] David let Pierce downstairs, locked the basement door, and then returned to his bedroom.[71]

After Pierce went downstairs, David heard "a thumping sound" from the basement.[72] About 10 to 15 minutes later, Pierce started "knocking hard" on David's basement door.[73] Pierce told David that he was upset because Heather liked Tony.[74] David asked Pierce about the thumping sound, and Pierce told him that Heather had slammed the door in his face.[75] (According to David, however, the thumping sound was not consistent with the sound of a slamming door.)[76] Pierce then told David, "I don't know what to do. I love her. But we broke up, and I'll never see that fucking bitch again."[77] Within a minute, Pierce left.[78]

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[70] A605.

[71] A605.

[72] A605.

[73] A605.

[74] A605.

[75] A605.

[76] A608; B12.

[77] A605, A607–08.

[78] A606, A612.

Google's location data showed Pierce's cell phone in the area of 231 Adams Street between 12:45 a.m. and 1:08 a.m.[79] The data then showed that, from 1:16 a.m. to 1:22 a.m., his cell phone traveled from Delaware City to Port Penn.[80]

At about 1:30 a.m., Pierce visited the home of Sandra Ciccantelli ("Sandra") and Amanda Mangini ("Amanda") at 200 East Market Street, Port Penn.[81] Amanda recalled the time because she was awake, in the middle of an argument with her boyfriend, when Pierce knocked on their door.[82] Sandra and Amanda went outside to talk to him.[83] Pierce was "[v]ery intoxicated," smelled like alcohol, was "staggering everywhere," and "couldn't really stand."[84] Amanda gave Pierce a chair, but when he sat down, he broke it.[85] Sandra asked Pierce, "What are you doing here?" and "Where's Heather?"[86] (Sandra had worked with both Pierce and Heather and knew that they had been dating.)[87] Pierce laughed,

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[79] A640.

[80] A640.

[81] A622–23, A627.

[82] A623, A627.

[83] A623, A628.

[84] A623, A628.

[85] A628.

[86] A624.

[87] A622–23, A625.

then told them that he hit Heather with a two-by-four and "that bitch" is dead.[88] He also said that he "did something very bad" and that he "was going to jail for a very long time."[89] A State Trooper drove past the house while they were talking, and Pierce ducked away.[90] Sandra went back inside when her granddaughter woke up.[91]

Google's location data showed Pierce's cell phone in the Port Penn area, where Sandra and Amanda lived, between 1:23 a.m. and 2:06 a.m.[92] The data then showed that, from 2:08 a.m. until about 2:50 a.m., his cell phone traveled from Port Penn, through Delaware City, to Elsmere.[93]

According to Pierce's mother, Dolores Pierce ("Dolores"), he visited her home—107 Alvil Road, Elsmere—that night at about 2:45 a.m.[94] After he arrived, they walked to a Wawa at 915 New Road, Elsmere, to buy cigarettes.[95] Wawa's surveillance video captured them in the store just after 3:00 a.m.[96]

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[88] A624, A628–29.

[89] A629.

[90] A629.

[91] A624.

[92] A640.

[93] A640.

[94] A654; B16.

[95] B16, B22–23.

[96] A641; B15.

Two GPS-sourced hits and one Wi-Fi-sourced hit showed Pierce's cell phone in the area of 107 Alvil Road between 2:49 a.m. and 3:07 a.m.[97] Wi-Fi data then showed his cell phone in the area of 915 New Road between 3:09 a.m. and 3:13 a.m.[98] Pierce's call-detail records revealed phone calls at 2:50 a.m., 3:23 a.m., and 10:24 a.m.[99] The associated CSLI showed that, during these times, his cell phone was in a coverage area that encompassed both 107 Alvil Road and 915 New Road.[100]

When they returned home from Wawa, Pierce and Dolores talked for a while; then Pierce went to bed.[101] In the morning, Pierce ate breakfast, took a shower, and then left for Heather's house.[102] Dolores washed his clothes after he left.[103] Google's location information showed that Pierce's cell phone remained in Elsmere from 3:17 a.m. until 10:29 a.m.[104]

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[97] A641.

[98] A641.

[99] A634.

[100] A634.

[101] B22.

[102] B22.

[103] B22–23.

[104] A641–42.

That next day, July 9, 2016, Mary could not find Heather.[105] She called and sent text messages but received no answer.[106] Heather's bedroom door was locked, and Heather did not answer when Mary banged on it.[107] After he came back to the house, Pierce drove around looking for Heather.[108]

Google's location data showed Pierce's cell phone in the area of 231 Adams Street between 1:17 p.m. and 3:26 pm., apparently traveling around between about 1:52 p.m. and 2:17 p.m.[109]

Around 2:00 p.m., Christopher Mendez ("Chris") arrived at 231 Adams Street with his daughter, who was friends with Heather's son.[110] Pierce and Mary still had not found Heather.[111] Pierce suggested that she might be with Tony.[112] He told Chris that they had a fight the night before, he came back to pack up his belongings, and then he left "for the night."[113] After driving around some more, Pierce asked Chris to help him break into the basement bedroom to see if Heather

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[105] A597.

[106] A597.

[107] A598.

[108] A600.

[109] A642.

[110] A562.

[111] A562.

[112] A562.

[113] A562.

was sleeping inside.[114] Chris popped open the lock with his work knife.[115] Pierce walked over to Heather's body and said either, "She's dead," or, "I think she's dead," and, "It looks like somebody shot her in the head."[116] Within two seconds, Pierce "just left the room."[117] He made no attempt to wake her.[118] He did not cry.[119]

Sergeant Daniel Guzevich of the New Castle County Police Department ("NCCPD") responded to a 911 call from 231 Adams Street.[120] When he arrived, he met Pierce, who stated that "possibly a Tony" had killed Heather.[121] Pierce then led him Sgt. Guzevich the basement.[122] Sgt. Guzevich found Heather's body lying on the bed with dried blood near her head and on her right hand.[123] She was stiff and cold to the touch.[124]

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[114] A562–63.

[115] A564.

[116] A564, A566–67.

[117] A564, A56–67.

[118] A567.

[119] A565.

[120] *See* B2–3.

[121] B3–4.

[122] B3–4.

[123] B3–4.

[124] B4.

DSP assumed the homicide investigation from NCCPD, and NCCPD Officer Zachary Sherwood transported Pierce to DSP Troop 2 at 5:24 p.m.[125] Officer Sherwood seized a cell phone and other items from Pierce.[126] Google's location data showed that Pierce's cell phone traveled from Delaware City to Troop 2 between 5:28 p.m. and 5:49 p.m.[127]

DSP investigators photographed several items that might have been used to cause Heather's injuries, such as a bowling ball.[128] After interviewing Sandra and Amanda, who relayed Pierce's admission that he struck Heather with a two-by-four, Detective Csapo returned to 231 Adams Street and found multiple two-by-fours in the basement.[129]

Dr. Gary Collins, the Chief Medical Examiner at the Delaware Division of Forensic Science, examined Heather's body.[130] He found the back of her skull flattened and fractured.[131] She suffered cerebral contusions and internal

[125] A569; B4.

[126] A569.

[127] A642.

[128] B5.

[129] B14.

[130] A614.

[131] A616–17.

bleeding.[132] Dr. Collins concluded that the cause of death was blunt impact injury to the head and the manner of death was homicide.[133] In order to cause the significant type and number of fractures she suffered, a significant amount of forced was needed, and Heather was likely hit two times or more.[134] Dr. Collins opined that several items found in the basement could have inflicted Heather's injuries, including a two-by-four.[135]

[132] A617–18.

[133] A618.

[134] A619.

[135] A619–20.

ARGUMENT

I. THE SUPERIOR COURT DID NOT ABUSE ITS DISCRETION BY ADMITTING THE EXPERT TESTIMONY CONSTRUING WI-FI LOCATION DATA.

Question Presented

Whether the Superior Court abused its discretion by admitting expert testimony about the location of Pierce's cell phone based on Google's Wi-Fi location data.

Standard and Scope of Review

This Court reviews a trial judge's decision to admit expert testimony for abuse of discretion "because trial judges, as gatekeepers, must have considerable leeway in deciding in a particular case how to go about determining whether particular expert testimony is reliable."[136] A trial judge abuses her discretion when she exceeds the bounds of reason under the circumstances or when she ignores recognized rules of law or practice in a way that produces injustice.[137]

[136] *Rodriguez v. State*, 30 A.3d 764, 769 (Del. 2011) (internal quotation marks omitted).

[137] *Lilly v. State*, 649 A.2d 1055, 1059 (Del. 1994).

Merits of Argument

At Pierce's trial, in addition to substantial other evidence of his guilt, the State introduced expert testimony construing Google Wi-Fi location data from Pierce's cell phone. Pierce had filed a motion to exclude this evidence, but the Superior Court ruled it admissible after a *Daubert* hearing and post-hearing briefing.[138] Pierce contends that Google's Wi-Fi location data is not reliable and the Superior Court abused its discretion by admitting it.[139]

Wi-Fi technology is well-understood and pervasive in modern society. The location information that Google generates using Wi-Fi technology is accepted by the computer-science, law-enforcement, and business communities. Independent testing, other geolocation tools, and direct observation have verified the data's accuracy, both in general and for the specific evidence of this case. The Superior Court did not abuse its discretion by concluding that the Wi-Fi location evidence was reliable and admissible.

[138] *Pierce*, 2019 WL 1077688.

[139] Opening Br. at 11.

A. Background on Wi-Fi Technology and Geolocation Data

Certain electronic devices, such as routers, can create wireless local area networks by projecting Wi-Fi signals.[140] The devices that project these signals are also called "access points" or "APs."[141] Mobile devices, such as cell phones, can scan for the Wi-Fi signals that APs transmit in order to find networks to which they might connect.[142] To detect an AP's Wi-Fi signal, the mobile device typically must be within 150 feet of the AP.[143]

Most cell phones use one of two operating systems: the iPhone Operating System or Android.[144] Cell phones using the Android operating system continuously capture and send user data to Google, including data from GPS and the cell phone's Wi-Fi scans.[145] Using such information, Google developed a "Wi-Fi positioning system" that tracks the locations of APs and approximates the location of cell phones within their range.[146] "Google stockpiles an endless list of the locations and the strength of untold numbers of routers and other access

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[140] *State v. Mosley*, 2019 WL 4248272, at *3 (R.I. Super. Ct. Aug. 30, 2019).

[141] *Id.*

[142] *Id.*

[143] *Id.*

[144] *Pierce*, 2019 WL 1077688, at *2.

[145] *Id.*

[146] *Id.* at *2–3.

points,"[147] identifying the APs by their Media Access Control ("MAC") addresses.[148] By continuously collecting so much data from its millions of users so frequently, a technique called "crowdsourcing," Google renders its system more accurate.[149] Google can then approximate the location of a particular cell phone by reference to the APs that the phone detects at a particular time and the strength of those signals.[150] If the cell phone detects signals from multiple APs at once, Google uses multilateration to approximate its location more accurately.[151] Wi-Fi positioning systems are more precise than GPS or CSLI and can typically identify the location of a cell phone within "'tens of meters.'"[152] Google regularly records the device's Wi-Fi location data with a timestamp, its latitude and longitude, and an estimated accuracy.[153]

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[147] *Mosley*, 2019 WL 4248272, at *3.

[148] *Pierce*, 2019 WL 1077688, at *3.

[149] *See id.* at *2–3.

[150] *Id.*

[151] *Id.*

[152] *Id.* at *7 (quoting Piotr Sapiezynski, et al., *Tracking Human Mobility Using WiFi Signals*, PLOS One, July 1, 2015, *available at* A403–16); *see also Mosley*, 2019 WL 4248272, at *3 ("[T]he Wi-Fi system generates keener location accuracy than either the cell-site or GPS location methods.").

[153] *Pierce*, 2019 WL 1077688, at *2.

Google developed its Wi-Fi positioning system to further its own commercial interests.[154] Google relies on the location data to tailor advertising and to provide its users with customized information based on their location.[155] In 2018, the market for location-based advertising was worth more $20 billion, and Google had "by far" the largest share of that market.[156]

B. Agent Vega's Expert Testimony and the Underlying Wi-Fi Location Data Is Reliable Evidence.

Delaware Rule of Evidence 702 governs the admissibility of expert testimony. D.R.E. 702 is identical to its federal counterpart.[157] Accordingly, this Court has adopted the holdings of *Daubert v. Merrell Dow Pharmaceuticals, Inc.*[158] and *Kumho Tire Co. v. Carmichael*[159]—which interpret Federal Rule of Evidence 702—as the correct interpretation of D.R.E. 702.[160]

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[154] *Mosley*, 2019 WL 4248272, at *7.

[155] *Id.*; *Pierce*, 2019 WL 1077688, at *2 & n.6.

[156] *Mosley*, 2019 WL 4248272, at *3.

[157] *M.G. Bancorporation v. Le Beau*, 737 A.2d 513, 521 (Del. 1999); *see also* D.R.E. 702 cmt. ("D.R.E. 702 was amended in 2001 to track F.R.E. 702 in effect on December 31, 2000. . . . D.R.E. 702 was amended in 2017 in response to the 2011 restyling of the Federal Rules of Evidence. The amendment is intended to be stylistic only. There is no intent to change any result in ruling on evidence admissibility.").

[158] 509 U.S. 579 (1993).

[159] 526 U.S. 137 (1999).

[160] *Le Beau*, 737 A.2d at 522.

Under D.R.E. 702 and the *Daubert* standard, trial judges act as "gatekeepers" to the admission of expert testimony.[161] A trial judge's responsibility is to ensure that an expert's testimony "is not only relevant, but reliable."[162] The focus, therefore, is on the principles and methodology used in formulating an expert's testimony—not on the conclusions they generate.[163] The trial judge considers whether the proffered testimony is based on reliable methods and procedures, as opposed to subjective belief or speculation.[164]

Delaware trial courts employ a five-step test, consistent with *Daubert*, to determine the admissibility of expert testimony.[165] The trial judge considers whether: (i) the witness is qualified as an expert by knowledge, skill experience, training or education; (ii) the evidence is relevant; (iii) the expert's opinion is based upon information reasonably relied upon by experts in the particular field; (iv) the expert testimony will assist the trier of fact to understand the evidence or to determine a fact in issue; and (v) the expert testimony will not create unfair

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[161] *Rivera v. State*, 7 A.3d 961, 971 (Del. 2010).

[162] *Id.*

[163] *Bowen v. E.I. DuPont de Nemours & Co.*, 906 A.2d 787, 794 (Del 2006).

[164] *Rivera*, 7 A.3d at 971–72.

[165] *Bowen*, 906 A.2d at 795.

prejudice or confuse or mislead the jury.[166] The proponent of the expert evidence must establish its admissibility by a preponderance of the evidence.[167]

Pierce does not attack Agent Vega's expert qualifications or the relevance of his testimony and the Wi-Fi location data. Rather, he challenges the reliability of the evidence under the *Daubert* standard.[168]

Trial judges have "considerable leeway" to decide whether particular expert testimony is reliable in a particular case.[169] *Daubert* identified four non-exclusive factors that the trial judge may consider: testing, peer review, error rates, and acceptability in the relevant scientific community.[170] Listing those factors "was meant to be helpful, not definitive."[171] The factors "may or may not be pertinent depending on the nature of the issue, an expert's particular expertise, and the subject of the testimony."[172] The trial judge's inquiry is flexible and should be tied to the facts of the particular case.[173]

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[166] *Id.*

[167] *Id.*

[168] Opening Br. at 11.

[169] *Rivera*, 7 A.3d at 972 (internal quotation marks omitted).

[170] *Le Beau*, 737 A.2d at 521–22 (citing *Kumho Tire*, 526 U.S. at 150).

[171] *Kumho Tire*, 526 U.S. at 151; *Norwood v. State*, 2003 WL 29969, at *2 (Del. Jan. 2, 2003).

[172] *Norwood*, 2003 WL 29969, at *2; *Le Beau*, 737 A.2d at 521–22.

[173] *Kumho Tire*, 526 U.S. at 150; *Le Beau*, 737 A.2d at 521–22.

Before Pierce's trial, the Superior Court held a *Daubert* hearing to consider the admissibility of the proffered expert testimony.[174] On the issue of reliability, the court considered factors such as testability, peer review, and community acceptance.[175] Based on those considerations, the Superior Court concluded that the proffered evidence was reliable and, ultimately, admissible.[176] Its decision did not "exceed the bounds of reason" under the circumstances.[177]

(1) *Google's Wi-Fi location data was subject to independent testing and verification.*

Daubert specifically identified "testability" as one factor for judging the reliability of proffered expert evidence.[178] If an expert's hypothesis can be tested—subjected to scrutiny and possibly refuted—that fact weighs in favor of its admissibility.[179] Testability "assures the opponent of proffered evidence the possibility of meaningful cross-examination (should he or someone else undertake the testing)."[180]

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[174] *Pierce*, 2019 WL 1077688, at *1.

[175] *Id.* at *6–8.

[176] *Id.* at *8.

[177] *See Lilly*, 649 A.2d at 1059 (Del. 1994).

[178] *Daubert*, 509 U.S. at 593.

[179] *See id.*; *United States v. Mitchell*, 365 F.3d 215, 238 (3d Cir. 2004).

[180] *Mitchell*, 365 F.3d at 238; *accord City of Pomona v. SQM N. Am. Corp.*, 750 F.3d 1036, 1046 (9th Cir. 2014).

In this case, the foundation of Agent Vega's expert testimony—the Google Wi-Fi location data—was both testable and actually tested. Three different sources demonstrated the reliability of the underlying data: (i) direct testing by Andrew Rist, an engineer at Oracle Corporation; (ii) other, regularly accepted geolocation data; and (iii) other evidence admitted at trial, such as surveillance video and witness testimony.

(a) *Rist's independent research and testing demonstrated that Google's Wi-Fi location data is reliable.*

Rist, an engineer at Oracle for more than 20 years, testified at the *Daubert* hearing.[181] The Superior Court qualified Rist as an expert "in the field of computer technology and specifically with respect to Google Wi-Fi Location Data,"[182] and Pierce does not challenge that conclusion on appeal.

For more than two years, as part of his responsibilities at Oracle, Rist tested and confirmed the accuracy of Google's Wi-Fi location data.[183] He and his team at Oracle employed a "man-in-the-middle" exploit—"an industry standard testing method"—to observe the communications sent back and forth between Google and

[181] *Pierce*, 2019 WL 1077688, at *1, *5.

[182] *Id.* at *6.

[183] *Id.*

devices with the Android operating system.[184] They constructed a "test rig," a device consisting of a bag containing 20 cell phones, each with an associated Google account.[185] Over those two years of testing, Oracle collected approximately 70,000 location data points from the test rig, 40,000 of which were sourced from Wi-Fi.[186] Using the massive amount of data he collected, Rist examined the accuracy of Google's Wi-Fi location data by two methods. First, he compared Wi-Fi location readings to GPS coordinates, when available.[187] Second, he compared data collected at actual physical locations near known APs to the Wi-Fi location data that Google generates.[188] This technique allowed him to "look inside [Google's] database," reverse engineer portions of its AP map, and scrutinize its accuracy.[189] Based on his testing and professional experience, Rist concluded that Google's Wi-Fi location data is accurate and reliable.[190]

In addition to his general testing of Google's Wi-Fi location data on behalf of Oracle, Rist deployed the test rig near 231 Adams Street to specifically test the

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[184] *Id.*

[185] *Id.*

[186] A212–13.

[187] *See* A193, A203–04.

[188] A200–03.

[189] A200–03.

[190] *Pierce*, 2019 WL 1077688, at *6.

evidence in this case.[191] He determined that the Wi-Fi location data Google generated in that area could reliably identify the location of a mobile device within about 100 feet.[192] Rist then compared his own findings with the location information in Agent Vega's report and concluded that they were consistent.[193]

Pierce attacks Rist's research and conclusions from various angles. He faults Rist's project at Oracle because, at its inception, it had a broad or vague purpose.[194] Pierce argues that the test rig "was not designed to test the reliability of Google's WiFi positioning system."[195] The argument does not fairly capture how Rist's research developed and the test rig's capabilities. Initially, Rist and his team were tasked with looking at the kind of information Android sends to Google.[196] As they observed that information, their objectives became more particular. As Rist testified at the *Daubert* hearing: "[W]e answered one set of questions, and then more questions were asked. We answered those questions again, and more questions were asked."[197] Eventually, the team became interested in the Wi-Fi

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[191] *Id.*

[192] *Id.*

[193] *Id.*

[194] Opening Br. at 19.

[195] Opening Br. at 19.

[196] A125.

[197] A125.

location data.[198] Despite Pierce's claim that Rist's test rig was not capable of testing the reliability of Google's Wi-Fi location data,[199] Rist successfully collected 40,000 Wi-Fi location readings, acquired the details of the Wi-Fi information that Android transmitted, verified AP locations, and reverse engineered portions of Google's database.[200] Rist's test rig could not reach into Google's database and reveal its algorithm for weighing the data, but it enabled Rist to test the reliability of Google's data through systematic observation. It is Rist's research, as well as the other factors discussed in the Superior Court's well-reasoned opinion, that have proven Google's "mathematical calculations" reliable.[201]

Pierce also points out that Rist could not find half of his 40,000 Wi-Fi based location readings in Google's database, to suggest that Google's database is incomplete or unreliable.[202] The absence of some APs from Google's database does not reflect on the accuracy of the data that it does contain. As Rist explained, Google might not incorporate mobile hotspots and other non-static APs that cannot be reliably mapped.[203] The absence of these APs from Google's database might

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[198] *See* A137.

[199] Opening Br. at 19.

[200] A150–51, A200–03, A213.

[201] *See* Opening Br. at 20.

[202] Opening Br. at 18–19.

[203] A215.

therefore reflect the high standards of Google's algorithm as much as anything else.

(b) *Other sources of geolocation data, such as GPS and CSLI, confirmed the accuracy of Google's Wi-Fi location data.*

Other methods for measuring geolocation include GPS and CSLI.[204] The reliability of these tools is well-established,[205] and Pierce does not challenge them here. The locations measured by these geolocation tools can verify the accuracy of Wi-Fi location data.[206] Mobile devices prefer to gather location information through Wi-Fi because its consumes less power than other geolocation tools, but the phones will switch between Wi-Fi and GPS as needed to improve the accuracy of a location reading, based on their relative signal strengths.[207] When its Wi-Fi signal is uncertain, the mobile device will "sometimes flash the GPS to find out exactly where it is."[208]

For several pieces of Wi-Fi data in this case, corresponding GPS or CSLI location data confirm its accuracy. For example, GPS data, CSLI data, and Wi-Fi

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[204] *Pierce*, 2019 WL 1077688, at *2–3.

[205] *Id.*

[206] *Id.* at *7.

[207] *Id.*

[208] A203.

data all placed Pierce near Dolores's home around 3:00 a.m.[209] As the Superior Court found, the "Google Wi-Fi Location Data is consistent with the fixed GPS location data" (and the CSLI data) in this case.[210]

(c) *Surveillance video and witness testimony corroborated Google's Wi-Fi location data.*

The Superior Court found: "Where fixed GPS location data is not available, time stamps from video surveillance footage substantiate the reliability of the Wi-Fi-sourced readings."[211] By way of example, surveillance from Clinton Street, Manor Park Liquor, and Wawa all confirmed, by visual evidence, that Pierce was in the area that Google's Wi-Fi location data place his phone.[212] Witness accounts also corroborated the Wi-Fi location information. For example, Amanda and Dolores placed Pierce at their respective homes at the same time that Google's data put his phone in those locations.[213]

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[209] A634, A641.

[210] *Pierce*, 2019 WL 1077688, at *7.

[211] *Id.*

[212] *See, e.g.*, A637–38, A639, A641.

[213] A627, A640, A654.

(d) *Under* Daubert*, the State is not required to explain Google's underlying methodology.*

Pierce's principal challenge to the reliability of the Wi-Fi location evidence is that neither Rist nor Agent Vega could explain Google's specific methodology for developing its Wi-Fi positioning system, such as its algorithm. He relies on a New York trial-court decision—*New York v. Oquendo*,[214] decided under the inapposite *Frye v. United States*[215] standard—to place an inappropriately high burden on the State. *Daubert*'s inquiry is more flexible than *Frye*'s and, as the Superior Court found below, allows room to test the reliability of the evidence through other methods.

In *Oquendo*, the New York trial court ruled that proffered Wi-Fi location evidence was inadmissible under *Frye*.[216] Unlike the *Daubert* standard, which focuses on the relevance and reliability of the evidence, the *Frye* standard allows for the admission of expert testimony only if the procedure or technique in question has gained general acceptance in the relevant scientific community.[217] The *Oquendo* court rejected the Wi-Fi location evidence for two reasons: (i) the

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[214] NY. Supr. Ct., Indictment No. 16-1154, Decision and Order, Ceresia, J. (Oct. 26, 2017), *available at* A347–51.

[215] 293 F. 1013 (D.C. Cir. 1923).

[216] NY. Supr. Ct., Indictment No. 16-1154, Decision and Order, Ceresia, J. (Oct. 26, 2017), *available at* A347–51.

[217] *Frye*, 293 F. at 1014.

proffered witnesses did not qualify as experts in the field; and (ii) the prosecution failed to demonstrate that Google's Wi-Fi location services were generally accepted, offering "no opinions at all" and no other evidence regarding its general acceptance.[218]

Oquendo is inapposite here, where the applicable standard is different, the State's witnesses qualified as experts, and the State offered much more evidence to satisfy its burden. The Superior Court found that both of the State's witnesses qualified as experts in the field,[219] and Pierce does not contest that finding. While Delaware does not apply *Frye*'s general-acceptance standard,[220] "general acceptance in the relevant scientific community" is one factor that bears on the expert evidence's reliability under *Daubert*.[221] In contrast to *Oquendo*, the State provided the Superior Court with a basis to find that Google's Wi-Fi location services are generally accepted in the community, and it was only one consideration in a broader, more flexible inquiry under *Daubert*.[222]

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[218] NY. Supr. Ct., Indictment No. 16-1154, Decision and Order at 2, Ceresia, J. (Oct. 26, 2017), *available at* A347–51.

[219] *Pierce*, 2019 WL 1077688, at *5–6.

[220] *E.g.*, *Nelson v. State*, 628 A.2d 69, 72 (Del. 1993).

[221] *See, e.g.*, *Le Beau*, 737 A.2d at 521–22.

[222] *See Pierce*, 2019 WL 1077688, at *7–8.

Rhode Island, like Delaware, applies the *Daubert* standard when reviewing the admissibility of expert evidence.[223] In *Mosley*, the Rhode Island Superior Court considered the admissibility of Wi-Fi location evidence under the *Daubert* standard.[224] It ruled that the principles and methodology of Google's Wi-Fi location data were reliable, were relevant, and should therefore be weighed by the trier of fact.[225]

Pierce cites to Rist's acknowledgement that not all of Google's Wi-Fi location data is accurate at any one moment, to question the reliability of its location services overall.[226] A person may move their router to a new location, for example, and it may take Google several days to update its database.[227] But Pierce's argument goes to the weight of Google's Wi-Fi location data, as applied to a particular case or location—not its admissibility. The accuracy of a particular reading at a particular time may be challenged by cross-examination.[228]

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[223] *See Mosley*, 2019 WL 4248272, at *4.

[224] *Id.* at *4–9.

[225] *See id.* at *8 ("Once an expert has shown that the methodology or principle underlying his or her testimony is scientifically valid and that it fits an issue in the case, the expert testimony should be put to the trier of fact to determine how much weight to accord the evidence." (internal quotation marks and brackets omitted)).

[226] *See* Opening Br. at 16–17.

[227] A262–64.

[228] *See Daubert*, 509 U.S. at 593.

(2) *Wi-Fi location data has been subject to peer review in the technology community.*

Pierce attacks the reliability of Google's Wi-Fi location evidence by arguing there is a "complete absence of publication and peer review."[229] The Superior Court disagreed because the "accuracy of Wi-Fi location data is the subject of computer science publications and blogs."[230] The Superior Court was "satisfied that the relevant scientific community is in agreement regarding the reliability of Google Wi-Fi Location Data."[231]

Pierce's peer-review challenge demonstrates why a *Daubert* inquiry is flexible and must tied to the facts of the particular case.[232] Compared to other scientific or technical fields, computer technology develops at a more-rapid pace.[233] Peer review in computer-science fields, therefore, is different.[234] It does not lend itself to the traditional publications that Pierce argues is required.

Nevertheless, Wi-Fi location data has, in fact, been the subject of some traditional publications. For example, in 2009, Paul A. Zandbergen, a geography

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[229] Opening Br. at 20.

[230] *Pierce*, 2019 WL 1077688, at *7.

[231] *Id.*

[232] *See Kumho Tire*, 526 U.S. at 150; *Le Beau*, 737 A.2d at 521–22.

[233] *See Pierce*, 2019 WL 1077688, at *7 n.35.

[234] *Id.*

professor at the University of New Mexico, published an article on the accuracy Wi-Fi and other positioning systems.[235] In 2014, professors affiliated with Saurashtra University in India published an article reviewing Wi-Fi location tracking and its algorithms.[236] In a 2015 article, professors from several relevant disciplines found: "'APs can be very efficiently geolocated in a way that covers a large majority of individuals' mobility patterns . . . . Wi-Fi scans containing at least one visible AP can be used for discovering the location of the user, with a typical spatial resolution on the order of the tens of meters.'"[237] Despite the rapid pace of technological development, as the Rhode Island Superior Court observed in

[235] Paul A. Zandbergen, *Accuracy of iPhone Locations: A Comparison of Assisted GPS, WiFi and Cellular Positioning*, 13 Transactions in GIS 5(2009), *available at* B25–45. "*Transactions in GIS* is an international, peer-reviewed journal that publishes original research articles, review articles, and short technical notes on the latest advances and best practices in the spatial sciences." Wiley, Transactions in GIS, https://www.wiley.com/en-us/Transactions+in+GIS-p-9780J (last visited Feb. 5, 2020).

[236] Atul Gosai & Rushi Raval, *Real Time Location Based Tracking Using WIFI Signals*, 101 Int'l J. of Computer Applications 21 (2014), *available at* B46–51. "International Journal of Computer Applications (IJCA) is a peer reviewed journal published by Foundation of Computer Science (FCS)." International Journal of Computer Applications, About IJCA & Disclaimer, https://www.ijcaonline.org/ (last visited Feb. 5, 2020).

[237] *Pierce*, 2019 WL 1077688, at *7 (quoting Piotr Sapiezynski et al., *Tracking Human Mobility Using WiFi Signals*, PLOS One, July 1, 2015, *available at* A403–16).

Mosley: "[T]he Wi-Fi process is hardly arid curriculum. It is light years, if not galaxies, beyond that . . . ."[238]

Pierce attempts to discredit Rist's research because it is not published and subject to peer review.[239] Presenting this argument conflates Rist's independent testing of Google's Wi-Fi location data with the expert evidence actually offered at trial. Only Agent Vega testified at trial, and he formed his expert opinions about Pierce's locations based on information provided by Google and the Delaware State Police—not on the results of Rist's research.[240] Rist's role in this case is more akin to the peer review that Pierce claims is missing. His testing scrutinized the reliability of Google's Wi-Fi location data—and, in turn, Agent Vega's expert opinions based on that data. Thus, whether Rist's research has been subjected to peer review is, at most, a subordinate question in the Court's analysis. That is not to say, however, that Rist's research has not been subjected to any scrutiny whatsoever. Rist testified at the *Daubert* hearing and faced vigorous cross-examination before the Superior Court accepted his findings.

[238] 2019 WL 4248272, at *4.

[239] Opening Br. at 20.

[240] A635; B20.

(3) *Google's Wi-Fi location data is generally accepted in computer-science and business communities.*

Another factor identified by *Daubert* to consider the reliability of proffered expert evidence is its acceptance within the relevant scientific community.[241] As the Superior Court found, "Google Wi-Fi Location Data is widely accepted as reliable in the computer science community." The examples of peer review offered above reveal as much. For example, one academic publication found that access points "can be very efficiently geolocated" and that Wi-Fi scans can identify locations of users within "tens of meters."[242]

But the importance and acceptance of Wi-Fi positioning extends beyond the computer-science industry. Wi-Fi positioning is as much a business tool as anything else. Google collects the data to further its own commercial interests and access the $20-billion market for location-based advertising.[243] Users rely on Google's location information to receive information tailored to them based on their location.[244] Merchants pay fees to Google for access to the information, and together they use it to promote products and services, sending targeted information

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[241] *See Le Beau*, 737 A.2d at 521–22.

[242] *Pierce*, 2019 WL 1077688, at *7 (quoting Piotr Sapiezynski et al., *Tracking Human Mobility Using WiFi Signals*, PLOS One, July 1, 2015, *available at* A403–16).

[243] *Mosley*, 2019 WL 4248272, at *7.

[244] *Pierce*, 2019 WL 1077688, at *7.

to specific geographical locations.[245] Google's business therefore depends on the accuracy of its information. These factors demonstrate both its widespread acceptance in the marketplace and its reliability.[246]

(4) *Wi-Fi positioning represents a new generation of geolocation services, it is more accurate than already accepted geolocation services, and its usage continues to expand.*

In *Mosley*, the opponent of the proffered Wi-Fi location evidence argued that the Wi-Fi technology is "significantly different" than GPS and CSLI methods.[247] The Rhode Island Superior Court agreed: "[The opponent] is correct. The Wi-Fi system is *not* 'equivalent' to the GPS or the cell-site location mode. It is *better* and *more accurate* than both of them."[248]

Wi-Fi positioning systems represent the next generation of geolocation services.[249] It is favored because it provides more accurate locations, is more effective indoors, and consumes less power.[250] Its utility is growing in business,

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[245] *Id.*

[246] *See id.* at *8 (noting that the United States Supreme Court recognized in *Carpenter v. United States*, 138 S. Ct. 2206, 2217 (2018), that the generation of location data for commercial purposes is an indicia of its reliability).

[247] 2019 WL 4248272, at *7.

[248] *Id.* (emphasis in original).

[249] *See Pierce*, 2019 WL 1077688, at *2–3.

[250] *Id.* at *7.

which uses the technology to tailor advertisements,[251] and in law enforcement, which increasingly relies on the technology to solve crimes.[252] Even though the proliferation of Wi-Fi positioning systems is a relatively recent phenomenon, "the Wi-Fi process is hardly arid curriculum . . . . and there is no danger that [the State's expert] is a charlatan or a purveyor of junk science."[253]

C. Any Error Was Harmless.

Even if this Court finds that the Superior Court abused its discretion by admitting the Wi-Fi location evidence, the error was harmless. Trial-court decisions to admit evidence—including expert evidence—are subject to a harmless-error analysis.[254] An error in admitting evidence is harmless "where the evidence admitted at trial, other than the improperly admitted evidence, is sufficient to sustain the defendant's conviction."[255] If the evidentiary error "is of a constitutional magnitude, the convictions may be sustained if the error is harmless

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[251] *Id.*

[252] *Mosley*, 2019 WL 4248272, at *7.

[253] *Id.* at *8 (internal quotation marks omitted).

[254] *E.g.*, *Guilfoil v. State*, 2016 WL 943760, at *5 (Del. Mar. 11, 2016) (horizontal-gaze-nystagmus evidence); *Nelson*, 628 A.2d at 77 (DNA evidence).

[255] *Miller v. State*, 1993 WL 445476, at *3 (Del. Nov. 1, 1993).

beyond a reasonable doubt."[256] This Court has consistently refused to reverse convictions for harmless errors.[257]

The State offered substantial other evidence of Pierce's guilt, and that evidence is sufficient to sustain his convictions. Pierce stated his intention to commit murder beforehand and confessed to committing Heather's murder afterward. Before returning to 231 Adams Street, Pierce told Shirley that, after that night, he would be serving a life sentence.[258] After leaving 231 Adams Street, Pierce told Sandra and Amanda he hit Heather with a two-by-four and "that bitch" is dead.[259]

The State established Pierce's motive to murder Heather. He told multiple people that he was upset about Heather's relationship with or feelings for Tony.[260] He even identified Tony as a suspect to the police.[261] His anger and emotion were on display when he left Heather at the waterfront and drove away, when he collected his belongings from their bedroom and moved out, when his emotions

[256] *Nelson*, 628 A.2d at 77 (internal quotation marks omitted).

[257] *Id.*

[258] A592.

[259] A624, A628–29.

[260] *E.g.*, A605.

[261] *E.g.*, B3–4.

swung from angry to upset at the Blunts' residence, and when he told David that he will "never see that fucking bitch again."[262]

Despite his strong emotions before and around the time of Heather's murder, Pierce showed no emotion when Heather's body was discovered.[263] He did not cry or show surprise when he found her body.[264] He immediately declared her dead without checking to see if she was alive.[265]

While Pierce was in the basement overnight, after David had let him inside, David heard a thumping sound.[266] Pierce claimed that Heather slammed the door on him, but David testified that it did not sound like a slamming door.[267] Pierce told Sandra and Amanda a different version of the events: that he hit Heather in the head with a two-by-four.[268] Dr. Collins agreed that a two-by-four could have caused the injuries that resulted in her death, and two-by-fours were found in the basement.[269] Pierce then denied ever returning to 231 Adams Street after gathering

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[262] *See* A590, A596, A606, A612, A637–38.

[263] A564–67.

[264] A564–67.

[265] A564–67.

[266] A605.

[267] A605, A608; B12.

[268] A624, A628–29.

[269] A619–20; B14.

his belongings and moving out, even though he had multiple interactions with David later that night inside the house.[270]

Pierce describes the Wi-Fi location evidence as largely corroborating evidence.[271] Indeed, the evidence admitted at trial, other than the Wi-Fi location evidence, was sufficient to sustain Pierce's convictions. Thus, admission of the Wi-Fi location evidence, if it was error, was harmless.

[270] *See* A562, A605, A607–08.

[271] Opening Br. at 13 ("The State's theory . . . centered around [David] King's testimony. . . . Thus, the State sought to introduce evidence that would place Pierce at 231 Adams Street at a time consistent with the rest of King's testimony and the rest of the State's evidence.").

CONCLUSION

For the foregoing reasons, this Court should affirm the judgment of the Superior Court.

Respectfully submitted,

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Date: February 7, 2020

IN THE SUPREME COURT OF THE STATE OF DELAWARE

STEVEN PIERCE,	)	
	)	
Defendant Below,	)	
Appellant,	)	
	)	
v.	)	No. 230, 2019
	)	
STATE OF DELAWARE,	)	
	)	
Plaintiff Below,	)	
Appellee.	)	

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Date: February 7, 2020

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