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NOTE

Face-to-Face With Facial Recognition Evidence: Admissibility Under the Post-*Crawford* Confrontation Clause

Joseph Clarke Celentino*

In Crawford v. Washington, *the Supreme Court announced a major change in Confrontation Clause doctrine, abandoning a decades-old framework that focused on the common law principles of hearsay analysis: necessity and reliability. The new doctrine, grounded in an originalist interpretation of the Sixth Amendment, requires courts to determine whether a particular statement is testimonial. But the Court has struggled to present a coherent definition of the term* testimonial. *In its subsequent decisions, the Court illustrated that its new Confrontation Clause doctrine could be used to bar forensic evidence, including laboratory test results, if the government failed to produce the technician who conducted the test. This Note explores the implications of* Crawford *and its progeny through the lens of one piece of forensic evidence: facial recognition technology. As facial recognition technology continues to gain purchase as a law enforcement tool, prosecutors are increasingly likely to attempt to introduce such evidence in court. Recognizing the interpretative difficulty created by the deep divides that remain on the Court over the proper scope of the Confrontation Clause, this Note argues that, under the* Crawford *framework, facial recognition evidence is testimonial and, therefore, requires confrontation.*

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Introduction

On June 15, 2004, a jury deadlocked on rape charges brought by Massachusetts prosecutors against Darrin Fernandez.[1] DNA evidence connected Darrin to semen recovered from the victim and Darrin had recently been convicted of a break-in and another rape, both of which occurred in the same neighborhood as the rape with which he was charged.[2] The case seemed straightforward. But the jury failed to reach a verdict because Darrin had a twin brother, Damien Fernandez.[3] A juror in Darrin's trial told the Boston Globe: "The fact that the DNA matches both identical twins created some doubt in all of our minds . . . ."[4] A second jury deadlocked several months later.[5] Prosecutors were eventually able to convict Darrin of the rape

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    1. Jonathan Saltzman, *Rape Defendant's DNA or That of His Twin? A Jury Deadlocks*, Boston Globe, June 16, 2004, www.boston.com/news/local/articles/2004/06/16/rape_defend ants_dna_or_that_of_his_twin_a_jury_deadlocks/ [http://perma.cc/H3YB-SEZ2]. No direct record of Fernandez's conviction at the trial court level is accessible online, but a description of the proceedings is available in his appeal to the Massachusetts Appeals Court. *See* Commonwealth v. Fernandez, 65 Mass. App. Ct. 1114 (2006).

    2. Saltzman, *supra* note 1.

    3. *Id.*

    4. *Id.*

    5. Matt Soniak, *Double Trouble: When Identical Twins Run into the Law*, Mental Floss (Oct. 13, 2011, 10:11 AM), http://mentalfloss.com/article/28989/double-trouble-when-identi cal-twins-run-law [http://perma.cc/W57R-5V6C].

in 2006, only after presenting new evidence about his other crimes, including the testimony of the earlier rape victim.[6]

DNA analysis has revolutionized criminal investigation and prosecution. It has been used to secure thousands of convictions[7] and hundreds of exonerations.[8] And jurors put immense stock in forensic evidence, potentially more than in eyewitness testimony.[9]

But such forensic evidence is by no means perfect. Samples of genetic material may never be found[10] or may be tainted.[11] Even when tests are conducted properly, analysts may disagree about the results.[12] Fraud is possible, particularly when the examiner knows the identities of all parties whose

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6. *Id.*

7. Data on the exact number of convictions secured using DNA evidence are unavailable, but the existing data suggest thousands. *See* N.Y. State Div. of Criminal Justice Services, *DNA—The Fingerprint of the 21st Century*, http://www.criminaljustice.ny.gov/forensic/index.htm [http://perma.cc/UD2F-D5HJ] (noting that, as of June 2012, the DNA Databank has helped prosecutors obtain nearly 3,000 convictions). For data regarding the number of publicly funded forensic crime laboratories that conduct DNA analysis, see, for example, Matthew R. Durose et al., Bureau of Justice Statistics, U.S. Dep't of Justice, Census of Publicly Funded Forensic Crime Laboratories, 2009 1 (2012), http://www.bjs.gov/content/pub/pdf/cpffcl09.pdf [http://perma.cc/S3HC-GWHN] (finding that 34 percent of the estimated 4.1 million requests for forensic services received by publicly funded crime laboratories were for the screening or DNA analysis of biological evidence). For an extensive discussion on the use of DNA evidence for criminal justice, including use in court, see generally Nat'l Research Council, The Evaluation of Forensic DNA Evidence (1996), https://www.ncjrs.gov/pdffiles1/Digitization/166538NCJRS.pdf [https://perma.cc/H2F6-R4HX].

8. *Exonerated: Cases by the Numbers*, CNN, http://www.cnn.com/2013/12/04/justice/prisoner-exonerations-facts-innocence-project/ [http://perma.cc/QC6W-WTLF].

9. *CBS Poll: What To Believe?: Americans Trust Physical Evidence More Than Eyewitness Testimony*, CBS News (Jul. 7, 1998), http://www.cbsnews.com/news/cbs-poll-what-to-believe [http://perma.cc/25E8-TZ55]. For a discussion of the reasons for this phenomenon, see generally William C. Thompson et al., *Do Jurors Give Appropriate Weight to Forensic Identification Evidence?*, 10 J. Empirical L. Stud. 359, 390 (2013) ("[P]articipants assumed, when not told otherwise, . . . that DNA evidence is extraordinarily reliable.").

10. Naseam Rachel Behrouzfard, *Strengths, Limitations, and Controversies of DNA Evidence* 1 S. New Eng. Roundtable Symp. L.J. 110, 120 (2006) ("Despite its powerful evidentiary impact on the criminal justice system, DNA evidence is only found in a small fraction of crime scenes.").

11. *See* Daniel Vanek & Katja Drobniè, *Forensic DNA Typing and Quality Assurance, in* Forensic DNA Applications 205, 239–47 (Dragan Primorac & Moses Schanfield eds., 2014).

12. One experiment asked seventeen DNA experts at the same accredited governmental laboratory to analyze actual DNA evidence from a gang rape case: only one of the experts reached the same result as the expert who testified at the actual trial. Four found the results inconclusive and twelve reached the opposite result. Itiel E. Dror & Greg Hampikian, *Subjectivity and Bias in Forensic DNA Mixture Interpretation*, 51 Sci. & Just. 204 (2011).

samples are tested.[13] The identical DNA of twins, although uncommon, may thwart analysts.[14]

Facial recognition technology—that is, computer programs that can identify a person based on a photograph or video still—may be able to pick up where other types of forensic evidence leave off. Imagine that Darrin had been caught on film breaking into any one of the three homes he was ultimately found to have entered. Simply introducing a still image from this video in court would suffer from some of the same deficiencies as DNA evidence, because a jury would be equally unable to distinguish Darrin Fernandez from Damien Fernandez. But a computer program *can* tell the difference; facial recognition technology can even distinguish between identical twins.[15] Had Darrin been caught on film, facial recognition evidence might have positively identified him and saved significant prosecutorial and judicial resources.[16]

Facial recognition technology is currently in widespread use and has significant private and governmental applications.[17] The technology is already used to identify suspects and solve crimes.[18] As higher-quality cameras

13. *See* Nat'l Research Council, Strengthening Forensic Science in the United States 187 (2009) ("[F]orensic practitioners who work in public crime laboratories often are seen as part of the prosecution team, not as part of the scientific enterprise."); William C. Thompson, *Tarnish on the "Gold Standard": Understanding Recent Problems in Forensic DNA Testing*, Champion, Jan.–Feb. 2006, at 10. The National Research Council authors also criticize the fact that the majority of forensic science laboratories are administered by law enforcement agencies, noting that this "leads to significant concerns related to the independence of the laboratory and its budget." Nat'l Research Council, *supra*, at 183–84.

14. Jess Bidgood, *New DNA Test Sought in Identical Twin's Rape Case*, N.Y. Times (Sept. 15, 2014) http://www.nytimes.com/2014/09/16/us/new-dna-test-sought-in-identical-twins-rape-case.html [http://perma.cc/AD92-MKBV] ("Because . . . identical twins[ ] come from a single fertilized egg—the same genetic material—they cannot be distinguished by conventional DNA testing, confounding prosecutors who might otherwise be able to build a solid case."). There are, though, *some* DNA analyses that are purportedly able to distinguish between identical twins. *See id.*

15. Although the effectiveness of facial recognition systems for distinguishing twins can vary, some existing systems can, under ideal conditions, recognize the difference between identical twins with 90 percent confidence. *See* P. Jonathon Phillips et al., *Distinguishing Identical Twins by Face Recognition*, http://www3.nd.edu/~kwb/PhillipsEtAlFG_2011.pdf [http://perma.cc/PS94-HSD5].

16. There is significant need to conserve resources in these areas. Prosecutor's offices are frequently overworked. *See, e.g.*, Lisa Rathke, *Prosecutors: State's Attorneys Offices Understaffed*, Burlington Free Press (Sept. 29, 2014), http://www.burlingtonfreepress.com/story/news/local/2014/09/29/prosecutors-states-attorneys-offices-understaffed/16426881 [http://perma.cc/J3QZ-9ESY]. For a discussion of the negative consequences overworking of prosecutor's offices can have for the administration of justice, see Adam M. Gershowitz & Laura R. Killinger, *The State (Never) Rests: How Excessive Prosecutorial Caseloads Harm Criminal Defendants*, 105 Nw. U. L. Rev. 261 (2011).

17. For example, the technology has been employed by the popular social networking site Facebook. *How Does Facebook Suggest Tags?*, Facebook [hereinafter Facebook] https://www.facebook.com/help/122175507864081 [http://perma.cc/U8AM-XSLN].

18. *See* Jose Pagliery, *FBI Launches a Face Recognition System*, CNN Money (Sept. 16, 2014), http://money.cnn.com/2014/09/16/technology/security/fbi-facial-recognition [http://perma.cc/4J25-R89V].

become more cost effective and facial recognition algorithms become more accurate,[19] law enforcement agencies will seek to use facial recognition evidence for more than just criminal investigation.[20] After all, "[s]ome law enforcement agencies estimate that up to a quarter of complaint cases contain face images of the suspect or an accomplice. This number is significantly higher than for latent fingerprints or DNA samples."[21] Prosecutorial use is therefore imminent.

But major hurdles still stand between facial recognition evidence and the courtroom. For instance, under the Federal Rules of Evidence, scientific evidence must be reliable and may require expert testimony to lay a sufficient foundation.[22] Because facial recognition evidence is relatively new, criminal defendants will likely challenge its reliability.[23]

In addition to challenging facial recognition evidence under the rules of evidence, criminal defendants may also invoke their constitutional right under the Confrontation Clause to keep such evidence out of court. This is especially likely given the Supreme Court's recent strengthening of the protections provided by the Confrontation Clause, a major shift that began with *Crawford v. Washington*[24] in 2004.[25]

This Note seeks to define the relevant Confrontation Clause framework for the use of facial recognition technology in court. Specifically, this Note argues that facial recognition evidence is subject to the Sixth Amendment's procedural guarantee of confrontation. Part I explores the rapid development of facial recognition technologies and the potential uses of those technologies in court. Part II presents the modern Confrontation Clause framework and discusses the two basic requirements that must be met for the Clause to apply to a piece of evidence: the evidence must be hearsay and

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19. *See* Chaochao Lu & Xiaoou Tang, *Surpassing Human-Level Face Verification Performance on LFW with GaussianFace*, 29 AAAI Conference on Artificial Intelligence 3811, (2015), http://www.aaai.org/ocs/index.php/AAAI/AAAI15/paper/view/9845/9816 [perma.cc/6FK8-CD3J] (demonstrating a facial recognition algorithm that can recognize faces with greater accuracy than human subjects); Yana Welinder, *Facing Real-Time Identification in Mobile Apps & Wearable Computers*, 30 Santa Clara High Tech. L.J. 89, 90–92 (2013) (discussing the proliferation of facial recognition mobile applications and their regulatory implications).

20. For this reason, a significant area of scholarship has developed around the Fourth Amendment issues surrounding facial recognition technology and other biometric identifiers. *E.g.*, Rudy Ng, Note, *Catching Up to Our Biometric Future: Fourth Amendment Privacy Rights and Biometric Identification Technology*, 28 Hastings Comm. & Ent. L.J. 425 (2006).

21. Michael Petrov, MorphoTrust USA, Law Enforcement Applications of Forensic Face Recognition 3 (2012), http://www.planetbiometrics.com/creo_files/upload/article-files/whitepaper_facial_recognition_morphotrust.pdf [http://perma.cc/C7JZ-XQHH].

22. *See* John Nawara, Note, *Machine Learning: Face Recognition Technology Evidence in Criminal Trials*, 49 U. Louisville L. Rev. 601, 604–07 (2011) (describing the standards for admissibility of scientific evidence in federal court).

23. *See* Fed. R. Evid. 702, 703.

24. 541 U.S. 36 (2004).

25. *See infra* Part II.

the evidence must be testimonial. Part III argues that facial recognition evidence meets both requirements and confrontation is thus required. This Part also briefly explores several avenues prosecutors may use to admit facial recognition evidence if a court finds it testimonial.

I. The Ever-Increasing Use of Facial Recognition Technology

In 2001, surveillance cameras captured the faces of more than 100,000 football fans attending the Super Bowl as they entered Raymond James Stadium in Tampa, Florida.[26] Police used facial recognition technology on the footage and were able to detect nineteen petty criminals, though they made no arrests.[27] Intended to test the counterterrorism ability of facial recognition, the Super Bowl program became one of the first highly publicized deployments of facial recognition technology.[28]

Since this public debut in 2001, facial recognition technology use has become common—both by private entities and government agencies.[29] Police in both the United States and the United Kingdom already deploy automated facial recognition systems.[30] The technology has proven an especially effective tool for identifying and apprehending criminals. For example, "researchers at Michigan State University were able to quickly identify one of the Boston Marathon bombing suspects from law enforcement video . . . ."[31] Indeed, facial recognition's substantial law enforcement applications have been a driving force behind the technology's accelerated development.

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26. Vickie Chachere, *Biometrics Used to Detect Criminals at Super Bowl*, ABC News (Feb. 13, 2002) http://abcnews.go.com/Technology/story?id=98871 [http://perma.cc/CAD5-95PG].

27. *Id.*

28. *See, e.g., id.*; Thomas C. Greene, *Feds Use Biometrics Against Super Bowl Fans*, The Register (Feb. 7, 2001, 12:55 PM), http://www.theregister.co.uk/2001/02/07/feds_use_biometrics_against_super/ [http://perma.cc/EXQ8-BPPR]; Patrick Marshall, *We Can See Clearly Now: After An Early Black Eye, Face Recognition Might Finally Be Ready for Prime Time*, Gov't Computer News (June 4, 2007), http://www.itl.nist.gov/iad/News/FaceRecog3.html [http://perma.cc/BSJ7-EDFQ].

29. For examples of the crossover between private applications and government applications, see Nat'l Telecomm. and Info. Admin., Commercial Facial Recognition Technology: Proposed Use Cases that Might Be Addressed by a Code of Conduct (Mar. 24, 2014), http://www.ntia.doc.gov/files/ntia/publications/stakeholder_use_cases_3_24_14.pdf [http://perma.cc/SC4R-7ULQ].

30. *E.g.*, Sebastian Anthony, *UK, The World's Most Surveilled State, Begins Using Automated Face Recognition to Catch Criminals*, ExtremeTech (July 17, 2014, 8:03 AM), http://www.extremetech.com/extreme/186435-uk-the-worlds-most-surveilled-state-begins-using-automated-face-recognition-to-catch-criminals [http://perma.cc/KQ2X-YFAZ]; Thomasi McDonald, *Raleigh Police Will Test Facial-Recognition Technology to Fight Crimes*, News & Observer (Sept. 18, 2014 9:12 PM), http://www.newsobserver.com/2014/09/18/4162497/raleigh-police-department-adds.html [http://perma.cc/M35K-YJPP].

31. Mich. State Univ., *Facial-Recognition Technology Proves its Mettle*, ScienceDaily (May 24, 2013), www.sciencedaily.com/releases/2013/05/130524142549.htm [http://perma.cc/Y4FR-F6GF].

This Part discusses the development of facial recognition technology and its potential application in criminal proceedings. First, it chronicles advancements in the quality of facial recognition algorithms and the growth of facial identification databases, highlighting the degree to which government involvement and investment has been critical to the technology's development. Then, it describes potential courtroom applications of the technology, many of which are already in use. Finally, it defines the steps in the implementation process of facial recognition technology in order to identify which steps will be most relevant in the Confrontation Clause analysis.

A.   *A Rapidly Advancing Technology*

Facial recognition technology has developed tremendously over the past two decades. The algorithms for identification have increased dramatically in accuracy and efficiency, and the databases containing facial information have grown substantially. It is no accident that these developments enhance the value of the technology for law enforcement purposes—as it is precisely governmental entities that funded and facilitated the development of the technology in the first place.

The United States government is intimately involved in the technology's development. In 1993, the Department of Defense's Counterdrug Technology Development Program sponsored the Face Recognition Technology (FERET) program, which was designed to spur commercial applications of the technology and create universal data standards.[32] As part of continuing efforts to integrate facial recognition systems, the federal government maintains a registry of recommended standards, and government use of facial recognition remains common.[33]

Facial recognition technology has improved since the 1993 FERET Evaluation. The National Institute of Standards and Technology reported that, as of 2010, error rates have dropped dramatically since the organization began tracking the performance of facial recognition systems.[34] Moreover, significant advances have been made in the amount of processing time a system requires to identify a match: the amount of physical space taken up by a

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32.   Nat'l Sci. & Tech. Council, Face Recognition 4–6 (2006), http://www.biometrics.gov/Documents/facerec.pdf [http://perma.cc/K4B7-TCAU]; *see also* P. Jonathon Phillips et al., *The FERET Evaluation Methodology for Face-Recognition Algorithms*, 22 IEEE Transactions on Pattern Analysis and Machine Intelligence 10 (2000), http://www.itl.nist.gov/iad/humanid/feret/doc/FERET_PAMI_Oct_2000.pdf [http://perma.cc/3XYK-KTMH].

33.   Nat'l Sci. & Tech. Council, Registry of USG Recommended Biometric Standards (2014), http://www.biometrics.gov/standards/Registry_v5_2014_08_01.pdf [http://perma.cc/5XLB-CXWD].

34.   *See* P. Jonathon Phillips, Nat'l Inst. of Standards & Tech., Next Challenge: Human Level Robust Performance 8 (2012), http://biometrics.nist.gov/cs_links/ibpc2012/presentations/Day1/112_Phillips.pdf [http://perma.cc/XF3K-HPYS]; *cf.* John Markoff, *Researchers Announce Advance in Image-Recognition Software*, N.Y. Times (Nov. 17, 2014), http://www.nytimes.com/2014/11/18/science/researchers-announce-breakthrough-in-content-recognition-software.html [http://perma.cc/5TPW-7BX6].

"fac[ial] recognition server may be 10 times smaller than that of a finger-print system with the same number of personal records and search throughput. A single server computer can contain over 10 million records with search time of less than 10 seconds."[35]

Databases containing facial data have also grown. The prevalence of photo and video technology, including camera phones, wearable devices such as Google Glass, and closed circuit television (CCTV) systems, makes data collection easier than ever before.[36] Law enforcement agencies can leverage the increased portability and affordability of image-capture technologies to grow their facial databases.[37] In short, the chances that a crime will either be caught on film or that a perpetrator's facial data will be on file can be expected to increase with time.

For example, in September 2014, the FBI's Next Generation Identification database went online.[38] The database already contains over 100 million records and includes an "Interstate Photo System" facial recognition service.[39] The system is accessible by over 18,000 law enforcement agencies.[40] Also at the federal level, the Department of Homeland Security has begun testing iris and facial recognition systems for use at international border crossings[41] while the Office of Biometric Identity Management (OBIM), formerly the United States Visitor and Immigration Status Indicator Technology (US-VISIT) Program, has for years collected other biometric data about foreigners entering the country.[42] Many state law enforcement agencies maintain similar databases, which they often compile using police mugshots

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35. Petrov, *supra* note 21, at 12.

36. *See* Farhad Manjoo, *In a World of Phones, Gadgets Must Adapt*, N.Y. Times (Jan. 7, 2015), http://nyti.ms/1yAPjYf [http://perma.cc/M3CZ-UZ66].

37. *See* Jared Newman, *Dubai Detectives Will Use Google Glass Facial Recognition Tech to ID Criminals*, PCWorld (Oct. 3, 2014), http://www.pcworld.com/article/2691615/dubai-detectives-will-use-google-glass-facial-recognition-tech-to-id-criminals.html [http://perma.cc/ASU8-VFPY].

38. Press Release, FBI, FBI Announces Full Operational Capability of the Next Generation Identification System (Sept. 15, 2014) [hereinafter *FBI Announces NGIS*], http://www.fbi.gov/news/pressrel/press-releases/fbi-announces-full-operational-capability-of-the-next-generation-identification-system [http://perma.cc/LAC5-X58J].

39. *Next Generation Identification: FBI Announces Biometrics Suite's Full Operational Capability*, FBI (Sept. 23, 2014), http://www.fbi.gov/news/stories/2014/september/fbi-announces-biometrics-suites-full-operational-capability/fbi-announces-biometrics-suites-full-operational-capability [http://perma.cc/MKC6-BYGZ].

40. *FBI Announces NGIS*, *supra* note 38.

41. Aliya Sternstein, *New Facility Will Rehearse Foreigner Iris and Facial Recognition at Airport Exits*, Nextgov (June 27, 2014), http://www.nextgov.com/emerging-tech/2014/06/new-facility-will-rehearse-foreigner-iris-and-facial-recognition-airport-exits/87502 [http://perma.cc/M3NH-VTWT].

42. *Office of Biometric Identity Management*, Dep't of Homeland Security, http://www.dhs.gov/obim-biometric-identification-services [http://perma.cc/EBN9-B9BR].

or driver's license photos.[43] The plethora of photographs that many Americans publicly display on social media may also provide a fertile source for database creation.[44]

As the government collects facial recognition data from an ever-increasing number of sources, vast data repositories allow for more effective matching.[45] It is feasible that within a few decades, most Americans' biometric information will be logged in a government database.[46] With increased database comprehensiveness comes increased application for law enforcement and criminal prosecution.[47]

B.   *Imminent Courtroom Applications*

Facial recognition evidence has clear courtroom applications. Most significantly, the evidence could be introduced to provide positive identifications of criminal suspects.[48] Prosecutors may also seek to supplement in-court identifications by witnesses with facial recognition evidence. Given the well-documented deficiencies of eyewitness identifications,[49] prosecutors have good reason to offer additional evidence to a jury for verification. Moreover, in cases where a photo or video provides the primary evidence against a defendant, the prosecution may wish to introduce evidence of a facial recognition match, rather than relying entirely on the jury's determination of whether the defendant is the one pictured.[50]

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43.   *See, e.g.*, Todd Strain & Monica Garske, *Chula Vista Police Use New Facial Recognition Technology*, NBC 7 News San Diego (Nov. 13, 2013), http://www.nbcsandiego.com/news/local/Chula-Vista-Police-Dept-New-Facial-Recognition-Technology-231835401.html [http://perma.cc/A8DP-S428]; Craig Timberg & Ellen Nakashima, *State Photo-ID Databases Become Troves for Police*, Wash. Post (June 16, 2013), https://www.washingtonpost.com/business/technology/state-photo-id-databases-become-troves-for-police/2013/06/16/6f014bd4-ced5-11e2-8845-d970ccb04497_story.html [http://perma.cc/ ET3C-YYZ5].

44.   Michael Schiffer, Commentary, *My Face Or Yours? Exploring the Reality of Facial Recognition Tech*, MediaPost (Sept. 10, 2012, 9:00 AM), http://www.mediapost.com/publications/article/182578/my-face-or-yours-exploring-the-reality-of-facial.html [http://perma-cc/7R6D-U253]. Indeed, many social media platforms themselves already deploy facial recognition technology. *E.g.*, Facebook, *supra* note 17.

45.   Timberg & Nakashima, *supra* note 43.

46.   Numerous privacy advocates have made this prediction. *See, e.g.*, Jennifer Lynch, *FBI Plans to Have 52 Million Photos in Its NGI Face Recognition Database by Next Year*, Electronic Frontier Found. (Apr. 14, 2014), https://www.eff.org/deeplinks/2014/04/fbi-plans-have-52-million-photos-its-ngi-face-recognition-database-next-year [http://perma-cc/69SW-VG6X].

47.   Timberg & Nakashima, *supra* note 43.

48.   *See, e.g., supra* Introduction.

49.   *See generally* Jennifer L. Devenport et al., *Eyewitness Identification Evidence: Evaluating Commonsense Evaluations*, 3 Psychol. Pub. Pol'y & L. 338 (1997); *Eyewitness Misidentification*, Innocence Project, http://www.innocenceproject.org/understand/Eyewitness-Misidentification.php [http://perma-cc/5JQQ-BVNB] (noting that eyewitness misidentification has played a role in "70% of convictions overturned through DNA testing").

50.   For an illustration of this type of application, consider the hypothetical use of facial recognition technology in the Fernandez case, discussed *supra* in the Introduction.

Facial recognition evidence will need to comport with a particular court's rules of evidence in order to be admissible. In federal court, all scientific evidence must be evaluated for relevance and reliability.[51] A party must lay a proper foundation, which is frequently bolstered by the use of expert testimony.[52] While the admissibility of facial recognition evidence under the rules of evidence is outside the scope of this Note, the technology's increasing accuracy and widespread use indicates that facial recognition evidence will soon—if it does not already—satisfy the requirements of the Federal Rules of Evidence.[53]

Finally, although facial recognition evidence has rarely been introduced in a prosecution,[54] it has already entered the court system. At least one habeas petitioner has called for the use of facial recognition evidence as a tool for exoneration.[55] Moreover, the FBI is now training investigators through the Facial Identification Scientific Working Group, the eventual goal of which is "to create a facial examiner certification program similar to that of fingerprint examiners."[56] Such substantial governmental investment, coupled with the immense probative value of such evidence, suggests that regular in-court use of facial recognition technology is imminent.

C. *Key Features of Facial Recognition Technology*

Before moving to an analysis of potential limitations the Confrontation Clause imposes on the use of facial-recognition-technology evidence, this Section outlines in detail the process through which facial recognition data is developed and prepared for introduction as evidence. Because evidence must contain the statement of a person—as opposed to merely machine-generated data—to be considered hearsay[57] and, therefore, to present a Confrontation Clause issue, this section specifically highlights *human* inputs in the facial recognition process.

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51. The inquiry usually proceeds under Fed. R. Evid. 104, 401, and 402.

52. *See* Fed. R. Evid. 702. Federal courts evaluating the reliability of a scientific method are guided by the factors announced in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).

53. *See* Nawara, *supra* note 22, at 621 ("[Facial recognition evidence] passes muster under both *Frye* and *Daubert* because it is reliable, relevant, and generally accepted by the scientific community. It has the requisite reliability, but only barely. Until the technology becomes more widespread and accurate, it makes sense to open the door to its admissibility slowly.").

54. Petrov, *supra* note 21, at 15 ("Court presentations of 1:1 face identification results are still rare.").

55. *See, e.g.*, Hutcherson v. State, 438 S.W.3d 909, 912 (Ark. 2014) ("In his petition . . . appellant contended that testing of the videotape that showed the robbery . . . would reveal that he was not the robber."). The Arkansas Supreme Court ultimately rejected Hutcherson's claim that facial recognition technology would be able to exonerate him, but the ruling was primarily based on the low quality of the video. The court's discussion, however, suggests that it is open to the use of facial recognition technology as a tool for exoneration. *Id.*

56. Petrov, *supra* note 21, at 15.

57. Discussed *infra* Section III.A.

The process of capturing and coding facial recognition data can be distilled to five basic steps: (1) data collection, (2) transmission, (3) signal processing, (4) decision, and (5) data storage.[58]

First, at the data-collection stage, facial data must be collected and entered into the system. This can be accomplished in a number of ways, such as through live collection using digital cameras or manual input of existing photo or video data.[59] The types of facial recognition evidence likely to be introduced in court will almost definitely involve manual input because fully automated facial recognition systems are neither sufficiently advanced nor sufficiently integrated with existing photo and video capture devices to be effective.[60] Progress toward fully automated data collection and processing remains the elusive goal of system developers. Current facial recognition technology is most reliable in controlled settings—where lighting conditions and angle are optimal—so human input at the data-collection stage is a virtual prerequisite for effective processing.[61] Specifically, human input is frequently used after a photo or video is made to modify lighting conditions and the subject's angle or position relative to the camera.

Second, transmission of the facial recognition data may be required. This is because some "systems collect data at one location but store and/or process it at another."[62] During the transmission step, data may need to be

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58. This model of analysis is drawn from the National Biometric Test Center. *See* James L. Wayman, Fundamentals of Biometric Authentication Technologies (1999), *reprinted in* National Biometric Test Center Collected Works 1997–2000 1, 6–9 (James L. Wayman ed., 2000) (identifying the five subsystems of "a generic biometric authentication system" as data collection, transmission, signal processing, decision, and data storage). Although the National Biometric Test Center's model describes biometric technologies generally, it clearly applies to technology employed by the most common facial recognition systems. *Cf. Face Recognition – Technology Overview*, Ex-Sight.Com (2009), http://www.ex-sight.com/technology.htm [http://perma-cc/ L9VW-STFQ] (describing a four-stage process analogously, using the terms capture, extraction, comparison, and matching).

59. *See* 2 MITRE Corp., Technology Assessment for the State of the Art Biometrics Excellence Roadmap, FBI 1–3 (2009), https://www.fbi.gov/about-us/cjis/fingerprints_biometrics/biometric-center-of-excellence/files/saber_techassessmentvol2_v1_3_2009mar30_delivered.pdf [https://perma.cc/TTY7-YFHW]. The differences between these multiple methods have no bearing on the Confrontation Clause analysis. This is because facial data from a video is generally processed as a collection of still images.

60. *See* Stephen Andrew Mosca, Biometric Facial Recognition Software: How the Law Should Treat Machines as Witnesses (2006) (unpublished manuscript), http://www.mosca-law-firm.com/articles/BFRS.pdf [http://perma.cc/M92V-X89H] ("The deployments of automated technology may be considered experimental in nature, and do not yet rise to the level of investigative or probative usefulness as evidence.").

61. Lee Gomes, *Videotape Can Help ID Terrorists, but Humans Must Still Do Scanning*, Wall St. J. (July 18, 2005 12:01 AM), http://www.wsj.com/articles/SB112163882608787799 [perma.cc/WLZ6-CRN8] ("The current successful field applications of face recognition . . . typically involve straight-on, passport-style photos in controlled settings where no effort is being made to disguise the person's facial features.").

62. Wayman, *supra* note 58, at 7.

compressed.[63] Transmission can impact data quality[64] and introduces an additional possibility of error—whether technical or human—into the process.[65] For example, a human-introduced error could be transmitting the wrong file type or the wrong file, while a technical error could be data corruption caused by the compression process. Whether and when transmission occurs will depend on the on-site technological capabilities and degree of network integration that the facial recognition system employs.[66]

Third, during the signal-processing stage, raw facial data is processed into a usable form. This process can be subdivided into three tasks—feature extraction, quality control, and pattern matching[67]—requiring varying degrees of human involvement.

The precise method of feature extraction will depend on the type of algorithm used, and thus this step may require more or less human input.[68] Generally speaking, these algorithms operate by mapping data points on a subject's face and measuring vectors between these points.[69] The goal of feature extraction is to isolate the "distinctive and repeatable" qualities of an individual's biometric pattern, while ignoring noise and imperfections in the data collected.[70]

During pattern matching, the stored templates are compared against all others already stored in the database. "[T]he pattern matching process compares the present sample to multiple templates from the database one-at-a-time, as instructed by the decision subsystem, sending on a quantitative 'distance' measure for each comparison."[71] Pattern matching also introduces a significant possibility of error into the facial recognition process. This is because "distances will rarely, if ever, be zero as there will always be some non-

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63. *Id.*

64. *Id.*

65. *See* Lucas D. Introna & Helen Nissenbaum, N.Y.U., The Center for Catastrophe Preparedness & Response, *Facial Recognition Technology: A Survey of Policy and Implementation Issues* 12, https://www.nyu.edu/projects/nissenbaum/papers/facial_recognition_report.pdf [http://perma.cc/RB63-5X9Q] (suggesting that the final determination of a match will come down to a human operator, which may make matching extremely difficult if the faces are of different ethnic backgrounds than the operator).

66. Transmission may also occur after the signal processing stage, depending on the type of system used. Wayman, *supra* note 58, at 7.

67. *Id.*

68. For a list of the most commonly used algorithms and a basic description of their operation, see Mislav Grgic & Kresimir Delac, *Algorithms*, Face Recognition Homepage, http://www.face-rec.org/algorithms [http://perma.cc/3V6Y-3Q9K].

69. *See, e.g.*, *id.* (describing the Elastic Bunch Graph Matching algorithm); *id.* ("Faces are represented as graphs, with nodes positioned at fiducial points. . . . Recognition is based on labeled graphs. A labeled graph is a set of nodes connected by edges, nodes are labeled with jets, edges are labeled with distances.").

70. Wayman, *supra* note 58, at 7.

71. *Id.* at 8.

repeatable biometric-, presentation-, sensor- or transmission-related variation remaining after processing."[72]

Fourth, the decision subsystem looks for matches in a database of existing templates. " '[M]atches' or 'non-matches' [are determined] based on the distance . . . measures received from the pattern matcher . . . ."[73] Decisions about the acceptable margin of error are "the most scientific aspect of biometric evidence integrity,"[74] and human input is most likely present in systems that require the user to specify a distance measure.[75] That is, it is sometimes up to the analyst to decide on the acceptable level of precision within which the results of the matching will be deemed conclusive.

Fifth, throughout the process, data must be stored. Storage represents an additional avenue for human input in the facial recognition process because increases in the number of stored templates necessitate additional decisions about how matching occurs. As the number of templates contained in a database increases, data will have to be partitioned into smaller subsets.[76] Because partitioning can corrupt data, error rates will not remain constant with increasing database size.[77] "Consequently, database partitioning strategies represent a complex policy decision[,]"[78] one that requires human decisionmaking and input to resolve. Partitioning choices will most likely be made at the initial programming stage,[79] but may also require input from the forensic laboratory conducting the test or, perhaps, even the individual technician involved in a particular case. At any rate, the partitioning choice will certainly have an impact on the overall accuracy of the system[80] and may provide an avenue for attacking the validity of a piece of facial recognition evidence.

Thus, while there is still a wide variation in the technologies and processes used to implement facial recognition technology, nearly all of the steps require some amount of human input and involvement, albeit to varying degrees. And, for the reasons described in Section III.A below, understanding the extent and nature of human involvement in the facial

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72.   James Wayman et al., *An Introduction to Biometric Authentication Systems*, in Biometric Systems 1, 13 (James Wayman et al. eds., 2005).

73.   *Id.* at 14.

74.   Mosca, *supra* note 60, at 107.

75.   Many facial recognition systems, however, contain pre-programmed values, frontloading the decision onto the algorithm's programmer, rather than the technician conducting any individual analysis. *E.g.*, First Line Facial Recognition Software, *Facing Your First Line*, Blue Line Security Solutions 3 (2014), https://bluelinesecuritysolutions.com/images/portfolioImages/First%20Line%20White%20Paper.pdf [http://perma.cc/5QZU-LLED] ("First Line facial detection is nothing more than a set of pre-programmed . . . variations of pixel shading and positions that defines the location and sizes of human faces in digital images.").

76.   Wayman, *supra* note 58, at 9.

77.   *Id.*

78.   *Id.*

79.   *See id.* at 8–9.

80.   *See id.*

recognition process is essential to considering the application of the Confrontation Clause to the introduction of such evidence.

II.   Modern Confrontation Clause Doctrine

This Part surveys the modern Confrontation Clause framework in order to set the stage for Part III's discussion of its application to facial recognition technology evidence. Under current doctrine, two basic requirements must be met for the Clause to apply to a piece of evidence: the evidence must be hearsay, and the evidence must be testimonial. Section II.A chronicles the history of the Supreme Court's interpretation of the Clause, summarizing the major changes introduced in the landmark case of *Crawford v. Washington*.[81] Section II.B analyzes the questions left open by the *Crawford* Court, specifically addressing the distinction between testimonial and nontestimonial evidence. Section II.C describes the threshold matter of whether the evidence in question is hearsay.

A.   *Historical Confrontation Clause Interpretation and* Crawford'*s Contribution*

The Confrontation Clause of the Sixth Amendment to the Constitution provides: "In all criminal prosecutions, the accused shall enjoy the right . . . to be confronted with the witnesses against him . . . ."[82] The precise contours of the protection afforded by the Confrontation Clause have developed primarily through case law in the last fifty years.[83] Specifically, the Supreme Court's Confrontation Clause jurisprudence can be broadly grouped into two major eras: the "*Roberts* Era" and the modern "*Crawford* Era."[84]

1.   Before *Crawford*

In the *Roberts* Era, the Supreme Court's jurisprudence focused on the necessity and reliability of hearsay evidence. The *Ohio v. Roberts* Court announced that, in order to introduce an out-of-court statement that would not be subject to cross-examination, a prosecutor would have to establish

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81.   541 U.S. 36 (2004).

82.   U.S. Const. amend. VI.

83.   4 Christopher B. Mueller & Laird C. Kirkpatrick, Federal Evidence § 8:26 (4th ed. 2013) ("[M]ost of what we can call the law of confrontation comes from Supreme Court decisions handed down after 1965.").

84.   *See* George Fisher, Evidence 588–90, 594 (3d ed. 2013). Fisher also mentions the "*Mattox* Era," during which the Court rejected the argument that the Confrontation Clause merely codified historical hearsay rules and exceptions, *id.*, and held that that the Fourteenth Amendment's Due Process Clause incorporates the Confrontation Clause against the states, Pointer v. Texas, 380 U.S. 400, 406 (1965). Because the first comprehensive doctrinal framework arose during the *Roberts* Era, this Note does not discuss the *Mattox* Era at length.

both necessity—the unavailability of the person who made the hearsay statement at issue[85]—and "adequate 'indicia of reliability.'"[86] According to the Court, "[r]eliability can be inferred without more in a case where the evidence falls within a firmly rooted hearsay exception. In other cases, the evidence must be excluded, at least absent a showing of particularized guarantees of trustworthiness."[87] Thus, the primary concern of *Roberts* Era courts was whether a given statement was sufficiently reliable to allow admission absent face-to-face confrontation.

But this framework began to unwind in the 1990s as jurists and scholars began to embrace a more historical approach to the Confrontation Clause.[88] Justices Thomas and Scalia, concurring in *White v. Illinois,* indicated their willingness to reconsider *Roberts* in 1992.[89] Justice Thomas wrote: "Relevant historical sources and our own earlier decisions, nonetheless, suggest that a narrower reading of the Clause than the one given to it since [*Roberts*] may well be correct."[90] Justice Breyer also joined this coalition, concurring in *Lilly v. Virginia*.[91] The death knell for the *Roberts* framework finally came in *Crawford v. Washington*,[92] marking the beginning of modern Confrontation Clause jurisprudence.

2.   *Crawford v. Washington*

Michael Crawford was arrested on August 5, 1999 for stabbing Kenneth Lee.[93] After receiving his Miranda warning, Crawford told police that he acted in self-defense during a fight at Lee's apartment.[94] Crawford's wife, Sylvia, largely corroborated his description of the events but her statement tended to discredit Crawford's claim that the victim had a weapon drawn

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85.   448 U.S. 56, 65 (1980) ("In the usual case . . . the prosecution must either produce, or demonstrate the unavailability of, the declarant whose statement it wishes to use against the defendant."), *abrogated by Crawford*, 541 U.S. 36.

86.   *Id.* at 66.

87.   *Id.*

88.   *See, e.g.*, Richard Friedman, *Confrontation: The Search for Basic Principles*, 86 Geo. L.J. 1011 (1998) (explaining that reliability and truth determinations are poor criteria to govern application of the Confrontation Clause and that a narrow understanding of the confrontation right best comports with the language and theory of the Clause); *see also* Margaret A. Berger, *The Deconstitutionalization of the Confrontation Clause: A Proposal for a Prosecutorial Restraint Model*, 76 Minn. L. Rev. 557 (1992) (arguing that treating hearsay statements created without governmental intrusion differently than hearsay statements procured by agents of the prosecution is more in line with the meaning and text of the Sixth Amendment).

89.   502 U.S. 346 (1992).

90.   *White*, 502 U.S. at 361 (Thomas, J., concurring).

91.   527 U.S. 116, 140–41 (1999) (Breyer, J., concurring) ("Viewed in light of its traditional purposes, the [*Roberts*] hearsay-based Confrontation Clause test . . . is both too narrow and too broad.").

92.   541 U.S. 36 (2004).

93.   *Crawford*, 541 U.S. at 38.

94.   *Id.* at 38–39.

when Crawford stabbed him.[95] Crawford was charged with assault and attempted murder in Washington state court.[96] Sylvia refused to testify at the trial, asserting spousal privilege.[97] Prosecutors invoked a state law hearsay exception and admitted a recording and transcript of Sylvia's statement over Crawford's objection.[98] The Washington Supreme Court found that Sylvia's statement "bore guarantees of trustworthiness," making it admissible under *Roberts*.[99]

The Supreme Court overruled *Roberts*[100] and announced a new framework for evaluating out-of-court statements under the Confrontation Clause.[101] The Court held that Sylvia's statements were inadmissible, because they were testimonial in nature.[102] The opinion, penned by Justice Scalia, was grounded in a historical analysis of confrontation and cross-examination practices in common law courts,[103] with a special focus on systems used in the colonies around the time of the founding.[104] Rather than just reflecting historical hearsay prohibitions, the Confrontation Clause "applies to 'witnesses' against the accused—in other words, those who 'bear testimony.'"[105] Citing the 1828 edition of Noah Webster's *An American Dictionary of the English Language*, the Court defined "testimony" as "[a] solemn declaration or affirmation made for the purpose of establishing or proving some fact."[106]

The Confrontation Clause, the Court concluded, "commands, not that evidence be reliable, but that reliability be assessed in a particular manner: by testing in the crucible of cross-examination."[107] And while "the Clause's ultimate goal is to ensure reliability of evidence . . . it is a procedural rather

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95.   *Id.* at 39–40.

96.   *Id.* at 40.

97.   *Id.*

98.   *Id.* at 40–41.

99.   *Id.* at 41–42 (citing State v. Crawford, 54 P.3d 656, 663 (Wash. 2002)).

100.   Although the *Crawford* majority did not *explicitly* overturn *Roberts*, the Court's analysis clearly indicates an abrogation of the doctrine. *See id.* at 62 ("The *Roberts* test . . . replaces the constitutionally prescribed method of assessing reliability with a wholly foreign one."). The Court explicitly acknowledged its abrogation of *Roberts* in *Whorton v. Bockting*, 549 U.S. 406, 413 (2007) ("While this appeal was pending, we issued our opinion in *Crawford*, in which we overruled *Roberts* . . . .").

101.   *Crawford*, 541 U.S. at 68–69.

102.   *Id.* at 68 ("In this case, the State admitted Sylvia's testimonial statement against petitioner, despite the fact that he had no opportunity to cross-examine her. That alone is sufficient to make out a violation of the Sixth Amendment.").

103.   *Id.* at 43–50 ("The common-law tradition is one of live testimony in court subject to adversarial testing . . . .").

104.   *See id.* at 48 ("Many declarations of rights adopted around the time of the Revolution guaranteed a right of confrontation.").

105.   *Id.* at 51.

106.   *Id.* (citing 2 Noah Webster, An American Dictionary of the English Language (New York, S. Converse 1828)).

107.   *Crawford*, 541 U.S. at 61.

than a substantive guarantee."[108] The *Crawford* Court thus held that the Confrontation Clause bars admission of testimonial statements of a witness who did not appear at trial unless he was unavailable to testify and the defendant previously had an opportunity for cross-examination.[109]

Although it was not explicit in *Crawford*, the Court subsequently ruled in *Whorton v. Bockting* that the Clause does not apply to nontestimonial out-of-court statements.[110] Thus, whether a statement is characterized as *testimonial* is critical. Testimonial statements fall within the Sixth Amendment's guarantees and require confrontation. Nontestimonial statements, in contrast, are subject only to the prohibitions of either state or federal rules of evidence.[111]

Today, prosecutors seeking to admit hearsay evidence over a defendant's assertion of her right to confrontation must show that the evidence is nontestimonial. If the prosecutor succeeds, the Clause poses no bar, and the court may admit the evidence if it falls within a traditional hearsay exception.[112] If the evidence is deemed *testimonial*, however, the defendant's right to confrontation attaches, and the evidence is generally barred[113] if the prosecutor is unable to produce the declarant in court.[114]

B.   *The Ambiguous Meaning of* Testimonial *Post-*Crawford

Although the *Crawford* Court unambiguously effected a major change in Confrontation Clause jurisprudence, it shed little light on what types of statements are testimonial. As Justice Scalia frankly acknowledged, "our refusal to articulate a comprehensive definition in this case will cause interim uncertainty."[115] Indeed, it has.[116]

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108.   *Id.*

109.   *Id.* at 53–54.

110.   549 U.S. 406, 420 (2007).

111.   *See* FISHER, *supra* note 84, at 674–78.

112.   *See supra* note 109 and accompanying text.

113.   *But see Crawford*, 541 U.S. at 59 ("Testimonial statements of witnesses absent from trial have been admitted only where the declarant is unavailable, and only where the defendant has had a prior opportunity to cross-examine."); Giles v. California, 554 U.S. 353, 353–54, 359 (2008) (holding that a defendant forfeits his right to confrontation where "the defendant engaged in conduct *designed* to prevent the witness from testifying").

114.   *Crawford*, 541 U.S. at 60 n.9 ("[W]hen the declarant appears for cross-examination at trial, the Confrontation Clause places no constraints at all on the use of his prior testimonial statements." (citing California v. Green, 399 U.S. 149, 162 (1970)).

115.   *Id.* at 68 n.10.

116.   State and federal courts have grappled with *Crawford*'s polysemy. *See, e.g.*, United States v. Cameron, 699 F.3d 621, 651 (1st Cir. 2012) (finding that child pornography trafficking tips passed to law enforcement were testimonial); United States v. McClain, 377 F.3d 219, 221 (2d Cir. 2004) (finding that coconspirators' guilty plea allocutions against defendants were testimonial). Indeed, lower courts analyzing or applying *Crawford* have sometimes reached wildly divergent results. *See* Robert P. Mosteller, Crawford v. Washington*: Encouraging and Ensuring the Confrontation of Witnesses*, 39 U. RICH. L. REV. 511 (2005) (describing conflicts among lower courts and collecting cases). Wary of these inconsistencies, this Note focuses almost exclusively on the Supreme Court's own interpretations and case law.

1.   The Primary Purpose Test

The first clue as to the meaning of *testimonial* came in *Davis v. Washington*,[117] where the Court introduced a test based on the "primary purpose" of the statement. The Court's opinion addressed two consolidated cases involving statements made by domestic abuse victims to police. In one case, the statements were made to a 911 emergency operator before police arrived.[118] In the other, the statements were made to police responding to a 911 call placed minutes before.[119] In the consolidated opinion, captioned *Davis v. Washington*, Justice Scalia wrote:

> Statements are nontestimonial when made in the course of police interrogation under circumstances objectively indicating that the *primary purpose* of the interrogation is to enable police assistance to meet an ongoing emergency. They are testimonial when the circumstances objectively indicate that there is no such ongoing emergency, and that the *primary purpose* of the interrogation is to establish or prove past events potentially relevant to later criminal prosecution.[120]

The declarant's primary purpose for making a statement has remained the cornerstone of Confrontation Clause analysis, informing all of the Court's subsequent cases.[121]

While the primary purpose test itself could have provided a workable standard, it soon became clear that the Court remained deeply divided about its application.[122] The most pertinent split of opinion for the purposes of this Note is between Justice Sotomayor and the late Justice Scalia.

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117.   547 U.S. 813 (2006).

118.   State v. Davis, 111 P.3d 844, 849 (Wash. 2005).

119.   Hammon v. State, 829 N.E.2d 444, 450 (Ind. 2005).

120.   *Davis*, 547 U.S. at 822 (emphasis added).

121.   This test is referenced in all of the Court's subsequent Confrontation Clause cases. *E.g.*, Ohio v. Clark, 135 S. Ct. 2173, 2180 (2015) ("[T]he question is whether, in light of all the circumstances, viewed objectively, the '*primary purpose*' of the conversation was to 'creat[e] an out-of-court substitute for trial testimony.'" (emphasis added) (quoting Michigan v. Bryant, 562 U.S. 344, 358 (2011))); Williams v. Illinois, 132 S. Ct. 2221, 2225 (2012) ("[T]he Cellmark report's *primary purpose* was to catch a dangerous rapist who was still at large, not to obtain evidence for use against petitioner . . . ." (emphasis added)); Michigan v. Bryant, 562 U.S. 344, 349 (2011) ("[T]he '*primary purpose* of the interrogation' was 'to enable police assistance to meet an ongoing emergency.'" (emphasis added) (quoting *Davis*, 547 U.S. at 822)).

122.   Justice Thomas has consistently rejected the primary purpose test. Instead, he believes that the testimonial nature of a statement is determined not by the purpose for which the statement was made, but by the *solemnity* with which it was made. *Davis*, 547 U.S. at 836 (Thomas, J., dissenting) ("[T]he plain terms of the 'testimony' definition we endorsed [in *Crawford*] necessarily require some degree of solemnity before a statement can be deemed 'testimonial.'"). Because Justice Thomas's views have been rejected by all the other Justices, they are not addressed in this Note. *See generally* Paul F. Rothstein, *Unwrapping the Box the Supreme Court Justices Have Gotten Themselves Into: Internal Confrontations Over Confronting the Confrontation Clause*, 58 How. L.J. 479 (2015) (noting that Justice Thomas has consistently filed concurring or dissenting opinions in Confrontation Clause cases based on his own rationales or theories).

Justice Sotomayor would look to the objective purpose of the statement, defined in reference to the surrounding circumstances. As she wrote for the Court in *Michigan v. Bryant*: "[T]he relevant inquiry is . . . the purpose that reasonable participants would have had, as ascertained from the individuals' statements and actions and the circumstances . . . ."[123]

Justice Scalia, in contrast, focused on the *declarant's* subjective intent: "[T]he declarant must intend the statement to be a solemn declaration . . . and he must make the statement with the understanding that it may be used to invoke the coercive machinery of the State against the accused."[124]

In its most recent Confrontation Clause case, the Court appeared to settle on the objective-circumstances iteration of the primary purpose test. *Ohio v. Clark* addressed whether statements indicating child abuse made by a three-year-old child to his teacher and a social worker were testimonial.[125] Concluding that they were not,[126] the Court relied heavily on language in *Davis* and *Bryant*, writing that "[i]n the end, the question is whether, in light of all the circumstances, viewed objectively, the 'primary purpose' of the conversation was to 'creat[e] an out-of-court substitute for trial testimony.'"[127]

The statements were nontestimonial in light of both the ongoing emergency involving suspected child abuse and the unlikelihood that the child declarant intended the statements to his teachers to be used by the police or prosecutors. "[C]onsidering all the relevant circumstances here, [the victim's] statements clearly were not made with the primary purpose of creating evidence for Clark's prosecution," the Court wrote.[128]

In Section III.B.1, this Note applies the primary purpose test to facial recognition evidence and concludes that, under either the objective or subjective primary purpose test, facial recognition technology is testimonial.

2.   Application to Forensic Laboratory Reports

The Court's Confrontation Clause jurisprudence surrounding forensic laboratory reports is particularly noteworthy in light of such reports' parallels to facial recognition evidence. In short, forensic laboratory reports containing an analyst's statement about the results of a scientific test *are* testimonial under *Crawford*, according to *Melendez-Diaz v. Massachusetts*[129] and *Bullcoming v. New Mexico*.[130]

In *Melendez-Diaz v. Massachusetts*, the Court addressed for the first time whether reports containing the results of a forensic analysis were testimonial

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123.   562 U.S. at 360.

124.   *Bryant*, 562 U.S. at 381 (Scalia, J., dissenting) (footnote omitted).

125.   135 S. Ct. at 2177–81.

126.   *Clark*, 135 S. Ct. at 2183.

127.   *Id.* at 2180 (quoting *Bryant*, 562 U.S. at 358).

128.   *Id.* at 2181.

129.   *See* 557 U.S. 305, 311 (2009).

130.   *See* 131 S. Ct. 2705, 2717 (2011).

statements requiring confrontation.[131] During Luis Melendez-Diaz's prose-cution on charges of cocaine distribution and trafficking, the State intro-duced bags of powder seized during arrest and "three 'certificates of analysis' showing the results of the forensic analysis performed on the seized sub-stances," which reported that the bags contained cocaine.[132] Analysts at the State Laboratory Institute of the Massachusetts Department of Public Health who had tested the bags swore to the content of the certificates before a notary public.[133] After a jury found Melendez-Diaz guilty, he appealed, argu-ing that admission of the certificates violated his Sixth Amendment right to confront the analysts who performed the tests.[134]

The *Melendez-Diaz* Court expressed little doubt that the documents at issue fell "within the 'core class of testimonial statements.'"[135] The so-called *certificates* were, in fact, *affidavits*, a category of documents explicitly covered under *Crawford*.[136] Justice Scalia noted that the certificates "are functionally identical to live, in-court testimony, doing 'precisely what a witness does on direct examination.'"[137] Because the certificates were testimonial, the labora-tory analysts were witnesses for the purposes of the Sixth Amendment, whom Melendez-Diaz was entitled to confront.[138]

Building on *Melendez-Diaz*, the Supreme Court again addressed the Confrontation Clause's requirements regarding a forensic lab report in *Bullcoming v. New Mexico*.[139] At Donald Bullcoming's trial for driving while intoxicated, the prosecution offered a forensic laboratory report certifying that his blood-alcohol concentration was well above the threshold for aggra-vated DWI.[140] Curtis Caylor, the analyst at the New Mexico Department of Health who tested Bullcoming's blood sample, had recently been placed on unpaid leave and did not testify at Bullcoming's trial.[141] Instead, the State attempted to introduce Caylor's finding "as a 'business record' during the testimony of . . . a[ ] [state laboratory] scientist who had neither observed nor reviewed Caylor's analysis."[142] The Supreme Court granted certiorari to

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131. 557 U.S. at 305.

132. *Melendez-Diaz*, 557 U.S. at 308.

133. *Id.*

134. *Id.* at 309.

135. *Id.* at 310 (quoting Crawford v. Washington, 541 U.S. 36, 51 (2004)).

136. *Id.* at 310.

137. *Id.* at 310–11 (quoting Davis v. Washington, 547 U.S. 813, 830 (2006)).

138. Justice Scalia did clarify one important limitation on the Court's holding, however: "[I]t is not the case[ ] that anyone whose testimony may be relevant in establishing the chain of custody, authenticity of the sample, or accuracy of the testing device, must appear in person as part of the prosecution's case." *Id.* at 311 n.1. The *Melendez-Diaz* Court noted that "gaps in the chain [of custody] normally go to the weight of the evidence rather than its admissibility." *Id.* (quoting United States v. Lott, 854 F.2d 244, 250 (7th Cir. 1988)).

139. 131 S. Ct. 2705 (2011).

140. *Bullcoming*, 131 S. Ct. at 2709.

141. *Id.* at 2712.

142. *Id.*

address whether the prosecution could introduce a testimonial forensic laboratory report through the in-court testimony of an analyst who did not sign the certification or personally perform or observe the test.[143]

Justice Ginsburg, writing for the 5–4 majority, confirmed that the report was testimonial and held that "[t]he accused's right is to be confronted with *the analyst who made the certification*, unless that analyst is unavailable at trial, and the accused had an opportunity, pretrial, to cross-examine that particular scientist."[144] Relying heavily on its analysis in *Melendez-Diaz*, the Supreme Court rejected New Mexico's argument that Caylor's status as "an 'independent scientis[t]' [acting] 'according to a non-adversarial public duty'" rendered the statements nontestimonial.[145]

Specifically, the Court held that "[a] document created solely for an 'evidentiary purpose' . . . made in aid of a police investigation, ranks as testimonial."[146] Thus, the New Mexico Supreme Court's view that Caylor was a mere scrivener[147] was in error. It made no difference, the Court ruled, that the analysts' findings in *Melendez-Diaz* were contained in certificates that were sworn to before a notary public[148] while Caylor's findings were not notarized. The Court thus determined that Bullcoming's Sixth Amendment rights had been violated.[149]

Bullcoming is particularly important to understanding how the Confrontation Clause applies to facial recognition technology for three reasons. First, the Court refined its analysis of forensic laboratory reports and explicitly rejected the argument that the laboratory analyst was a mere scrivener.[150] Second, the Court insisted that neither the perceived reliability of evidence[151] nor the prosecutorial inconvenience that confrontation creates should bear on resolution of the constitutional question.[152] Finally, the *Bullcoming* Court concluded that the "analyst who must testify is the person who signed the certificate,"[153] clarifying the process that prosecutors must use to satisfy a defendant's right to confrontation and preventing a possible end run around *Melendez-Diaz*.

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143. *Id.* at 2710.

144. *Id.* at 2709–10 (emphasis added).

145. *Id.* at 2717 (quoting Brief for Respondent at 32–33, *Bullcoming*, 131 S. Ct. 2705 (No. 09-10876), 2011 WL 108378, at *32–33).

146. *Id.* (citing Melendez-Diaz v. Massachusetts, 557 U.S. 305, 311 (2009)).

147. *Id.* at 2713.

148. *Id.* at 2717 (citing Melendez-Diaz v. Massachusetts, 557 U.S. 305, 310 (2009)).

149. *See id.* at 2719.

150. *Id.* at 2710, 2713.

151. *Id.* at 2715 ("[T]he comparative reliability of an analyst's testimonial report drawn from machine-produced data does not overcome the Sixth Amendment bar.").

152. *Id.* at 2717–18 ("The constitutional requirement, we reiterate, 'may not [be] disregard[ed] . . . at our convenience.'" (quoting Melendez-Diaz v. Massachusetts, 557 U.S. 305, 325 (2009)).

153. *Id.* at 2716 (quoting Melendez-Diaz v. Massachusetts, 557 U.S. 305, 334 (2009) (Kennedy, J., dissenting)).

Thus, *Melendez-Diaz* provides the basic rule: the Confrontation Clause applies to lab reports. And *Bullcoming* prescribes the presumptive means of introduction: prosecutors must produce the forensic analyst who conducted the particular test.

The Court's most recent forensic laboratory report case, however, muddied the waters. In *Williams v. Illinois*,[154] the police sent a rape kit taken from a victim to Cellmark, an outside laboratory. Cellmark returned a male DNA profile[155] contained in a report signed by two analysts.[156] Sandra Lambatos, a forensic analyst with the Illinois State Police, subsequently used the profile produced by Cellmark to search a state DNA database.[157] The electronic database returned a match to Sandy Williams, who had given a sample of blood when he was arrested on unrelated charges in 2000.[158] Before Lambatos's search, police had not identified a suspect.[159]

Like the report in *Bullcoming*, the Cellmark analysis described the relevant samples, test methodology, and results and included the signatures of the laboratory officials who conducted the test.[160] Unlike *Melendez-Diaz* or *Bullcoming*, however, the prosecution did not attempt to admit the report into evidence.[161] Instead, Lambatos testified as an expert, stating that she used the Cellmark report to formulate her independent opinion that Williams's DNA matched that of the DNA profile contained within the report.[162]

The *Williams* case resulted in a total of four separate opinions, advocating three conflicting viewpoints.[163] The plurality opinion, penned by Justice Alito, held that there was no Confrontation Clause violation, offering two important rationales: (1) all references to the report "either were not hearsay or were not offered for the truth of the matter asserted,"[164] and (2) even if it had been introduced for its truth, the Cellmark report was not testimonial

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154.   132 S. Ct. 2221, 2227 (2012).

155.   *Williams*, 132 S. Ct. at 2230.

156.   *Id.* at 2266–67 (Thomas, J., dissenting).

157.   *Id.* at 2229 (plurality opinion).

158.   *Id.*

159.   *See id.* (noting that Williams, the only suspect, was identified and indicted following the results of Lambatos's search).

160.   *Id.* at 2267 (Kagan, J., dissenting).

161.   *Compare id.* at 2230 (plurality opinion), *with* Bullcoming v. New Mexico, 131 S. Ct. 2705, 2719 (2011), *and* Melendez-Diaz v. Massachusetts, 557 U.S. 305, 309 (2009).

162.   *Williams*, 132 S. Ct. at 2230 ("Lambatos confirmed that she did not conduct or observe any of the testing on the vaginal swabs, and that her testimony relied on the DNA profile produced by Cellmark.").

163.   Chief Justice Roberts, Justice Kennedy, and Justice Breyer joined the plurality. Justice Brennan wrote a concurring opinion, but joined Justice Alito's opinion in full. Justice Thomas concurred in the judgment but offered a vastly different rationale for his result. Justice Kagan penned the dissent, which was joined by Justices Scalia, Ginsburg, and Sotomayor. *Id.* at 2227.

164.   *Id.* at 2224.

because it lacked "the primary purpose of accusing *a targeted individual* of engaging in criminal conduct."[165]

In regard to the primary purpose question, the plurality stated that the reports were nontestimonial, placing significant weight on the fact that the Cellmark technicians only produced an anonymous DNA profile, rather than identifying a particular suspect.[166] According to Justice Alito, the primary purpose of the state crime lab in sending the sample to Cellmark was to "catch a dangerous rapist who was still at large,"[167] rather than to obtain evidence for trial. "Similarly, no one at Cellmark could have possibly known that the profile that it produced would turn out to inculpate petitioner—or for that matter, anyone whose DNA profile was in the law enforcement database."[168] These differences, bolstered by the presumed reliability of the evidence,[169] led the plurality to conclude that the report fell outside the protection of the Confrontation Clause.[170]

Writing a sternly worded opinion for the four-justice dissent, Justice Kagan was quick to attack the precedential value of the plurality's holding: "I call Justice Alito's opinion 'the plurality,' because that is the conventional term for it. But in all except its disposition, his opinion is a dissent: Five Justices specifically reject every aspect of its reasoning and every paragraph of its explication."[171]

Justice Kagan went on to reject the plurality's targeted individual test as contrary to the Confrontation Clause's text, history, and precedents.[172] Indeed, *Melendez-Diaz* had already rejected the argument that a laboratory analyst's statement must be accusatory in order to be testimonial:[173] "None of our cases has ever suggested that . . . the statement must be meant to accuse a previously identified individual . . . ."[174]

Finally, the dissent lamented the confusion caused by the plurality: "What comes out of four Justices' desire to limit *Melendez-Diaz* and *Bullcoming* in whatever way possible, combined with one Justice's one-justice view of those holdings, is—to be frank—who knows what."[175] Kagan concluded that "until a majority of this Court reverses or confines [*Melendez-Diaz* and *Bullcoming*], I would understand them as continuing to

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165. *Id.* at 2225 (emphasis added). This second rationale is discussed in Section II.C.

166. *Id.* at 2243–44.

167. *Id.* at 2243.

168. *Id.* at 2243–44.

169. *See id.* at 2244 (noting the lack of "incentive to produce anything other than a scientifically sound and reliable profile").

170. *Id.*

171. *Id.* at 2265 (Kagan, J., dissenting).

172. *Id.* at 2273 (citing Davis v. Washington, 547 U.S. 813, 822 (2006)).

173. *Id.* at 2274; *see also infra* note 223 and accompanying text.

174. *Williams*, 132 S. Ct. at 2274 (Kagan, J., dissenting).

175. *Id.* at 2277.

govern, in every particular, the admission of forensic evidence."[176] The precedential effect of *Williams* has thus generated substantial confusion among lower courts,[177] and some have even disregarded the opinion entirely.[178]

C.   *The Hearsay Requirement*

Embedded in the testimonial analysis is an additional requirement: the evidence in question must be hearsay. Although the *Crawford* Court did not treat the issue at length, the Court "explicitly noted that its exclusionary rule does not apply when testimonial statements are introduced for some purpose other than establishing 'the truth of the matter asserted.'"[179] But, despite the limited discussion of the hearsay prerequisite in *Crawford*, numerous scholars and the Court's subsequent decisions confirm that the Confrontation Clause *only* applies to hearsay evidence—that is, evidence offered to prove the truth of the matter asserted therein.[180]

The Court grappled with the hearsay requirement in *Williams v. Illinois*.[181] As described in Section II.B.2 above, the prosecution in *Williams* did not attempt to admit the DNA report into evidence. Instead, it called an expert to testify. Lambatos stated that she used the Cellmark lab report to formulate her independent opinion that Williams's DNA matched that of the DNA profile contained within the report.[182] She also testified about the general process of generating DNA profiles from forensic samples and asserted that Cellmark was an "accredited crime lab" that regularly conducted testing on samples sent by state police.[183] Critically, "Lambatos confirmed

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176.   *Id.*

177.   *See, e.g.*, United States v. Turner, 709 F.3d 1187, 1189 (7th Cir. 2013) ("[T]he divergent analyses and conclusions of the [*Williams*] plurality and dissent sow confusion as to precisely what limitations the Confrontation Clause may impose when an expert witness testifies about the results of testing performed by another analyst . . . ."); State v. Michaels, 95 A.3d 648, 666 (N.J. 2014) ("We find *Williams*'s force, as precedent, at best unclear.").

178.   *E.g.*, State v. Norton, 117 A.3d 1055, 1071 (Md. 2015) (noting that some state supreme courts "have declined to apply *Williams*"); Jenkins v. United States, 75 A.3d 174, 184 (D.C. 2013) ("The Supreme Court's most recent Confrontation Clause case has not provided any clarity."); *id.* at 189 ("We therefore conclude that *Williams* produces no new rule of law . . . .").

179.   Jennifer Mnookin & David Kaye, *Confronting Science: Expert Evidence and the Confrontation Clause*, 2012 Sup. Ct. Rev. 99, 113 (2013) (quoting People v. Williams, 939 N.E.2d 268, 277 (Ill. 2010), *aff'd* Williams v. Illinois, 132 S. Ct. 2221 (2012)). Surprisingly, the *Crawford* Court's only mention of this crucial point was contained parenthetically in a footnote: "The Clause also does not bar the use of testimonial statements for purposes other than establishing the truth of the matter asserted." Crawford v. Washington, 541 U.S. 36, 60 n.9 (2004) (citation omitted).

180.   *See, e.g.*, 12 Federal Procedure, Lawyers Edition § 33:351 (West 2010) ("[T]he Confrontation Clause does not require exclusion of all out-of-court statements, and it does not affect the admissibility of statements which are not hearsay, such as out-of-court statements not offered as truth of the matter asserted.").

181.   132 S. Ct. at 2221.

182.   *Williams*, 132 S. Ct. at 2230.

183.   *Id.*

that she did not conduct or observe any of the testing on the vaginal swabs, and that her testimony relied on the DNA profile produced by Cellmark."[184]

Regarding hearsay, the plurality concluded that Lambatos's testimony was not offered to prove that the matching DNA profile was found in the vaginal swabs taken from the victim. "Rather, that fact was a mere premise of the prosecutor's question[ing], and Lambatos simply assumed that premise to be true when she gave her answer indicating that there was a match between the two DNA profiles."[185] Other evidence—such as the fact that the Cellmark profile matched Williams, whom the victim identified as her attacker—not Lambatos's testimony, provided the necessary inferences about chain of custody.[186]

The dissent argued that the prosecution *had* offered the Cellmark report for its truth by implicitly asking the jury to assume its veracity when assessing Lambatos's opinion. When a witness repeats an out-of-court statement as the basis for a conclusion, Kagan wrote, the conclusion's utility depends on the statement's truth.[187] Bringing the number of Justices in support of the dissent's reasoning to five, Justice Thomas wrote that "[t]here is no meaningful distinction between disclosing an out-of-court statement so that the factfinder may evaluate the expert's opinion and disclosing that statement for its truth."[188]

The discussion of hearsay in the *Williams* case offers two major insights that bear directly on this Note. First, all nine Justices agreed that the Confrontation Clause only applies when testimonial statements are *offered for the truth of the matter asserted*—that is, when they are hearsay.[189] Thus, any cogent Confrontation Clause analysis must consider whether the evidence is hearsay. This Note addresses hearsay as a preliminary question in Section III.A, arguing that all facial recognition evidence likely to be used in court today constitutes hearsay. This analysis paves the way for this Note's conclusion that facial recognition evidence is testimonial in nature and thus falls within the protection of the Confrontation Clause. Second, the non-hearsay purpose proposed by the plurality in *Williams*—namely, forming the basis for an expert opinion—has not been foreclosed by existing Supreme Court precedent. This Note concludes in Section III.A.2, however, that *Williams*'s precedential value in this regard is limited and, in any event, is unlikely to be

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184.   *Id.*

185.   *Id.* at 2236.

186.   *Id.* at 2238.

187.   *Id.* at 2268–69 (Kagan, J., dissenting).

188.   *Id.* at 2257 (Thomas, J., concurring).

189.   *Id.* at 2235 (plurality opinion) ("[T]he Confrontation Clause 'does not bar the use of testimonial statements for purposes other than establishing the truth of the matter asserted.'" (quoting Crawford v. Washington, 541 U.S. 36, 59–60 n.9 (2004)); *id.* at 2245 (Breyer, J., concurring) (stating that the Clause "concerns out-of-court statements admitted for their truth"); *id.* at 2255 (Thomas, J., concurring) (quoting the same portion of *Crawford* as the plurality); *id.* at 2268 (Kagan, J., dissenting) (quoting the same portion of *Crawford* as the plurality).

invoked by prosecutors seeking to admit facial recognition evidence because of the technology's unique features.

III.   Facial Recognition Evidence Requires Confrontation

This Part argues that, in light of the Supreme Court's precedents post-*Crawford*, the Confrontation Clause will apply to most facial recognition evidence offered against criminal defendants because such evidence is almost always hearsay and is testimonial in nature. As a result, a defendant's right of confrontation will have to be satisfied in order for such evidence to be introduced in court. Section III.A demonstrates that, under the circumstances most likely to be seen in court, facial recognition evidence contains hearsay. Section III.B shows that facial recognition evidence is testimonial. Section III.C briefly reviews the implications of testimonial status on the admissibility of facial recognition evidence.

A.   *Facial Recognition Evidence is Hearsay*

In order to trigger *Crawford*'s testimonial analysis, a court must deem the evidence hearsay, which requires a determination of whether a statement of a person is offered for its truth. The five basic units of a facial recognition test—described in Section I.C above—thus drive the first step of the Confrontation Clause inquiry. All facial recognition evidence likely to be used in court today constitutes hearsay because it (1) contains the statements of the laboratory technician who conducted the analysis and (2) will almost always be offered for the purpose of proving the truth of the matter asserted therein.

1.   Facial Recognition Evidence Will Usually Contain Statements of the Laboratory Technician Who Conducted the Analysis

Though facial recognition evidence operates behind a scrim of automation, the hearsay rules require us to mind the man or woman behind the curtain. Indeed, for the overwhelming majority of facial recognition systems, the data-collection and decision stages require the incorporation of human statements—that is, the inputs of actual people. The presence of these *human* statements, when offered to prove their truth, render the laboratory reports hearsay.[190]

To see why this is so, it is useful to look at a small subcategory of facial recognition systems that arguably do *not* contain human statements. Fully automated facial recognition systems automatically extract facial data from live-streaming video and conduct a comparison and matching analysis in

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190.   See Section II.C above for a discussion of the role of hearsay in the Confrontation Clause analysis, and Section III.A.2 below for a discussion of how facial recognition evidence will almost always be offered for the purpose of proving the truth of the matter asserted.

real time.[191] Fully automated systems likely fall outside the scope of the Confrontation Clause because such purely machine-generated information may not constitute the statement of a *person*, as is required to constitute hearsay.

This reasoning, which draws on the definition of hearsay contained in Federal Rule of Evidence 801, was summarized most concisely by the Fourth Circuit Court of Appeals:

> [Hearsay] is understood to be "a *statement*, other than the one made by the *declarant* while testifying at the trial or hearing, offered in evidence to prove the truth of the matter asserted." "A declarant is a *person* who makes a statement." And a "statement" . . . is an "(1) oral or written assertion or (2) nonverbal conduct of a *person*, if it is intended by the person as an assertion." Only a *person* may be a declarant and make a statement. Accordingly, "nothing 'said' by a machine . . . is [hearsay]."[192]

The Fourth Circuit went on to hold that "[a]ny concerns about the reliability of such machine-generated information is [sic] addressed through the process of authentication not by hearsay or Confrontation Clause analysis."[193]

The rule that a statement must be made by a person in order to constitute hearsay is fundamental to this Note's Confrontation Clause analysis. When human input is involved in the facial recognition process, this prerequisite to hearsay status is satisfied.

Take, for example, the manipulation of photo or video evidence at the data-collection stage.[194] When an automated system processes data collected from a constantly running video feed, absent human input, it is the computer itself that generates a statement. Using the Fourth Circuit's reasoning, such "[e]vidence is computer-generated, and therefore not hearsay, if it 'involve[s] so little intervention by humans in [its] generation as to leave no doubt that [it is] wholly machine-generated for all practical purposes.'"[195]

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191.   *See, e.g.*, *supra* Section I.C.

192.   United States v. Washington, 498 F.3d 225, 231 (4th Cir. 2007), *cert. denied*, 557 U.S. 934 (2009) (second omission in original) (citations omitted) (first quoting Fed. R. Evid. 801(a)–(c); then quoting 4 Christopher B. Mueller & Laird C. Kirkpatrick, Federal Evidence § 380 (2d ed. 1994)).

193.   *Washington*, 498 F.3d at 231.

194.   *See, e.g.*, Petrov, *supra* note 21, at 13–14 (describing a software application that allows data manipulation on the "front end for forensic searches").

195.   Erick J. Poorbaugh, Note, *Interfacing Your Accuser: Computerized Evidence and the Confrontation Clause Following* Melendez-Diaz, 23 Regent U. L. Rev. 213, 222–23 (2010) (quoting United States v. Lamons, 532 F.3d 1251, 1263 n.23 (11th Cir. 2008)); *see also* Susan E.E.B. Sherman, *"I Object . . . It's Hearsay": Hearsay and Evidence in the Computer Emergency Response Team (CERT)*, Sans (Oct. 20, 2004), https://www.sans.org/reading-room/whitepapers/legal/hearsay-evidence-computer-emergency-response-team-cert-1541 [https://perma.cc/A6W4-W3V7] ("Computer-generated records contain the output of computer instructions without manual intervention. This fails the hearsay definition . . . because in computer-generated records, a 'person' is not making an assertion. . . . On the other hand, computer-stored information can be based on human generated contents. . . . If the person that entered the information does not testify . . . the computer-stored information is considered hearsay.").

In contrast, when a laboratory technician participates in the data-collection process—either by inputting the photo or video evidence to be processed or by enhancing the facial image to ensure accurate identification—this additional human interaction with the computer affects the result.[196] Under these circumstances, it is the forensic technician's input that gives life to the computer's otherwise-automated programming and—in no small sense—determines the result that is generated.[197] In such a case, "[t]he test results, although computer-generated, [are] produced with the assistance and input of the technicians and must therefore be attributed to the technicians."[198]

Similarly, when a laboratory technician verifies the results of a facial recognition analysis, she inserts her statements into the process. A unique feature of facial recognition analysis is that the results can, in most instances, be verified by a technician. Indeed, some facial recognition systems require human verification.[199] While a technician cannot, without the aid of scientific techniques and devices, determine whether a particular blood sample contains alcohol,[200] the same technician may conduct at least a basic visual analysis to confirm the results of a facial recognition match. Such analysis provides another possible entry point for human statements into the facial recognition process.

In sum, certain facial recognition systems may be categorically beyond the reach of the Confrontation Clause because they do not contain human statements.[201] But, those facial recognition systems within the scope of this Note do contain human statements made out of court. Thus, if facial recognition evidence is offered by a prosecutor to prove the truth of the matter

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196.   *See* Introna & Nissenbaum, *supra* note 65 (noting that reliance on human employees can affect the outcome of false positives).

197.   *Cf. Washington*, 498 F.3d at 233 (Michael, J., dissenting) ("In light of the significant role that the technician plays in conducting the test and generating accurate results, the results cannot be attributed solely to the machine.").

198.   *Id.* at 232–33.

199.   For a visual representation of this process, see Anil K. Jain et al., Mich. State Univ. Biometrics Research Grp., Face Recognition: Some Challenges in Forensics, Biometrics Research Group (2011), http://biometrics.cse.msu.edu/Presentations/JainKlarePark_Forensic FR_IEEE_FG.pdf [perma.cc/6LGV-UXAC].

200.   *Washington*, 498 F.3d at 230 ("The 'statement' that Washington's blood contained PCP and alcohol is a conclusion drawn only from the machines' data, and its source was independent of human observation or reporting. Only the machine, through its diagnostic and technical process, could provide facts about the chemical composition of Washington's blood.").

201.   Admittedly, there is a colorable argument that the algorithm contains the statements of its programmer. *See* Poorbaugh, *supra* note 195, at 226 ("A . . . significant argument for distinguishing computer-generated evidence from other evidence generated by inanimate objects is the fact that computers are programmed by humans."). This Note adopts the Fourth Circuit's position that fully automated facial recognition systems do not contain hearsay statements. The Supreme Court's refusal to hear *Washington* shortly after it decided *Bullcoming* may indicate support of this perspective. *See* Washington v. United States, 557 U.S. 934 (2009). Confrontation Clause challenges to the admissibility of evidence produced by automated facial recognition systems would have to refute the reasoning of *Washington*.

asserted in those statements—that is, the defendant is the person that the facial recognition system identified from the photo or video input—then it is hearsay.[202] And, if the facial recognition evidence is testimonial, the Confrontation Clause will apply.

2.   Facial Recognition Evidence Will Almost Always Be Offered for Its Truth

In order to be hearsay, an out-of-court statement must be offered to prove the truth of the matter asserted therein.[203] Facial recognition evidence will, in almost any conceivable case today, be offered in this manner. This is because, first, the primary purpose of facial recognition evidence (and thus the most common purpose for which it would be offered in a criminal prosecution) will usually be to prove that the defendant is the individual pictured in an underlying photo or video.[204] And, second, the evidence itself will usually purport to show that the defendant is the person pictured in an underlying photo or video, a classic truth-of-the-matter-asserted purpose.

The *Williams* plurality introduced the possibility, however, that a laboratory report is not offered for its truth when the substance of a lab report is merely relied upon by an expert witness to form her own opinion.[205] Such a rule, if valid, could conceivably bring facial recognition evidence outside the scope of Confrontation Clause protection if the prosecution does not introduce the evidence, but instead introduces its substance through the testimony of a witness. There are two reasons to believe, however, that the rationale of the *Williams* plurality will not apply to facial recognition evidence.

First, and most obviously, a majority of the Court rejected the plurality's rationale in this regard.[206] Five justices recognized that "the supposed distinction between admission for the truth and admission in support of the expert's opinion is non-existent when the statement supports the opinion only if true."[207] Thus, the *Williams* decision *does not*, as a matter of binding precedent, allow the prosecution to sneak the evidence in using another expert's testimony.[208] Indeed, if the plurality's analysis were the rule, the

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202.   For a discussion of why facial recognition data will almost always be offered for its truth, see Section III.A.2 below.

203.   Fisher, *supra* note 84 at 379.

204.   One possible non-hearsay use, however, would be to explain the course of an investigation—for example, to show why the police followed a particular lead or procedures with regards to a criminal defendant. *See, e.g.*, State v. Batchelor, 690 S.E.2d 53, 56 (N.C. Ct. App. 2010) (holding that an officer's statements were offered to explain his presence at a particular location, rather than to prove that the defendant was a drug dealer).

205.   *See* discussion *supra*, Section II.C.

206.   *See supra* notes 187–188 and accompanying text.

207.   Richard D. Friedman, *Thoughts on Williams, Part I: Reasons to Think the Impact May Be Limited*, Confrontation Blog (June 19, 2012, 7:52 AM), http://confrontationright.blog spot.com/2012/06/thoughts-on-williams-part-i-reasons-to.html [http://perma.cc/8SDL-AJBE].

208.   *See infra* note 229 and accompanying text.

"Clause would be rendered a virtual nullity: A witness could make a testimonial statement in writing out of court, and then another witness could testify at trial as to the substance of the statement."[209]

For this reason, courts have divided on whether to apply the plurality's reasoning.[210] Several courts have declined to apply *Williams* altogether, agreeing with Justice Kagan that *Melendez-Diaz* and *Bullcoming* provide the controlling standard.[211] Indeed, the opinions in *Williams* indicate that if the question were cleanly presented, the Supreme Court would likely find that such a statement is hearsay when relied upon by an expert witness.

Second, the question of whether the Supreme Court will embrace the expert-testimony work-around may prove largely academic, however, because of a key difference between facial recognition evidence and other forensic laboratory tests: facial recognition tests are much more readily replicable.

Consider for a moment the multiple places, described in Section I.C above, where human statements can be inserted into the facial recognition testing process. A laboratory technician will be required to insert the photo or image into the facial recognition system. The technician may have to optimize the photo or video for face detection. The technician may have to set distance values for the matching algorithm or use visual confirmation to verify the results. And it is highly likely that a single analyst would perform all of these functions.[212]

An expert witness called to testify about facial recognition technology could easily perform these functions using the same digital file and in a relatively short period of time.[213] Therefore, unlike a DNA test, where the process requires both the original sample[214] and an onerous multi-step analysis,[215] the expert who is called to testify on facial recognition evidence

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209.   Brief for Richard D. Friedman as Amicus Curiae in Support of Petitioner at 5, Williams v. Illinois, 132 S. Ct. 2221 (2012) (No. 10-8505).

210.   *Compare* United States v. Ignasiak, 667 F.3d 1217, 1229–35 (11th Cir. 2012), *and* United States v. Moore, 651 F.3d 30, 70–72 (D.C. Cir. 2011) *with* Marshall v. People, 309 P.3d 943, 946–48 (Colo. 2013), *and* State v. Michaels, 95 A.3d 648, 651 (N.J. 2014). This divide has spawned three petitions for certiorari. United States v. Katso, 74 M.J. 273 (C.A.A.F. 2015), *petition for cert. filed*, No. 15-405 (U.S. Oct. 1, 2015); State v. Brewington, 743 S.E.2d 626 (N.C. 2013), *cert. denied*, 134 S. Ct. 2660 (2014); State v. Griep, 863 N.W.2d 567 (Wis. 2015), *cert. denied*, 136 S.Ct. 793 (2016).

211.   *See supra* note 178.

212.   *See infra* notes 247–249 and accompanying text; *supra* Section I.C.

213.   *See* John Dowden, *Facial Recognition: The Most "Natural" Forensic Technology*, Evidence Tech. Mag., http://www.evidencemagazine.com/index.php?option=com_content&task=view&id=1344 [http://perma.cc/5TUY-AADY].

214.   Since the photos and videos are stored and analyzed digitally, the original photograph is not necessary. The Supreme Court's Confrontation Clause jurisprudence indicates that the use of a digital copy of the file would go to the new test's weight, not its admissibility. Melendez-Diaz v. Massachusetts, 557 U.S. 305, 311 n.1 (2009).

215.   Although some machines can analyze DNA in as little as 90 minutes, most crime labs use a process that is more time-intensive. *See* Ben Lockhart, *New DNA Testing Could Take Hours, Not Weeks*, Deseret News (Mar. 24, 2013, 11:00 AM), http://www.deseretnews.com/

could, with little extra effort, create a new statement—her own test results—that would be offered for its truth. This procedure would also simultaneously satisfy the defendant's Confrontation Clause rights by forcing the declarant herself to appear in court for cross-examination.

Because of the ease of retesting and the need to call an expert anyway, the prosecution would thus save few to no resources by having the expert rely on another's opinion, rather than simply conducting the facial recognition analysis again herself. The enhanced credibility of an expert with personal knowledge of the instant case would also incentivize prosecutors to use this method.

The Confrontation Clause would continue to operate by allowing the defendant to cross-examine the testifying expert witness, identify flaws in the expert's process, and expose a history of mistakes that could be evaluated by the jury. In short, regardless of whether the introduction of a testimonial statement via an expert witness is a viable option for prosecutors, they are likely to call a witness who will offer his or her own statement for its truth, simultaneously satisfying the defendant's Confrontation Clause rights. Therefore, as a practical matter, facial recognition evidence will rarely be offered for a purpose other than to prove the truth of the matter asserted therein.

B.   *Facial Recognition Evidence Is Testimonial*

Facial recognition evidence is testimonial under the *Crawford* framework for two reasons.[216] First, the evidence satisfies the primary purpose test[217] as evidence prepared for prosecution. Second, the Supreme Court's basis for finding laboratory reports testimonial in *Melendez-Diaz* and *Bullcoming* applies with equal force to facial recognition evidence.

1.   Primary Purpose Test

The Supreme Court has repeatedly affirmed that statements made "with the primary purpose of creating evidence" are testimonial.[218] Facial recognition evidence is thus properly classified as testimonial because the primary purpose of the evidence is to identify the perpetrator of a crime *for the purposes of prosecution*.

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article/865576611/New-DNA-testing-could-take-hours-not-weeks.html [http://perma.cc/5ZP4-FL7K].

216.   This analysis ignores circumstances where facial recognition test results are contained in formalized affidavits, which would clearly rank as testimonial under *Crawford*. *See supra* notes 133–138 and accompanying text. Such affidavits are "functionally identical to live, in-court testimony, doing 'precisely what a witness does on direct examination.'" *Melendez-Diaz*, 557 U.S. at 310–11 (quoting Davis v. Washington, 547 U.S. 813, 830 (2006)).

217.   For a discussion of the Court's application of the primary purpose test, see Section II.B.1 above.

218.   Ohio v. Clark, 135 S. Ct. 2173, 2181 (2015).

This interpretation accords with both the subjective and objective methods of interpreting the primary purpose test advanced by Justices Scalia and Sotomayor, respectively, in *Michigan v. Bryant*.[219] When a technician processes a piece of photo or video evidence using a facial recognition program, she is clearly *subjectively* aware that the evidence will likely be used in trial. The context of submitting evidence to a crime laboratory or other law enforcement investigatory unit for analysis necessarily contemplates its use in prosecution. This same reasoning would satisfy the objective inquiry: the results of such a test are "made under circumstances which would lead an *objective* witness reasonably to believe that the statement would be available for use at a later trial."[220] The test results are documents prepared for an "evidentiary purpose," and are thus testimonial.[221]

The plurality's opinion in *Williams* does not change this result. According to the plurality, a laboratory report is nontestimonial if it is "not prepared for the primary purpose of accusing a targeted individual."[222] The plurality emphasized the fact that the Cellmark technicians only produced an anonymous DNA profile, rather than identifying a particular suspect.[223] Therefore, according to the plurality, the primary purpose of the state crime lab in sending the sample to Cellmark was to "catch a dangerous rapist who was still at large,"[224] rather than to obtain evidence for trial.

Facial recognition evidence is readily distinguishable from the circumstance relied upon by the *Williams* plurality, however. This is because, by the time a facial recognition analysis is conducted, the police have targeted an individual: the person pictured in the photo or video. An analyst who processes the facial recognition evidence will have seen the face of the person who will be prosecuted. The act of confirming the legal identity of this person does not change the fact that the analyst already knows who will be accused. This is different from the DNA context, where the analyst could not derive meaningful identification information from her own sensory observation of the sample, which in many cases will be nothing more than a small quantity of hair, blood, or semen. By the time the police have transmitted an image to the laboratory for facial recognition, the police inquiry should be focused enough to satisfy the *Williams* plurality.[225]

At a minimum, this feature of facial recognition technology undercuts one of the key rationales offered by the plurality: the near impossibility of

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219.   *See supra* notes 123–124 and accompanying text.

220.   Crawford v. Washington, 541 U.S. 36, 52 (2004) (emphasis added).

221.   *See Melendez-Diaz*, 557 U.S. at 310–11.

222.   Williams v. Illinois, 132 S. Ct. 2221, 2243 (2012).

223.   *Id.* at 2243–44.

224.   *Id.* at 2243.

225.   *See* Richard D. Friedman, *Confrontation and Forensic Laboratory Reports, Round Four*, 45 Tex. Tech. L. Rev. 51, 59–61 (2012) [hereinafter Friedman, *Confrontation and Lab Reports*] (discussing that knowledge about the actual individual may be sufficiently "targeted" even though in *Williams*, the fact that the lab workers could not have known that the DNA sample would inculpate someone in the database was not sufficiently accusatory).

fraud where the technician could not have known the identity of the defendant. The *Williams* plurality stressed that "no one at Cellmark could have possibly known that the profile that it produced would turn out to inculpate petitioner . . . . Under these circumstances, there was no 'prospect of fabrication' and no incentive to produce anything other than a scientifically sound and reliable profile."[226] But the same cannot be said about an analyst who is asked to conduct a facial recognition analysis on a photo or video. If the photo depicts the analyst's mother committing a crime, for example, the analyst may well have incentive to fabricate or distort the results.

Moreover, the *Williams* plurality's rationale clearly does not apply in cases where facial recognition technology is used to distinguish between photos of two similar-looking, known suspects. The example in this Note's Introduction is illustrative: imagine that the prosecution had used the technology to compare mugshots of both Darrin and Damien Fernandez to the hypothetical security camera footage. The identities of both Fernandez brothers would be known to the analysts in this situation. It remains to be seen how often such uses will arise, but it stands to reason that the technology will be deployed to distinguish between known defendants with some frequency, given the technology's marked superiority to the human eye.[227]

In any event, under the Supreme Court's own precedents, the plurality in *Williams* is "of questionable precedential value, largely because a majority of the Court expressly disagreed with the rationale of the plurality."[228] Even if the plurality's test did apply to facial recognition technology, the test itself is subject to substantial criticism. Scholars and the dissenting justices in *Williams* have attacked the test as flying in the face the Court's precedents and the text of the Clause itself.[229] For these reasons, as Justice Kagan indicated in her *Williams* dissent,[230] *Melendez-Diaz* and *Bullcoming* likely provide the proper doctrinal analysis.[231] The next section of this Note thus applies this precedent to facial recognition evidence, which further bolsters the conclusion that such evidence is testimonial.

2. Specific Application of *Melendez-Diaz* and *Bullcoming*

The Court's key Confrontation Clause opinions addressing forensic laboratory reports—*Melendez-Diaz* and *Bullcoming*—preclude four additional possible objections to the testimonial nature of facial recognition evidence: the accusatory-witness argument, the neutral-scientific-testing argument, the increased-prosecutorial-burden argument, and the reliability argument.

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226. *Williams*, 132 S. Ct. at 2243–44 (quoting Michigan v. Bryant, 562 U.S. 344, 359 (2011)).

227. *See* Lu & Tang, *supra* note 19.

228. *See* Seminole Tribe of Fla. v. Florida, 517 U.S. 44, 66 (1996) (citing Nichols v. United States, 511 U.S. 738, 746 (1994)).

229. *See, e.g.*, Friedman, *Confrontation and Lab Reports*, *supra* note 225, at 58–60 (attacking the targeted individual test on these grounds).

230. *See supra* notes 171–172 and accompanying text.

231. *See supra,* note 176 and accompanying text.

In *Melendez-Diaz*, the Court explicitly rebuffed three major arguments that forensic testimony is not testimonial.[232] First, it rejected the State's contention that the analysts are not "accusatory" witnesses, and therefore not subject to the Confrontation Clause. According to the State, the analysts were not directly accusing Melendez-Diaz of wrongdoing, and "their testimony [wa]s inculpatory only when taken together with other evidence linking petitioner to the contraband."[233] The Court flatly rejected this argument:

> The text of the Amendment contemplates two classes of witnesses—those against the defendant and those in his favor. The prosecution *must* produce the former; the defendant *may* call the latter. Contrary to respondent's assertion, there is not a third category of witnesses, helpful to the prosecution, but somehow immune from confrontation.[234]

Thus, it is no objection to the testimonial nature of facial recognition evidence to say that the photograph or video depicting the defendant, rather than the facial recognition analysis, is doing the accusing. The fact that a human technician was required to generate the test result creates a witness whom the defendant is entitled to confront.

Second, the *Melendez-Diaz* Court also dismissed the idea that the analysts' certifications should not be considered under *Crawford*'s testimonial framework because they are the "resul[t] of neutral, scientific testing."[235] The Court acknowledged that "there are other ways—and in some cases better ways—to challenge or verify the results of a forensic test. But the Constitution guarantees one way: confrontation. We do not have license to suspend the Confrontation Clause when a preferable trial strategy is available."[236] The Court reiterated that, because the Clause is a procedural—not substantive—guarantee, the reliability of the evidence does not bear on whether confrontation is required.[237] This ensures that, as facial recognition technology continues to improve in terms of algorithm effectiveness, facial-print-processing capacity, and database size, the defendant's right to confrontation will remain. This will prove critically important as facial recognition technology gains acceptance in courtrooms.

Additionally, the *Melendez-Diaz* Court confirmed that any increased prosecutorial burden resulting from confrontation has no bearing on the proper constitutional analysis. "The Confrontation Clause may make the prosecution of criminals more burdensome, but that is equally true of the

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232. Melendez-Diaz v. Massachusetts, 557 U.S. 305, 313, 317, 325 (2009).

233. *Id.* at 314.

234. *Id.* at 313–14 (internal citation omitted).

235. *Id.* at 317 (quoting Brief for Respondent at 29, *Melendez-Diaz*, 557 U.S. 305 (No. 07-591)).

236. *Id.* at 318 (internal citation omitted).

237. *Id.* at 317–18. The majority also challenged the State's characterization of forensic tests as neutral and reliable. To the contrary, Justice Scalia wrote, confrontation may provide significant value, because human judgments are involved in scientific tests and cross-examination may reveal incompetence or procedural missteps. *Id.* at 317–21.

right to trial by jury and the privilege against self-incrimination. The Confrontation Clause—like those other constitutional provisions—is binding, and we may not disregard it at our convenience."[238] Additionally, Melendez-Diaz's ability to subpoena the analysts "whether pursuant to state law or the Compulsory Process Clause—is no substitute for the right of confrontation."[239] The burden of presenting testimonial witnesses squarely rests on the prosecution, not the defendant.[240]

Finally, the Court has repeatedly rejected the notion that the testimonial nature of evidence is tied to the evidence's reliability. As the *Bullcoming* Court held: "[T]he comparative reliability of an analyst's testimonial report drawn from machine-produced data does not overcome the Sixth Amendment bar."[241] Therefore, the perceived accuracy of facial recognition systems is immaterial for testimonial classification. Together, these two definitive holdings—rejecting the touchstones of reliability and prosecutorial burden—insulate facial recognition technology against major challenges to its testimonial nature.

In sum, facial recognition evidence is testimonial in nature under any formulation of the primary purpose test as articulated by the Supreme Court since *Crawford*. Moreover, the Court's Confrontation Clause jurisprudence has demonstrated that, if a laboratory report has the "'primary purpose' of 'establish[ing] or prov[ing] past events potentially relevant to later criminal prosecution,'" it is testimonial.[242] Because facial recognition evidence is testimonial hearsay, confrontation is required and will restrict the manner by which prosecutors may introduce the evidence against criminal defendants.

C. *Implications for the Admissibility of Facial Recognition Evidence*

Because facial recognition evidence is hearsay and testimonial, prosecutors seeking to admit the evidence must take steps to satisfy a criminal defendant's Confrontation Clause right.

The simplest solution is for the declarant to appear for cross-examination at trial.[243] In the context of facial recognition evidence, the declarant would be the technician who conducted the facial recognition analysis.[244] As

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238.   *Id.* at 325.

239.   *Id.* at 324.

240.   *Id.* at 324–25 ("More fundamentally, the Confrontation Clause imposes a burden on the prosecution to present its witnesses, not on the defendant to bring those adverse witnesses into court.").

241.   Bullcoming v. New Mexico, 131 S. Ct. 2705, 2715 (2011).

242.   *Id.* at 2714 n.6 (plurality opinion in part) (quoting Davis v. Washington, 547 U.S. 813, 822 (2006)). Although footnote six of Justice Ginsburg's opinion was not joined by a majority of the court, it was joined by all the Justices who apply the primary purpose test.

243.   Crawford v. Washington, 541 U.S. 36, 59 n.9 (2004) ("[W]hen the declarant appears for cross-examination at trial, the Confrontation Clause places no constraints at all on the use of his prior testimonial statements.").

244.   *See* discussion *supra* Section I.C.

Melendez-Diaz makes clear, once a laboratory report is deemed testimonial, the burden of producing the declarant rests on the prosecution, not on the criminal defendant.[245] *Bullcoming* further established that "[t]he prosecution cannot satisfy the Confrontation Clause by presenting a lab report through an analyst from the lab who had no role in performance of the test that is the subject of the report."[246] Simply put, the prosecution *presumptively* must present the analyst who performed the facial recognition test in order to satisfy Confrontation.

Unlike DNA evidence, where a multitude of laboratory analysts may be involved in the processing of a single test kit,[247] facial recognition evidence is likely to contain the statements of a single, clearly identifiable declarant. This is because forensic applications of facial recognition technology require a limited number of human steps, which can easily be conducted by one person.[248] The most significant act in the analysis—inputting the photo or video into the facial recognition program—is necessarily conducted by a single technician.[249] *Melendez-Diaz* and *Bullcoming* thus establish that this technician—the analyst who played by far the most significant role in production of the evidence—is the declarant who must testify in court.[250]

Prosecutors may attempt to skirt this requirement in a number of ways. As described in Section III.A.2 above, introduction of facial recognition evidence via expert testimony may present one route to admissibility but is, on the whole, unlikely to remain viable in the future. In the interest of expedience or perhaps to secure prosecutorial leniency, defendants may waive their Confrontation Clause rights.[251] States may pass notice-and-demand statutes, which require the prosecution to provide notice to the defendant of its intent to use an analyst's report as evidence at trial, after which the defendant is given a period of time in which he can demand the analyst's appearance live at trial.[252] By passing such statutes, states can generally compel criminal

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245.   *See supra* notes 233–234 and accompanying text.

246.   Richard D. Friedman, *Potential Responses to the* Melendez-Diaz *Line of Cases*, 90 Crim. L. Rep. (BNA) No. 12, 2011, at 396.

247.   *See, e.g.*, State v. Lopez, 45 A.3d 1, 10 (R.I. 2012) (noting that at Orchid Cellmark of Dallas, Texas, "it is not typical for one person to perform each step of the process . . . . Instead, Cellmark uses a 'team format,' with different analysts performing each step").

248.   *See* discussion *supra* Section I.C.

249.   *See* discussion *supra* Section I.C.

250.   It is admittedly conceivable that other technicians could be involved in the evidence's production. This may create more complex chain of custody and declarant identity issues—beyond the scope of this Note—that have not yet been addressed by the Supreme Court.

251.   Melendez-Diaz v. Massachusetts, 557 U.S. 305, 313–14, 314 n.3 (2009) ("The right to confrontation may, of course, be waived . . . ."). This can be accomplished through forfeiture by wrongdoing, by the defendant's failure to object to the offending evidence, by stipulation in a plea bargain or at trial, or by certain State procedural rules governing the exercise of objections. *Id.* at 314 n.3; *see also id.* at 355 (Kennedy, J., dissenting); Giles v. California, 554 U.S. 353, 359 (2008).

252.   *See Melendez-Diaz*, 557 U.S. at 326. For an illustrative discussion of North Carolina's Notice and Demand Statutes, see Jessica Smith, *Understanding the New Confrontation Clause Analysis:* Crawford, Davis, *and* Melendez-Diaz, Admin. Just. Bull., UNC School of Gov't

defendants to exercise or else waive their Confrontation Clause rights before trial.[253]

The long-term feasibility of these workarounds remains to be seen. One thing is certain, however: as facial recognition evidence increases in accuracy, prosecutors will continue to seek innovative paths to admissibility. Fortunately, because facial recognition evidence is testimonial, the Confrontation Clause will continue to protect defendants' weighty interests in probing its veracity. It is thus incumbent upon courts to recognize that interest and ensure that prosecutorial convenience does not come at the expense of a fair trial in the manner guaranteed by the Constitution.

Conclusion

The *Crawford* Court breathed new life into the Confrontation Clause, defending the Founders' notion of the Sixth Amendment right and affirming the integral place of cross-examination in the criminal trial. Although the Founders could never have imagined facial recognition technology, much less considered its application when drafting the Constitution, the principles that animated the Confrontation Clause demand that criminal defendants faced with such evidence be allowed to face their accuser. Although the Court has fractured around competing meanings of the requirement that evidence be testimonial in order to trigger the confrontation right, the currently predominant forms of facial recognition evidence are testimonial under any formulation of the primary purpose test. Confrontation is thus required and, except for a few narrow exceptions, the declarant—here, the analyst who conducted the facial recognition analysis—must testify in Court.

As the Court has affirmed, the Confrontation Clause is a procedural, not substantive, right. It "commands, not that evidence be reliable, but that reliability be assessed in a particular manner: by testing in the crucible of cross-examination."[254] As facial recognition technology continues to improve and becomes more prevalent, we can expect prosecutorial use to increase as well. Fortunately, criminal defendants armed with a constitutional right to cross-examination will be able to uncover mistaken applications of this technology. This procedure—presentation of evidence by the prosecution and probing of evidence by the defendant—preserves the trial form so valued by the Founders: one that emphasizes the central role of cross-examination, "the greatest legal engine ever invented for the discovery of truth."[255]

21–25 (2010), http://sogpubs.unc.edu/electronicversions/pdfs/aojb1002.pdf [http://perma.cc/W256-T44W].

253.   *Melendez-Diaz*, 557 U.S. at 327 ("There is no conceivable reason why [a criminal defendant] cannot . . . be compelled to exercise his Confrontation Clause rights before trial.").

254.   Crawford v. Washington, 541 U.S. 36, 61 (2004).

255.   5 John Henry Wigmore, Evidence in Trials at Common Law § 1367 (James H. Chadbourn rev. 1974).