HUMAN CONFRONTATION

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The United States Constitution's Confrontation Clause ensures the criminally accused a right "to be confronted with

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the witnesses against" them. Justice Sotomayor recently referred to this clause as "[o]ne of the bedrock constitutional protections afforded to criminal defendants." However, this right faces a new and existential threat. Rapid developments in law enforcement technology are reshaping the evidence available for use against criminal defendants. When an AI or algorithmic system places an alleged perpetrator at the scene of the crime, or an automated forensic process produces a DNA report used to convict an alleged perpetrator, should this type of automated evidence invoke a right to confront? If so, how should confrontation be operationalized, and on what theoretical basis?

Determining the Confrontation Clause's application to automated statements is both critically important and highly under-theorized. Existing work treating this issue has largely discussed the scope of the threat to confrontation, called for more scholarship in this area, suggested that technology might not make the types of statements that would implicate a confrontation right, or found that direct confrontation of the technology itself could be sufficient.

This Article takes a different approach and posits that human confrontation is required. The prosecution must produce a human on behalf of relevant machine statements or such statements are inadmissible. Drawing upon the dignity, technology, policing, and confrontation literatures, this Article offers several contributions. First, it uses automated forensics to show that certain technology-generated statements should implicate confrontation. Second, it claims that for dignitary reasons, only cross-examination of live human witnesses can meet the Confrontation Clause. Third, it reframes automation's challenge to confrontation as a "humans in the loop" problem. Finally, it proposes a "proximate witness approach" that permits a human to testify on behalf of a machine, identifies an open set of principles to guide courts as to who can be a sufficient proximate witness, notes possible supplemental approaches, and discusses certain broader implications of requiring human confrontation. Human confrontation could check the power of the prosecution, aid system legitimacy, and ultimately act as a form of technology regulation.

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INTRODUCTION

Three dead bodies are at the homicide scene but no living people. Instead, small autonomous mobile robots are scouring the scene for DNA evidence that will be flown back to a laboratory by unmanned drones. The drones will feed the crime scene samples directly into a

fully automated forensic DNA testing system, where robotic arms and mechanisms pass the sample through a series of steps, culminating in an artificial intelligence (AI) system declaring a match between the crime scene sample and one in the criminal database from the alleged perpetrator. A large language model drafts a forensic report memorializing the match, which the prosecution then seeks to enter as evidence at the alleged perpetrator's homicide trial.[1] The defense objects based on the Confrontation Clause, but the prosecution asserts that autonomously generated evidence is admissible without confrontation. Who, asks the prosecution, could the defendant even confront?

The U.S. Constitution's Confrontation Clause ensures the criminally accused a right "to be confronted with the witnesses against" them.[2] *Crawford v. Washington*[3] determined that confrontation only attaches to "testimonial" statements.[4] Although they are not explicitly defined in *Crawford*, "testimonial" statements seemingly include "out-of-court written or oral statements meant or understood to provide some form of evidence for use at trial," in particular "if made solemnly and to a state actor or agent."[5] Justice Sotomayor has recently emphasized the Confrontation Clause's place as "[o]ne of the bedrock constitutional protections afforded to criminal defendants."[6]

However, emerging law enforcement technology poses a new and existential threat to this right. Robots and robotic police dogs have already been employed in public safety;[7] forensic science has been

1. For illustrative purposes, this hypothetical is a simplified extrapolation of current forensic practices. *See* Brian Sites, *Rise of the Machines: Machine-Generated Data and the Confrontation Clause*, 16 COLUM. SCI. & TECH. L. REV. 36, 68 (2014); Erin Murphy, *Forensic DNA Typing*, 1 ANN. REV. CRIMINOLOGY 497, 498 (2018); Williams v. Illinois, 567 U.S. 50, 99–102 (2012) (Breyer, J., concurring). A large language model "is a program that can generate natural language text in response to a prompt." Mark A. Lemley & Matthew T. Wansley, *Coopting Disruption*, 105 B.U. L. REV. 457, 498 (2025).

2. U.S. CONST. amend. VI. The Fourteenth Amendment renders this Sixth Amendment protection also binding on the states. Pointer v. Texas, 380 U.S. 400, 403 (1965).

3. 541 U.S. 36 (2004).

4. *Id.* at 51–54; Ronald J. Coleman & Paul F. Rothstein, *A Game of* Katso *and Mouse: Current Theories for Getting Forensic Analysis Evidence Past the Confrontation Clause*, 57 AM. CRIM. L. REV. 27, 27 (2020) [hereinafter Katso *and Mouse*].

5. Katso *and Mouse*, *supra* note 4, at 27.

6. Hemphill v. New York, 142 S. Ct. 681, 690 (2022).

7. *See, e.g.*, N'dea Yancey-Bragg, *Police Robots Are on Patrol. Now the Questions About Them Are Piling Up.*, USA TODAY (Nov. 7, 2023), https://perma.cc/2BQQ-XLNE.

marching toward automation;[8] Pennsylvania relied on the AI-powered gunshot detection technology "Shotspotter" in a criminal matter;[9] and the AI-generated likeness of a murder victim even "spoke" in an Arizona court in connection with criminal defendant sentencing.[10] When an AI or algorithmic system places an alleged perpetrator at the scene of the crime, or an automated forensic process like the one described in the hypothetical above produces a DNA report used to convict an alleged perpetrator, how, if at all, should confrontation apply?[11]

Determining the Confrontation Clause's application to automated statements is both exceedingly important and very under-theorized. Existing work on this issue has largely recognized the scope of the potential threat to confrontation, encouraged additional research in this area, suggested technological systems may not create the sorts of statements that implicate confrontation, or determined that direct confrontation of the machine itself might be sufficient.[12]

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8. Edward J. Imwinkelried, *Computer Source Code: A Source of the Growing Controversy Over the Reliability of Automated Forensic Techniques*, 66 DEPAUL L. REV. 97, 97–98 (2016).

9. Commonwealth v. Weeden, 304 A.3d 333, 353–63 (Pa. 2023) (Wecht, J., concurring).

10. Neil Vigdor, *A.I.-Generated Likeness of Murder Victim Forgives His Killer in Court*, N.Y. TIMES (May 8, 2025), https://perma.cc/Y2AF-RF3C (noting this use appeared "uncharted"); Maneka Sinha, *The Automated Fourth Amendment*, 73 EMORY L.J. 589, 607–13 (2024).

11. In this Article, "automated statements" may be referred to in various ways, such as "autonomously-generated statements," "technology-generated statements," or "machine assertions." All formulations should be read synonymously.

12. *See* Paul F. Rothstein & Ronald J. Coleman, *Confrontation, the Legacy of* Crawford*, and Important Unanswered Questions,* 57 U. MICH. J.L. REFORM 731, 748–50 (2024) [hereinafter *Unanswered Questions*] (offering questions needing answers); Andrea Roth, *Machine Testimony*, 126 YALE L.J. 1972, 2040–51 (2017) (stating "the subject deserves Article-length treatment" and seemingly suggesting something less than "physical confrontation" could be sufficient); Sites, *supra* note 1, at 68 & n.178, 91 (assuming "no right to cross-examine a machine" and suggesting cross-examination and confrontation of machines as the "best way to apply the Confrontation Clause to the modern world"); Sherman J. Clark, *Confronting Algorithms: Conscience Catching in the Criminal Trial and Beyond*, 57 U. MICH. J.L. REFORM 787, 792–93 (2024) (suggesting it would be a "mistake" to "define what . . . algorithms do as testimony"); Joseph Clarke Celentino, Note, *Face-To-Face With Facial Recognition Evidence: Admissibility Under the Post*-Crawford *Confrontation Clause*, 114 MICH. L. REV. 1317, 1343 (2016) (suggesting statements of "[f]ully automated systems" are likely not covered by the Confrontation Clause); Brian Sites, *Machines Ascendant: Robots and the Rules of Evidence*, 3 GEO. L. TECH. REV. 1, 6–12 (2018) (discussing cases); Benjamin Welton, Note, *Meaningful Machine Confrontation*, 76 STAN. L. REV. 845, 874–88 (2024) (discussing potential options for machine confrontation, including not only live testimony but also source code disclosure, broadened discovery, and defendant tinkering with machines themselves). A separate, but

This Article asserts that human confrontation is required. The prosecution must produce a live human witness for testimonial machine statements or those statements are inadmissible. Human confrontation's primacy responds to important values confrontation serves. Reliability of evidence is, to be sure, a primary rationale for confrontation.[13] But reliability is not confrontation's only purpose. This Article centers a second, lesser-explored confrontation value and brings it to bear on confrontation of automated evidence: dignity.[14] Drawing upon the dignity, technology, policing, and confrontation literatures, this Article offers several contributions in its four parts.

Part I discusses the automated technology challenge to confrontation and grounds it in existing Supreme Court doctrine. For instance, the Court has held that forensic analysis reports prepared by humans may be testimonial, but they have also implied that pure "machine-generated results" such as a device "printout" could be treated differently.[15] Are automated reports and other such automated assertions testimonial like human reports or nontestimonial as mere "printouts" might be? If testimonial, how should confrontation be operationalized in view of confrontation's values?

Part II argues that certain autonomously-generated statements should be testimonial. For example, it argues that where law enforcement actively replaces human statements with machine statements in a way that subverts the right to confront—for instance, by fully replacing forensic laboratory analysts with machines—such statements should be deemed covered by the Confrontation Clause.

Part III claims that, for testimonial automated statements, only cross-examination of live human witnesses can meet a defendant's right to confront. Machine "confrontation"—such as production of code—is insufficient. Even if technological systems could eventually overcome reliability issues, like biases or hallucinations, these systems will not be able to meet a defendant's dignitary interest in standing "face to face" with their accusers. Dignity demands that a human accuser face the defendant, acknowledge the defendant, and grant the defendant a participatory interest in their defense.

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related, concern has been voiced regarding "implicit guarantee[s]" technology companies may make when transferring big data to government investigators. *See* Chad Squitieri, Note, *Confronting Big Data: Applying the Confrontation Clause to Government Data Collection*, 101 VA. L. REV. 2011, 2024–33 (2015). Even outside the automation context, the confrontation right remains under-theorized. *See* Michael S. Pardo, *Constructing Confrontation: Between Constitutional and Evidence Theory*, 57 U. MICH. J.L. REFORM 813, 813–33 (2024).

13. *See infra* Part III.

14. *See infra* Part III.

15. *See* Melendez-Diaz v. Massachusetts, 557 U.S. 305, 309–11 (2009); Bullcoming v. New Mexico, 564 U.S. 647, 673–74 (2011) (Sotomayor, J., concurring).

Part IV then considers what would constitute effective human confrontation. First, it reframes automation's challenge to confrontation as a "humans in the loop" problem.[16] Second, it discusses potential approaches to human confrontation consistent with that frame. It primarily proposes a "proximate witness approach," meaning one or more closely connected humans would need to testify on behalf of an automated system. It offers an open set of principles to guide courts as to who can be a proximate witness: involvement, knowledge, representativeness, and responsibility.[17] In the absence of a sufficient proximate witness, the testimonial automated statements would be inadmissible. Part IV also notes possible supplemental approaches, including those that might either lessen the societal burden of requiring human confrontation or provide even stronger defendant protections. For instance, courts could adopt a risk- or harm-based approach to confrontation remedies, ground a right to explanation in the Confrontation Clause or Due Process Clause, or take a "human-plus approach" that requires production of both a human and a machine. Finally, Part IV considers broader implications of human confrontation. It emphasizes that requiring live human witnesses to appear could aid system legitimacy. It also suggests that clear human confrontation rules could drive "confrontation by design," with technologies and processes being structured to meet confrontation requirements through a feedback loop, and that this could eventually lead to a form of technology regulation.

Automated police technology will supercharge the already severe power asymmetry between the government and criminal defendants.[18] Meaningful human confrontation is an important step

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16. By "humans in the loop" problem, this Article refers to the conundrum of what roles, if any, humans can or should play in connection with technological systems and processes. *See infra* Section IV.A. Consideration of this problem may help inform decisions on where it makes sense to find—or place—a human confrontation witness consistent with reliability and dignity. *See infra* Section IV.A.

17. For instance, in the automated DNA hypothetical that began this Introduction, a court might consider the report inadmissible unless a human was inserted into the process to review and check such report. Or a court might consider someone who helped design the sample-collecting robots, and is responsible for their maintenance and operations, a sufficient witness for any testimonial statements these robots might make.

18. *Cf.* ORIN S. KERR, THE DIGITAL FOURTH AMENDMENT: PRIVACY AND POLICING IN OUR ONLINE WORLD 3 (2025) ("Technology has upset the balance again, this time mostly favoring the police."); Aziz Z. Huq, *A Right to a Human Decision*, 106 VA. L. REV. 611, 682 (2020) ("Because machine-learning tools require large pools of data and robust computational resources, it is likely that they will be adopted and used by organizational entities, not least the state, that already have asymmetrical relationships with the public at large. Adoption of machine learning might exacerbate these imbalances in undesirable ways.");

in recognizing the dignity of those accused and checking the power of the prosecution. This Article offers a broad theoretical framework for human confrontation, but further work will be necessary to refine its contours and better understand its broader implications. To that end, the Article closes by offering several suggestions for helpful future research.

I. AUTOMATED POLICING'S CHALLENGE TO CONFRONTATION

Automation is everywhere.[19] AI is impacting a variety of industries, from the medical field to employers automating hiring.[20] Algorithms tell viewers what to watch, and both purchasers and sellers of products may utilize them as well.[21] AI-generated content, memes, and emojis abound, and societies are grappling with the challenges of "deepfakes."[22]

Julia Simon-Kerr, *Credibility in an Age of Algorithms*, 74 RUTGERS U. L. REV. 111, 121 (2021) ("While the legal system's response to [certain algorithmic] tools might mirror its long-held skepticism of the polygraph, this is a different time and algorithms are a different tool.").

19. Daniel J. Solove & Woodrow Hartzog, *Kafka in the Age of AI and the Futility of Privacy as Control*, 104 B.U. L. REV. 1021, 1023 (2024) ("Powerful machine learning algorithmic systems, colloquially known as 'Artificial Intelligence' or 'AI,' are being used to make an ever-expanding range of decisions affecting our lives."); John O. McGinnis, *Accelerating AI*, 104 NW. U. L. REV. COLLOQUY 366, 370 (2010) ("The power of exponential growth is hard to overstate.").

20. Ifeoma Ajunwa, *An Auditing Imperative for Automated Hiring Systems*, 34 HARV. J.L. & TECH. 621, 622–23 (2021); Boris Babic & I. Glenn Cohen, *The Algorithmic Explainability "Bait and Switch,"* 108 MINN. L. REV. 857, 859 (2023); CYNTHIA ESTLUND, AUTOMATION ANXIETY: WHY AND HOW TO SAVE WORK 4–5 (2021).

21. *See* Kal Raustiala & Christopher Jon Sprigman, *The Second Digital Disruption: Streaming and the Dawn of Data-Driven Creativity*, 94 N.Y.U. L. REV. 1555, 1587–88 (2019); Oren Bar-Gill, Cass R. Sunstein & Inbal Talgam-Cohen, *Algorithmic Harm in Consumer Markets*, 15 J. LEGAL ANALYSIS 1, 5 (2023) (referencing "algorithms deployed by sellers and service providers" and "'digital butlers,' like Alexa, Siri, and Google Assistant, that can help consumers make purchasing decisions").

22. *See* Emmett Lindner, *Happy Puppies and Silly Geese: Pushing the Limits of A.I. Absurdity*, N.Y. TIMES (Jan. 4, 2024), https://perma.cc/7URE-GAL3; Max Read, *Is A.I. the Greatest Technology Ever for Making Dumb Jokes?*, N.Y. TIMES (July 11, 2023), https://perma.cc/C4K9-9N9W; Max Eddy, *AI Is Coming to Your iPhone. Here Are All the New Features Apple Just Announced.*, N.Y. TIMES: WIRECUTTER (June 10, 2024), https://perma.cc/38JG-7U5U; Raustiala & Sprigman, *supra* note 21, at 1583–84 ("[U]se of algorithms, artificial intelligence, and machine learning to guide the creation of content or even . . . create the content without, or with little, human intervention." (footnotes omitted)); *see also* Amy Adler & Jeanne C. Fromer, *Memes On Memes and the New Creativity*, 97 N.Y.U. L. REV. 453, 477–91 (2022) (discussing memes); Daniel J. Capra, *Deepfakes Reach the Advisory Committee on Evidence Rules*, 92 FORDHAM L. REV.

The criminal legal system is no exception.[23] Automated law enforcement systems could eventually produce large quantities of evidence for use against criminal defendants.[24] Automated forensic processes could match the DNA of an alleged perpetrator to that from murder victims or identify seized substances as narcotics.[25] AI-powered facial recognition systems might place an alleged perpetrator at the scene of a robbery.[26] AI-drafted police reports could also provide inculpatory evidence, as could wholly robotic officers or police dogs.[27]

2491, 2491 (2024); Bobby Chesney & Danielle Citron, *Deep Fakes: A Looming Challenge for Privacy, Democracy, and National Security*, 107 CALIF. L. REV. 1753, 1763 (2019); Mary Anne Franks & Ari Ezra Waldman, *Sex, Lies, and Videotape: Deep Fakes and Free Speech Delusions*, 78 MD. L. REV. 892, 893 (2019) ("Deep fakes, a portmanteau of 'deep-learning' and 'fake,' are audio or visual material digitally manipulated to make it appear that a person is saying or doing something that they have not really said or done."); Eric Goldman, *Emojis and the Law*, 93 WASH. L. REV. 1227, 1228–29 (2018) (discussing emojis).

23. *See, e.g.*, Elizabeth E. Joh, *Reckless Automation in Policing*, BERKELEY TECH. L.J.: COMMENTS. 117 (July 11, 2022), https://perma.cc/DS4K-JUW5; Rothstein & Coleman, *supra* note 12, at 748–50; Andrew Guthrie Ferguson, THE RISE OF BIG DATA POLICING: SURVEILLANCE, RACE, AND THE FUTURE OF LAW ENFORCEMENT 5 (2017); Neil M. Richards & Jonathan H. King, *Big Data Ethics*, 49 WAKE FOREST L. REV. 393, 408 (2014).

24. *See, e.g.*, *Unanswered Questions*, *supra* note 12, at 748–50; Paul W. Grimm, Maura R. Grossman & Gordon V. Cormack, *Artificial Intelligence as Evidence*, 19 NW. J. TECH. & INTEL. PROP. 9, 13 (2021) ("[I]f AI applications now dominate our lives, it is unavoidable that the evidence that will be needed to resolve civil litigation and criminal trials will include facts that are generated by this enigmatic technology."). Confrontation of evidence from the gunshot detection system "ShotSpotter" has recently been considered in Pennsylvania, and such technology may contemplate even less human involvement in the future. *See* Commonwealth v. Weeden, 304 A.3d 333, 335–39 (Pa. 2023).

25. *See supra* Introduction; *see also* Brandon L. Garrett & Cynthia Rudin, *The Right to a Glass Box: Rethinking the Use of Artificial Intelligence in Criminal Justice*, 109 CORN. L. REV. 561, 571–86 (2024) ("For DNA mixtures of multiple and sometimes unknown numbers of contributors, algorithms have been designed to interpret the test results, to try to determine whether a suspect might or not have contributed to a sample from the crime.").

26. *See supra* Introduction; *see also* Ronald J. Coleman, *Big Data Policing Capacity Measurement*, 53 N.M. L. REV. 305, 308 (2023); Joh, *supra* note 23, at 117; Paul H. Robinson, Jeffrey Seaman & Muhammad Sarahne, *Our Troubling Failures in Solving Crimes: Rethinking Legal Limits on Crime Investigation*, 74 CASE W. RSRV. L. REV. 693, 782 (2024).

27. *See, e.g.*, Andrew Guthrie Ferguson, *Generative Suspicion and the Risks of AI-Assisted Police Reports*, 120 NW. U. L. REV. 299, 299 (2025); *Robotic Police Dog Shot Multiple Times, Credited With Avoiding Potential Bloodshed*, ASSOCIATED PRESS (Mar. 27, 2024), https://perma.cc/DX7E-GAFG; Robert Sassan, *Civil Liability for Autonomous Police Robots: The Inadequacy of § 1983 in Responding to Robot Excessive Force*, 30 RICH. J.L. & TECH. 471, 472–73 (2024).

Using evidence derivable from automated police technology can be problematic. Automated systems can be biased or may hallucinate, and unreliability of these systems may be especially pernicious when their processes are "opaque" and "shrouded in a black box."[28] But even if this evidence were highly reliable, its use at trial still challenges longstanding procedural safeguards, such as a defendant's confrontation right.[29]

The Confrontation Clause ensures: "In all criminal prosecutions, the accused shall enjoy the right . . . to be confronted with the witnesses against him."[30] *Crawford* made clear that this clause helps

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28. *See* Roth, *supra* note 12, at 1983; CHINMAYI ARUN, AI AND THE GLOBAL SOUTH: DESIGNING FOR OTHER WORLDS, IN THE OXFORD HANDBOOK OF ETHICS OF AI 600 (Markus D. Dubber et al. eds., 2020) ("Algorithmic systems are often trained on a corpus of data, which means that big data and its inherent biases affect the outcome of these systems."); Karen Weise & Cade Metz, *When A.I. Chatbots Hallucinate*, N.Y. TIMES (May 9, 2023), https://perma.cc/9X2S-6THC ("The tech industry often refers to the [generative AI] inaccuracies as 'hallucinations.'"); Robert Brauneis & Ellen P. Goodman, *Algorithmic Transparency for the Smart City*, 20 YALE J.L. & TECH. 103, 107–09 (2018) ("Because the designing entities typically do not disclose their predictive models or algorithms, there is a growing literature criticizing the 'black box' opacity of these processes."); Ryan Calo & Danielle Keats Citron, *The Automated Administrative State: A Crisis of Legitimacy*, 70 EMORY L.J. 797, 805 (2021) ("Tasks once performed by officials and juries are now undertaken by machines. And procedural mechanisms of transparency and accountability have not kept pace." (footnote omitted)). It may be argued that "other minds are just as much black boxes as are machine-learning instruments." *See* Huq, *supra* note 18, at 643. Even if this is so, it does not merit less stringent treatment for machine statements than what is required of human statements.

29. *See supra* Introduction. Collection of automated evidence may present other challenges, such as those associated with privacy and surveillance. *See, e.g.*, David Garland, *Panopticon Days: Surveillance and Society*, 20 CRIM. JUST. MATTERS 3, 4 (1995).

30. *See supra* Introduction; U.S. CONST. amend. VI. Certain caveats are worth noting. First, this Article offers an extremely limited background on confrontation precedent, but more fulsome discussions are available elsewhere. *See, e.g.*, Katso *and Mouse*, *supra* note 4, at 29–44. Second, this Article takes no position as to the merits of existing Supreme Court precedent and largely takes it as given. *See* Paul F. Rothstein & Ronald J. Coleman, *Confronting Memory Loss*, 55 GA. L. REV. 95, 121 (2020) [hereinafter *Memory Loss*] ("[T]he Court would prefer to set a bright-line rule rather than to adopt a case-by-case approach . . . ."). The Article neither seeks to disturb the *Crawford* framework nor rethink confrontation wholesale in light of important values. More general arguments relating to attacking, redefining, or overturning *Crawford* have been advanced, but this Article does not specifically address such types of arguments. *See, e.g.*, David Crump, *Overruling* Crawford v. Washington*: Why and How*, 88 NOTRE DAME L. REV. 115, 115–18 (2012) ("The stars are aligned today for the overruling of *Crawford v. Washington*."); David Alan Sklansky, *Hearsay's Last Hurrah*, 2009 SUP. CT. REV. 1, 7–64 (discussing different approaches for "giv[ing] meaning to the Confrontation Clause"); Franklin v. New York, 145 S. Ct. 831,

safeguard evidence reliability.[31] But confrontation is concerned with more than just reliability. *Crawford* emphasized the Confrontation Clause also affords something additional: a procedural right to cross-examination.[32] Some scholars have suggested the something additional is grounded in dignity and this Article endorses such view.[33] Adequate confrontation should serve the value of dignity, not just reliability.

831–33 (2025) (Alito J., respecting the denial of certiorari) ("If we reconsider *Crawford*, as I think we should, the result might be a reaffirmation of *Crawford* or the adoption of an entirely different Confrontation Clause rule."); *see also* Lawrence Lessig, *Fidelity in Translation*, 71 TEX. L. REV. 1165, 1165–68 (1993) (noting "originalis[t]," "dynamic," and "textualist" interpretive methods); Orin S. Kerr, Katz *as Originalism*, 71 DUKE L.J. 1047, 1048–51 (2022) (discussing textualist and originalist approaches). This Article does, at times, consider flexing *Crawford* for technology-generated statement matters. Third, without taking any position on the merits, this Article assumes continuation of the adversarial process, the broader current criminal legal system, and increasing use of automated law enforcement technology. Finally, although this Article relies on dignitary arguments in the Confrontation Clause context, it specifically avoids broader consideration of whether dignity should ground constitutional or other rights outside this context. *See infra* Part III.

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

32. *Id.*

33. *See, e.g.*, Erin Sheley, *The Dignitary Confrontation Clause*, 97 WASH. L. REV. 207, 210 (2022) (making "historical and narrative analysis of the confrontation right's origins in Anglo-American law" and "conclud[ing] that criminal defendants have a distinct dignitary interest in confronting witnesses against them" (emphasis omitted)); David Alan Sklansky, *Anti-Inquisitorialism*, 122 HARV. L. REV. 1634, 1655 (2009); Welton, *supra* note 12, at 850 ("Directly confronting a witness . . . restore[s] [defendants'] sense of dignity and fairness."); *see also* Sklansky, *supra* note 30, at 67 ("Protecting a defendant's ability to probe the evidence offered against him . . . . accords the defendant a degree of dignity, allowing him some agency in the adjudication process and treating his input and his objections as worthy of respect."); Justin Sevier, *Popularizing Hearsay*, 104 GEO. L.J. 643, 657 (2016) ("Supreme Court decisions interpreting *Crawford* continued to focus on the dignity interests of confronting one's accusers at trial . . . ."); Roth, *supra* note 12, at 2040 ("[A]ccusations made behind closed doors can also subvert the dignity of criminal procedure . . . ."); Coy v. Iowa, 487 U.S. 1012, 1017 (1988) ("The Sixth Amendment's guarantee of face-to-face encounter between witness and accused serves ends related both to appearances and to reality. . . . [T]here is something deep in human nature that regards face-to-face confrontation between accused and accuser as 'essential to a fair trial in a criminal prosecution.'" (quoting Pointer v. Texas, 380 U.S. 400, 404 (1965))). As the concept of dignity has a long history that far predates the Founding, dignitary interests are arguably relevant to an originalist understanding of the Confrontation Clause, such as that advanced by Justice Scalia in *Crawford*. *See* Christopher McCrudden, *Human Dignity and Judicial Interpretation of Human Rights*, 19 EUR. J. INT'L L. 655, 656–57 (2008); Sheley, *supra*, at 247 ("The Founders drew on [Thomas] Paine's views of dignity, with Thomas Jefferson asserting that 'the dignity of man is lost in arbitrary distinctions based on "birth or badge"' and Alexander Hamilton describing a constitutional democracy as the

Consistent with the Supreme Court's *Crawford* framework, confrontation only attaches to "testimonial" statements.[34] Where a testimonial statement is entered against a criminal defendant, the declarant must be produced at trial absent declarant "unavailability and a prior opportunity for cross-examination."[35] *Crawford* never fully defined "testimonial."[36] But subsequent cases adopted a "primary purpose test" for testimoniality.[37] If a statement has the objective "primary purpose of . . . establish[ing] or prov[ing] past events potentially relevant to later criminal prosecution," it will be testimonial, but if it has some other "primary purpose"—such as "respond[ing] to an ongoing emergency"—it will be nontestimonial.[38]

At times, the Court has also suggested certain additional guidelines relating to testimoniality and Confrontation Clause coverage,[39] such as: (1) "formal" statements and those made "to police" (or state actors or agents) are more likely to be testimonial;[40] (2) statements may need to have "the primary purpose of accusing a targeted individual" to be testimonial (although the current vitality of this "specifically accusatory" view is unclear);[41] (3) "the Confrontation Clause does not prohibit the introduction of . . . statements that would have been admissible in a criminal case at the time of the founding" (such as dying declarations);[42] and (4) "[s]tatements by very young children will rarely, if ever, implicate the Confrontation Clause" (both because there is "strong evidence" such statements "were admissible at common law" and because such children would seemingly not "intend [their] statements to be a substitute for trial testimony" since few of them "understand the details of [the] criminal [legal] system").[43] The "primary purpose" test

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'safest course for your liberty, your dignity, and your happiness.'" (footnote omitted)).

34. *See Crawford*, 541 U.S. at 51–54; Katso *and Mouse*, *supra* note 4, at 27.

35. *Crawford*, 541 U.S. at 59, 68.

36. Katso *and Mouse*, *supra* note 4, at 27.

37. *See id.* at 30–34.

38. Michigan v. Bryant, 562 U.S. 344, 356, 359 (2011) (quoting Davis v. Washington, 547 U.S. 813, 822 (2006)); *see also Unanswered Questions*, *supra* note 12, at 733–34; George Fisher, *The* Crawford *Debacle*, 113 MICH. L. REV. FIRST IMPRESSIONS 17, 23 (2014).

39. *See supra* Introduction; *Crawford*, 541 U.S. at 50–53.

40. Ohio v. Clark, 576 U.S. 237, 244 (2015); *see also Crawford*, 541 U.S. at 51.

41. Williams v. Illinois, 567 U.S. 50, 82 (2012) (plurality opinion), *abrogated by* Smith v. Arizona, 44 S. Ct. 785 (2024); Katso *and Mouse*, *supra* note 4, at 53.

42. *Clark*, 576 U.S. at 246.

43. *Id.* at 247–48. As a practical matter, the Court appears eager to simply exempt very young child statements from the Confrontation Clause. But the rationale of not understanding the legal system seems particularly problematic under the primary purpose test, since such rationale appears to only account for the speaker's (child's) intention. If the listener's intention and the context of the

is very fact-specific and has been criticized on both certainty and historical grounds.[44]

Two additional doctrinal confrontation issues are worth emphasizing here as background for the remainder of this Article. First, Justice Thomas has a unique "formality and solemnity" view of the Confrontation Clause.[45] Specifically, only "extrajudicial statements" that are "contained in formalized testimonial materials," like depositions, are testimonial.[46] Other statements, like "off-hand, overheard remark[s]" are nontestimonial.[47] While formality may have some general relevance for other Justices, for Justice Thomas, it is the central inquiry.[48] Second, the Court appears to require effective,

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discussion point to an overall evidence-gathering purpose, the statements could seemingly be testimonial under the "objective" primary purpose test.

44. *See* Fisher, *supra* note 38, at 25 (referencing "the primary-purpose test's ambiguity and inability to generate predictable results"); Michael S. Pardo, *Confrontation After Scalia and Kennedy*, 70 ALA. L. REV. 757, 780 (2019) (referring to the "primary purpose" analysis in the eyewitness context as "a highly fact-bound determination"); Crump, *supra* note 30, at 134; People v. Lopez, 286 P.3d 469, 477 (Cal. 2012) (noting disagreement as to "what the statement's primary purpose must be"); Davis v. Washington, 547 U.S. 813, 834–42 (2006) (Thomas, J., concurring in the judgment in part and dissenting in part); Franklin v. New York, 145 S. Ct. 831, 836 (2025) (Gorsuch, J., respecting the denial of certiorari) ("The primary-purpose test came about accidentally. It has caused considerable confusion. This Court has never sought to justify it on the basis of the Sixth Amendment's text or original meaning. Nor, for that matter, is it easy to see how one might. . . . What matters . . . is not the *purpose* for which an out-of-court statement was originally created, but whether the government seeks to *use* a witness's statement at trial against a defendant in lieu of live testimony."); *see also Unanswered Questions*, *supra* note 12, at 734–35 (discussing open questions in application of the primary purpose test). The *Crawford* framework could easily persist under a different test, since the "primary purpose test" was announced after *Crawford*. *See Davis*, 547 U.S. at 822.

45. Melendez-Diaz v. Massachusetts, 557 U.S. 305, 329–30 (2009) (Thomas, J., concurring); *Williams*, 567 U.S. at 104 (Thomas, J., concurring in the judgment).

46. *Davis*, 547 U.S. at 836 (Thomas, J., concurring in the judgment in part and dissenting in part) (quoting White v. Illinois, 502 U.S. 346, 365 (1992) (Thomas, J., concurring in part and concurring in the judgment) (referencing "affidavits, depositions, prior testimony, or confessions" as sufficiently formal. (citation omitted))); Michigan v. Bryant, 562 U.S. 344, 378–79 (2011) (Thomas, J., concurring in the judgment); *Melendez-Diaz*, 557 U.S. at 329–30 (Thomas, J., concurring).

47. Crawford v. Washington, 541 U.S. 36, 51 (2004); *see also Davis*, 547 U.S. at 836 (Thomas, J., concurring in the judgment in part and dissenting in part).

48. *See Davis*, 547 U.S. at 836–38 (Thomas, J., concurring in the judgment in part and dissenting in part); *Melendez-Diaz*, 557 U.S. at 329–30 (Thomas, J., concurring); *Clark*, 576 U.S. at 245; *Williams*, 567 U.S. at 82–83; *see also Lopez*, 286 P.3d at 477 ("[T]o be testimonial the out-of-court statement must have been made with some degree of formality or solemnity.").

but not perfect, confrontation.[49] In *United States v. Owens*,[50] the Court stressed that "[t]he Confrontation Clause guarantees only 'an opportunity for effective cross-examination, not cross-examination that is effective in whatever way, and to whatever extent, the defense might wish.'"[51]

The Supreme Court has not yet ruled on the Confrontation Clause's applicability to automated statements. But, it has considered confrontation of forensic analyses conducted by human analysts.[52] Where human-prepared reports include testimonial statements, the Supreme Court has found defendants have the right to confront an involved analyst, even if the human analysts utilized machines in coming to their conclusions.[53] In an important concurrence, however, Justice Sotomayor implied, but did not rule, that "raw data generated by a machine"—effectively a machine "printout"—might be treated differently.[54] Should automated forensic reports and other equivalent automated assertions be treated as testimonial statements or potentially nontestimonial computer "printouts"? If they are treated as testimonial assertions, how should confrontation be operationalized consistent with the values of reliability and dignity? As law enforcement continues to automate, these will become essential questions for the Court to answer.[55]

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49. United States v. Owens, 484 U.S. 554, 559 (1988).

50. *Id.*

51. *Id.* (emphasis omitted) (quoting Kentucky v. Stincer, 482 U.S. 730, 739 (1987)). *Owens* predates but likely survives *Crawford*, since Justice Scalia authored the opinions in both cases. *Memory Loss*, *supra* note 30, at 120–21. Acceptance of *Owens* suggests the Court may focus on the minimum sufficient degree of cross-examination required in relevant confrontation contexts. *Cf. id.* at 121.

52. *See Melendez-Diaz*, 557 U.S. at 307; Bullcoming v. New Mexico, 564 U.S. 647, 651 (2011); *Williams*, 567 U.S. at 56–57; Smith v. Arizona, 144 S. Ct. 1785, 1791 (2024).

53. *Bullcoming*, 564 U.S. at 658–68; Paul F. Rothstein & Ronald J. Coleman, *Confrontation's Multi-Analyst Problem*, 9 TEX. A&M L. REV. 165, 178–90 (2021) [hereinafter *Multi-Analyst Problem*]. Testifying analysts may elucidate "lapses or lies" in the testing process, but it is unclear "which analyst must testify." *Bullcoming*, 564 U.S. at 662; *Multi-Analyst Problem*, *supra*, at 189.

54. *Bullcoming*, 564 U.S. at 673–74 (Sotomayor, J., concurring) ("[W]e do not decide whether . . . a State could introduce (assuming an adequate chain of custody foundation) raw data generated by a machine in conjunction with the testimony of an expert witness."). It is noteworthy that even in Justice Sotomayor's hypothetical, some human testimony was assumed. *Id.*

55. *See, e.g.*, *Unanswered Questions*, *supra* note 12, at 750.

II. TECHNOLOGY-GENERATED ASSERTIONS AS TESTIMONIAL STATEMENTS

This Part argues that automated statements should be deemed testimonial in appropriate cases. Several rationales support that conclusion.

First, post-*Crawford* Supreme Court precedent suggests these statements could be testimonial. Relevant analyst statements in forensic reports are testimonial even when analysts rely upon machines.[56] Statements of sophisticated automated systems are potentially just as damaging to defendants as their human analyst equivalents. Just like human analyst statements, autonomously-drafted forensic reports may consist of formal statements made to law enforcement with a primary prosecutorial purpose.[57] Such automated statements may eventually go far beyond the mere "printout" concept Justice Sotomayor suggested might theoretically be treated differently in her *Bullcoming* concurrence.[58] They may include "lapses or lies," just like human statements; and even if they were perfect, the *Crawford* Court made clear that reliable statements are not exempt from confrontation.[59] Even under the more restrictive view that statements must be "specifically accusatory" of a targeted individual perpetrator to be testimonial, automated processes are often run to inculpate known suspects.[60]

Second, the *Crawford* framework's originalist interpretation of the Confrontation Clause supports testimoniality of automated statements. In *Crawford* itself, the Court discussed historical instances where England had adopted civil law system procedural elements—such as where officials made pretrial examination of witnesses and such examinations were relayed in court rather than offering live witness testimony.[61] Sir Walter Raleigh's infamous treason trial—discussed by the Court as emblematic of this "principal

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56. *See supra* Part I.

57. *See id.*

58. *See id.*; *see also* People v. Lopez, 286 P.3d 469, 478 (Cal. 2012) (considering use of "data generated by a gas chromatography machine"); Roth, *supra* note 12, at 2045–48.

59. *See Bullcoming*, 564 U.S. at 662; Crawford v. Washington, 541 U.S. 36, 68–69 (2004); *see also* Michigan v. Bryant, 562 U.S. 344, 392 (Scalia, J., dissenting) ("Reliability tells us *nothing* about whether a statement is testimonial."). *Crawford* actually overruled a confrontation regime centered on reliability. *See Crawford*, 541 U.S. at 67–69 (overruling *Ohio v. Roberts*); *cf.* Ohio v. Roberts, 448 U.S. 56, 66 (1980) (focusing on whether statement "bears adequate 'indicia of reliability'").

60. *See supra* Part I.

61. *Crawford*, 541 U.S. at 43.

evil at which the Confrontation Clause was directed"—was one such case.[62] As recounted in *Crawford*,

> Lord Cobham, Raleigh's alleged accomplice, had implicated him in an examination before the Privy Council and in a letter. At Raleigh's trial, these were read to the jury. Raleigh argued that Cobham had lied to save himself . . . . Suspecting that Cobham would recant, Raleigh demanded that the judges call him to appear, arguing that "[t]he Proof of the Common Law is by witness and jury: let Cobham be here, let him speak it. Call my accuser before my face . . . ." The judges refused, and, despite Raleigh's protestations that he was being tried "by the Spanish Inquisition," the jury convicted, and Raleigh was sentenced to death.[63]

Autonomously generated statements, created at the behest of law enforcement and used against a criminal defendant without supporting confrontation, are dangerously close to this "principal evil" the Confrontation Clause was specifically meant to prevent.[64]

Third, exempting automated statements from confrontation would be a huge windfall for the prosecution. If these statements were deemed nontestimonial, as automated law enforcement technologies become more prevalent and sophisticated, the Confrontation Clause could effectively disappear in a large volume of cases.[65] As discussed

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62. *Id.* at 50 ("[T]he principal evil at which the Confrontation Clause was directed was the civil-law mode of criminal procedure, and particularly its use of *ex parte* examinations as evidence against the accused. It was these practices that the Crown deployed in notorious treason cases like Raleigh's; that the Marian statutes invited; that English law's assertion of a right to confrontation was meant to prohibit; and that the founding-era rhetoric decried. The Sixth Amendment must be interpreted with this focus in mind.").

63. *Id.* at 44 (second and third alterations in original) (citations omitted).

64. *See id.* at 43–50; Melendez-Diaz v. Massachusetts, 557 U.S. 305, 310–11 (2009); *see also* People v. Lopez, 286 P.3d 469, 494 (Cal. 2012) (Liu, J., dissenting) (warning against "gradually recreat[ing] through machines instead of magistrates the civil law mode of ex parte production of evidence"); Roth, *supra* note 12, at 2041–43. Similar points have been made regarding electronic communications, social media, and forensics. *See* Jeffrey Bellin, *Applying Crawford's Confrontation Right in a Digital Age*, 45 TEX. TECH. L. REV. 33, 34, 49 (2012); Lauren McLane, *Confronting the Twenty-First-Century Marian Examination*, 82 ALB. L. REV. 949, 951 (2019) ("Forensic evidence in cases involving multi-analyst laboratory settings, or 'assembly line' forensic analysis, such as DNA testing, toxicology, and alcohol breath testing, have become the modern-day Marian examination.").

65. *See Unanswered Questions*, *supra* note 12, at 750; *see also* Roth, *supra* note 12, at 2051 ("[T]o immunize accusatory machine output from the Clause's reach entirely seems to be the wrong answer, at least as a theoretical, if not strategic, matter."); Sites, *supra* note 1, at 40 ("[S]ome evidence once subject to the Confrontation Clause—because it came in the form of individuals testifying about what they saw or what they did—no longer triggers a confrontation right

further in Part III, confrontation affords defendants a dignitary interest in facing their accusers, and wholly exempting accusations from automated systems undermines this important confrontation value.[66]

Fourth, the Confrontation Clause should not permit law enforcement to evade confrontation rights by replacing humans with machines.[67] In defending his "formality and solemnity" view of testimoniality, Justice Thomas has argued the Confrontation Clause would "reach[]" a government's attempted evasion of confrontation by using "technically informal statements."[68] Similarly, statements once made by humans will more and more be made by machines, and this could be viewed as law enforcement evasion.[69] If automation exempted evidence from confrontation, law enforcement would be incentivized to take advantage of that loophole by further automating.[70] Even if the prosecution could truthfully assert that law enforcement had no idea the Confrontation Clause would be impacted, the damage to confrontation would be the same, and so the automation should be deemed effective evasion or something akin to it.

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because machines now generate the evidence in place of humans."); Commonwealth v. Weeden, 304 A.3d 333, 339 (Pa. 2023) (noting the admitted ShotSpotter report "purport[ed] to show the time and location of a shooting incident").

66. *See infra* Part III; *see also supra* Part I.

67. Substituting machines for humans is a type of evasion. *See* Roth, *supra* note 12, at 1983 ("[I]f substituted for the testimony of witnesses otherwise subject to credibility testing, machine testimony allows the State to evade responsibility for accusations.").

68. Davis v. Washington, 547 U.S. 813, 838 (2006) (Thomas, J., concurring in part and dissenting in part) ("[E]ven if the interrogation itself is not formal, the production of evidence by the prosecution at trial would resemble the abuses targeted by the Confrontation Clause if the prosecution attempted to use out-of-court statements as a means of circumventing the literal right of confrontation." (citation omitted)).

69. *See supra* Part I.

70. It could be "tactically superior" to collect evidence in a way that avoids potentially damaging cross-examination. *See* Bellin, *supra* note 64, at 38 (discussing a similar point in connection with social media commentary); Fisher, *supra* note 38, at 26 ("Just as forfeiture doctrine saps the incentive for wrongdoers to eliminate witnesses, the Confrontation Clause should thwart those who contrive to plant trial evidence that eludes confrontation."). Continued automation could also then be seen as analogous to "tech-washing," where the credibility of an individual could previously be tested at trial but machine statements cannot. *See* Tim Lau, *Predictive Policing Explained*, BRENNAN CTR. FOR JUST. (Apr. 1, 2020), https://perma.cc/2SL8-94LK ("Some critics have labeled predictive policing a form of 'tech-washing' that gives racially biased policing methods the appearance of objectivity, simply because a computer or an algorithm seems to replace human judgment.").

Confrontation Clause coverage of automated statements would, however, face two key definitional challenges.[71] First, the Constitutional text calls for production of "witnesses" and machines do not seem like "witnesses."[72] Although the *Crawford* Court's interpretation of "witness" in this context may be ripe for rethinking, such rethinking is not strictly necessary for purposes of this Article.[73] *Crawford* defined "witnesses" as "those who 'bear testimony'" and determined that "testimonial" statements trigger confrontation.[74] *Crawford* declined to define "testimonial" but advanced three potential definitions:

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71. It could also face practical challenges, in particular how to cross-examine a machine. *See infra* Part III.

72. *See* Crawford v. Washington, 541 U.S. 36, 51 (2004); *see also* Welton, *supra* note 12, at 855 ("With few exceptions, courts have held that machine-generated evidence does not trigger the Confrontation Clause . . . . on three grounds: (1) machines are not 'witnesses' within the meaning of the Sixth Amendment; (2) reliability concerns are properly addressed through evidentiary tools like authentication; and (3) machines cannot be cross-examined." (footnote omitted)).

73. *See Crawford*, 541 U.S. at 51; Fisher, *supra* note 38, at 19 (referencing the "hopeless ambiguity" of the text "witnesses against"). The Court relied on Noah Webster's 1828 dictionary for its definition of "witness." *Crawford*, 541 U.S. at 51; 2 NOAH WEBSTER, AN AMERICAN DICTIONARY OF THE ENGLISH LANGUAGE 906 (1828) (offering "[o]ne who gives testimony" as one of the noun definitions and "[t]o bear testimony" as one of the verb definitions). Even accepting such approach, several different conceptions of "witness" could have been drawn from that dictionary. *See* WEBSTER, *supra*, at 906; Jeffrey Bellin, *The Incredible Shrinking Confrontation Clause*, 92 B.U. L. REV. 1865, 1883 (2012). The Court could have, for instance, fashioned a conception around: "A person who knows or sees any thing; one personally present" (a noun definition); "That which furnishes evidence or proof" (a noun definition); "To attest; to give testimony to; to testify to something" (a verb definition); or "To give evidence" (a verb definition). WEBSTER, *supra*, at 906.

Dissenting in a pre-*Crawford* case, Justice Scalia explained that at least the person "who knows or sees any thing" definition was inappropriate for the Confrontation Clause context due to use of "*against him*" after "witnesses" in the Constitutional text. *See* Maryland v. Craig, 497 U.S. 836, 864–65 (1990) (Scalia, J., dissenting) ("The [constitutional] phrase obviously refers to those who give testimony against the defendant at trial."). *But see* Bellin, *supra*, at 1884–88 (questioning the vitality of Justice Scalia's explanation). In the non-automated forensics context, for instance, one scholar has suggested an approach that would recognize that "science," itself, is "a witness that bears testimony." McLane, *supra* note 64, at 1016–24 (suggesting adoption of Justice Thomas's formality approach and proposing "the performing analyst or an observer" could testify rather than all involved analysts). Other scholars have suggested forensic science might merit differential confrontation treatment since "science is a collective phenomenon." Jennifer Mnookin & David Kaye, *Confronting Science: Expert Evidence and the Confrontation Clause*, 2012 SUP. CT. REV. 99, 155.

74. *See Crawford*, 541 U.S. at 51.

> [(1)] "*ex parte* in-court testimony or its functional equivalent—that is, material such as affidavits, custodial examinations, prior testimony that the defendant was unable to cross-examine, or similar pretrial statements that declarants would reasonably expect to be used prosecutorially," [(2)] "extrajudicial statements . . . contained in formalized testimonial materials, such as affidavits, depositions, prior testimony, or confessions," [and (3)] "statements that were made under circumstances which would lead an objective witness reasonably to believe that the statement would be available for use at a later trial."[75]

Definitions (2) and (3) could arguably include automated statements. Even definition (1) could, assuming "declarants" were interpreted objectively rather than subjectively and automated statements were considered the "functional equivalent" of "*ex parte* in-court testimony." Each of these assumptions seems plausible.[76]

Second, evidence rules suggest a statement must come from a "person." The Federal Rules of Evidence define "Hearsay" in Rule 801 as "a statement . . . the declarant does not make while testifying at the current trial or hearing" that is "offer[ed] in evidence to prove the truth of the matter asserted."[77] In turn, "Statement" is defined as "a person's oral assertion, written assertion, or nonverbal conduct, if the person intended it as an assertion," and "Declarant" is defined as "the person who made the statement."[78] Considering machine testimony

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75. *Id.* at 51–52 (alteration in original) (citations omitted) (first quoting Brief for Petitioner 23; then quoting White v. Illinois, 502 U.S. 346, 365 (1992) (Thomas, J., concurring in part and concurring in judgment); and then quoting Brief for National Association of Criminal Defense Lawyers et al. as *Amici Curiae* 3); Katso *and Mouse*, *supra* note 4, at 35 n.69; *see also* Sklansky, *supra* note 30, at 42–43.

76. On the objectivity point, the Court's primary purpose test is purportedly objective. *See* Michigan v. Bryant, 562 U.S. 344, 359 (2011). A testimonial formulation discussed in *Bryant* could also arguably include automated statements. *See id.* at 358 ("[S]tatement[s] . . . procured with a primary purpose of creating an out-of-court substitute for trial testimony."). On the functional equivalence point, machines will eventually be able to produce reports nearly identical to human analysts, so it would seem odd for the law to intentionally treat them differently. *See supra* Parts I–II.

77. FED. R. EVID. 801(c).

78. *See id.* 801(a)–(b); *see also* United States v. Washington, 498 F.3d 225, 231 (4th Cir. 2007) (considering hearsay-related definitions and concluding "the raw data generated by the machines do not constitute 'statements,' and the machines are not 'declarants'"); United States v. Moon, 512 F.3d 359, 362 (7th Cir. 2008) ("[T]he instruments' readouts are not 'statements', so it does not matter whether they are 'testimonial.'"); People v. Lopez, 286 P.3d 469, 478 (Cal. 2012); State v. Stillwell, 232 A.3d 363, 371–72 (N.H. 2019); State v. Buckland, 96 A.3d 1163, 1171–72 (Conn. 2014) (discussing reliability concerns for machine-generated data as an authentication rather than confrontation issue); Celentino, *supra* note 12, at 1343.

"hearsay" has found vanishingly scant theoretical support in lower courts, but the confrontation right's application to automated statements remains an open question at the Supreme Court level.[79] Because evidence rules are subject to the Constitution, constitutional interpretation of the Confrontation Clause is not bound by evidence rule definitions.[80] If automated statements are found testimonial, evidence definitions should be correspondingly tweaked as necessary.[81]

Either of these two definitional challenges could also be solved if the Court simply deemed automated statements to be the statements of a relevant human.[82] For instance, in the automated DNA hypothetical discussed in the Introduction, a designer or engineer of the sample-collecting robots or unmanned drones could be considered the actual declarant of any testimonial statements such machines may make.[83] Such approach has not seemingly found much support in courts, but it remains a plausible fallback option.[84]

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79. *See* Bullcoming v. New Mexico, 564 U.S. 647, 673–74 (2011) (Sotomayor, J., concurring); Sites, *supra* note 12, at 6–12; *see also* Young v. United States, 63 A.3d 1033, 1046 (D.C. 2013) (stating "it is too simplistic to say the DNA profiles and the RMP printout were not hearsay because they were 'nothing more than raw data produced by a machine'" but seemingly basing "statement" on "inputs that require judgment or permit subjectivity"); Commonwealth v. Weeden, 304 A.3d 333, 354 (Pa. 2023) (Wecht, J., concurring) ("Admitting these out-of-court statements [in the ShotSpotter report] as substantive evidence undermines each of the foundational interests underlying the Confrontation Clause of the Sixth Amendment to the United States Constitution.").

80. *See Crawford*, 541 U.S. at 50–51; *see also* David L. Faigman, Christopher Slobogin & John Monahan, *Gatekeeping Science: Using the Structure of Scientific Research to Distinguish Between Admissibility and Weight in Expert Testimony*, 110 NW. U. L. REV. 859, 875 (2016) ("The Rules of Evidence must be interpreted against the basic guarantees of the Constitution."); Jeffrey L. Fisher, Crawford v. Washington*: The Next Ten Years*, 113 MICH. L. REV. FIRST IMPRESSIONS 9, 11 (2014).

81. For instance, although outside the scope of this Article, the rules might consider doing this via a narrow carve-out or a more general reconsideration of who or what can make a hearsay statement.

82. *See* Celentino, *supra* note 12, at 1344 (suggesting that, where a forensic technician and machine work together, the results may be deemed a statement of the technician); Roth, *supra* note 12, at 1978 ("Because human design, input, and operation are integral to a machine's credibility, some courts and scholars have reasoned that a human is the true 'declarant' of any machine conveyance. But while a designer or operator might be partially epistemically or morally responsible for a machine's statements, the human is not the sole source of the claim." (footnote omitted)).

83. *See supra* Introduction.

84. Courts have largely seemed somewhat less willing to ascribe wholly machine assertions to humans. *See, e.g.*, Jess Hutto-Schultz, Comment, Dicitur Ex Machina*: Artificial Intelligence and the Hearsay Rule*, 27 GEO. MASON L. REV. 683, 696–701 (2020). Some may argue that certain technologies could eventually be deemed legal or constructive "persons"—perhaps analogous to how

This Article's preferred approach would be to simply recognize certain automated technologies can make testimonial assertions. In determining testimoniality for given automated statement types, courts would presumably be guided by the primary purpose test, general precedent on confrontation of forensic reports, and other testimoniality indicia established in past confrontation precedent.[85] As new automated technologies and processes develop and become better understood, and courts better refine their testimoniality rules for human statements, courts should seek to provide clearer guidance as to testimoniality of statements derived from specific types or categories of technological systems and processes.[86] At a minimum, if

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corporations are currently treated—but considerations of such issues are outside the scope of this Article. *See id.* at 702–07; Mark Kingwell, *Are Sentient AIs Persons?*, *in* THE OXFORD HANDBOOK OF ETHICS OF AI 325, 336–41 (Markus D. Dubber et al. eds., 2020).

85. *See supra* Part I.

86. Nuanced rules should be developed over time. This Article suggests some possible points for future consideration. First, courts could be informed by existent machine-related taxonomies. *See, e.g.*, Roth, *supra* note 12, at 2000–22. Second, courts could identify technologies that continue to be merely incorporated within any assertions of their human operators. The Court has found, for example, that human analysts relying on an apparatus may make testimonial statements. *See supra* Parts I–II. Perhaps a similar approach would apply to any permissible uses of items like radar guns, clocks, and thermometers. *See supra* Part II; *cf.* Richard D. Friedman, *Route Analysis of Credibility and Hearsay*, 96 YALE L.J. 667, 673–74 n.17 (1987); *Unanswered Questions*, *supra* note 12, at 750 n.72.

Third, courts could consider which automated technologies might be insufficiently assertive to be making confrontation statements. For instance, perhaps mere security footage would be deemed too passive, even if such footage depicts those potentially making assertive accusations. Fourth, courts will need to determine how the primary purpose test applies to automated technologies, if such test maintains vitality. For instance, should the purpose of an automated gunshot detection system be halting an ongoing emergency (nontestimonial) or creating trial evidence (testimonial)? *Cf.* Commonwealth v. Weeden, 304 A.3d 333, 350–51 (Pa. 2023). Which, if any, interim or tangentially-involved machines in a larger automated process can meet the primary purpose test? *Cf. Multi-Analyst Problem*, *supra* note 53, at 197–99. Fifth, the courts will need to determine what constitutes sufficient formality for automated statements, if formality remains relevant. *Cf. supra* Parts I–II; Roth, *supra* note 12, at 2047–48. For instance, are assertions made by interim or tangentially-involved machines insufficiently formal? *Cf. Multi-Analyst Problem*, *supra* note 53, at 197–99.

Finally, courts should consider the potential interplay between any automated and non-automated testimoniality guidance. For instance, the Court largely removed child statements from confrontation protection, in part because young children lack sufficient understanding of the criminal legal system. *See supra* Part I. If machines are capable of making testimonial statements, and assuming they also lack sufficient understanding of the criminal legal system, should that militate in favor of revising this rationale in respect of children? *Cf.*

in the future automated assertions replace certain currently testimonial assertions of humans, these new automated assertions should also generally be treated as testimonial. Testimonial statements would, therefore, flow from the automated DNA hypothetical described in the Introduction.

III. NECESSITY OF HUMAN CONFRONTATION

Assuming technology can make testimonial statements, the law must establish who or what can offer supporting testimony. The idea of cross-examining a machine does not fit neatly within the law's conception of cross-examination.[87] This Part argues only human confrontation is sufficient, meaning the prosecution must produce a sufficient human on behalf of testimonial machine statements or such statements are inadmissible.[88] Human confrontation serves confrontation's reliability and dignity interests.

A. Human Confrontation Serves Reliability Interest

Just like human evidence, automated evidence may be flawed. Reliability concerns could include inaccuracies from hallucinations, biases, malfunctions, or improper settings.[89]

Roth, *supra* note 12, at 2048. Similarly, assertions by machines might be analogized to police dog identifications. *See* Friedman, *supra*, at 673–74 n.17; Sites, *supra* note 1, at 63–65 (noting courts have not been amenable to canine "confrontation" for reasons such as "dogs are not capable of making testimonial statements; the dog is not the witness, the handler is; and dogs are not witnesses or declarants within the meaning of the Confrontation Clause and the rules of evidence" (footnotes omitted)); Roth, *supra* note 12, at 2046 ("[T]he Framers were concerned primarily with human accusers, although bloodhound evidence presents an interesting point of comparison."). If courts ultimately determine that machines make testimonial statements, should that have any implications for how confrontation of canine identifications is viewed?

87. *See, e.g.*, People v. Lopez, 286 P.3d 469, 478 (Cal. 2012) ("[U]nlike a person, a machine cannot be cross-examined . . . ."); United States v. Moon, 512 F.3d 359, 362 (7th Cir. 2008).

88. Part IV, *infra*, will propose principles for identification of such a sufficient human confrontation witness.

89. *See Unanswered Questions*, *supra* note 12, at 748–50; Rashida Richardson, Jason M. Schultz & Kate Crawford, *Dirty Data, Bad Predictions: How Civil Rights Violations Impact Police Data, Predictive Policing Systems, and Justice*, 94 N.Y.U. L. REV. ONLINE 15, 19 (2019); Pauline Kim, *Auditing Algorithms for Discrimination*, 166 U. PA. L. REV. ONLINE 189, 189 (2017) ("As reliance on algorithmic decisionmaking expands, concerns are growing about the potential for arbitrary, unfair, or discriminatory outcomes in areas such as . . . criminal justice."); Ngozi Okidegbe, *Discredited Data*, 107 CORN. L. REV. 2007, 2011 n.9 (2022) ("A major reason that algorithms produce biased results is that they are constructed with biased data."); *see also* CATHY O'NEIL, WEAPONS OF MATH DESTRUCTION: HOW BIG DATA INCREASES INEQUALITY AND THREATENS DEMOCRACY 199–200 (2016) (describing how mathematical models reinforce

In addition, challenging reliability may be easier with human witnesses than machine witnesses.[90] First, human witnesses take an oath to tell the truth and their demeanor can be observed.[91] Machines cannot truly understand such an oath and evaluating machine "demeanor" would be difficult. Second, humans can have a "guilty conscience" and recant.[92] Machines do not suffer guilt in the same way. Finally, automated systems may be complicated, nontransparent "black boxes."[93] Simply getting code might not illuminate all relevant concerns, and a modal nontechnical defendant is likely less able to understand code than the explanation of another individual.[94]

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existing inequalities and harm vulnerable people); Mary D. Fan, *Suspecting with Data*, 109 MINN. L. REV. 2253, 2326 (2025) (noting "risk of opaque untested errors").

90. Certain access to source code, software, or other information may also implicate trade secrecy issues. *See* Imwinkelried, *supra* note 8, at 124; Garrett & Rudin, *supra* note 25, at 586; Charlotte A. Tschider, *Beyond the "Black Box*,*"* 98 DENV. L. REV. 683, 710–14 (2021); Rebecca Wexler, *Life, Liberty, and Trade Secrets: Intellectual Property in the Criminal Justice System*, 70 STAN. L. REV. 1343, 1346–54 (2018) (arguing no trade secret privilege "should exist in criminal proceedings").

91. Oaths and watching demeanor—while not without problems—have been noted as safeguards of in-court testimony. *See* Sklansky, *supra* note 30, at 16–17; *see also* Sheley, *supra* note 33, at 234 (discussing psychological literature).

92. *See* Sheley, *supra* note 33, at 232–35 (discussing emotional guilt as connected to accuracy and the broader dignitary interest).

93. *See supra* Part I.

94. *See* Lilian Edwards & Michael Veale, *Enslaving the Algorithm: From a "Right to an Explanation" to a "Right to Better Decisions"?*, 16 IEEE SEC. & PRIV. 46, 49 (2018) ("[A]lgorithmic models, inputs, and weightings, however disclosed, may still not show that a system has been designed to be biased, unfair, or deceptive. Most algorithms will display inadvertent bias rather than explicitly coded-in bias."); Sklansky, *supra* note 30, at 72 (suggesting defense attorneys, judges, and juries may lack sufficient background or training to understand "scientific evidence"); *see also* Roth, *supra* note 12, at 1979 (noting testimony of a "designer, inputter, or operator" might "be justified based on the inability of jurors, without such testimony, to assess the black box dangers"); Sandra Wachter, Brent Mittelstadt & Luciano Floridi, *Why a Right to Explanation of Automated Decision-making Does Not Exist in the General Data Protection Regulation*, 7 INT'L DATA PRIV. L. 76, 99 (2017) ("What counts as a meaningful explanation for one individual or group may not be meaningful for another; requirements for 'meaningful explanations' must be set if a legal right to explanation is to be practically useful.").

Of course, cross-examining a human is imperfect.[95] But it may be preferable to code or some type of machine cross-examination.[96]

B. Human Confrontation Required to Meet Dignitary Interest

A time may come when machines can adequately address reliability concerns. Still, that would not render them sufficient from a confrontation perspective, since machines would not be able to meet a defendant's dignitary interest in coming "face to face" with their accusers.

1. Dignity as a Legal Principle

"Dignity" may be most associated with international human rights discourse and instruments such as the United Nations Charter and the Universal Declaration of Human Rights, but it is also an important principle in U.S. domestic law as well.[97] Justice Brennan famously declared in *Goldberg v. Kelly*[98]: "From its founding the Nation's basic commitment has been to foster the dignity and well-being of all persons within its borders."[99] Dignity has been invoked by Supreme Court Justices in 900-plus opinions, including by Roberts Court Justices ranging from Justice Ginsburg to Justice Scalia.[100] It

95. *See* Sklansky, *supra* note 30, at 71–72; Edward K. Cheng & G. Alexander Nunn, *Beyond the Witness: Bringing a Process Perspective to Modern Evidence Law*, 97 TEX. L. REV. 1077, 1096 (2019) (considering the DNA analysis context and stating "cross-examining the witness constitutes a weak test of the evidence at best, because the technician is merely a proxy").

96. Of course, courts could offer defendants both. *See infra* Section IV.B.2.b.i.

97. *See* U.N. Charter pmbl. ("[R]eaffirm[ing] faith . . . in the dignity and worth of the human person . . . ."); G.A. Res. 217 (III) A, Universal Declaration of Human Rights (Dec. 10, 1948) (referencing "dignity" several times); Oscar Schachter, *Human Dignity as a Normative Concept*, 77 AM. J. INT'L L. 848, 848 (1983); Leslie Meltzer Henry, *The Jurisprudence of Dignity*, 160 U. PA. L. REV. 169, 172–78 (2011); McCrudden, *supra* note 33, at 656 ("Dignity is becoming commonplace in the legal texts providing for human rights protections in many jurisdictions."); *see also* Jeremy Waldron, *How Law Protects Dignity*, 71 CAMBRIDGE L.J. 200, 200 (2012) ("Implicitly, dignity is protected also by prohibitions on degradation like those we find in Article 7 of the International Covenant on Civil and Political Rights (ICCPR) and Article 3 of the European Convention on Human Rights (ECHR)."); BRUCE ACKERMAN, THE POSTMODERN PREDICAMENT: EXISTENTIAL CHALLENGES OF THE TWENTY-FIRST CENTURY 53 (2024).

98. 397 U.S. 254 (1970).

99. *Id.* at 264–65 (discussing procedural rights in welfare benefits context); *see also* Charles A. Reich, *The New Property*, 73 YALE L.J. 733, 786 (1964) (discussing "individual well-being and dignity" in public benefits context); Adam B. Cox & Emma Kaufman, *The Adjudicative State*, 132 YALE L.J. 1769, 1811 (2023) (noting *Goldberg* as among the "'new property' cases decided during the 1960s and 70s"); Stephen J. Wermiel, *Law and Human Dignity: The Judicial Soul of Justice Brennan*, 7 WM. & MARY BILL RTS. J. 223, 231–33 (1998).

100. Henry, *supra* note 97, at 172–78.

has also been discussed in constitutional cases relating to important criminal defendant rights, such as those under the Eighth, Sixth, Fifth, and Fourth Amendments—including in the landmark case recognizing *Miranda* rights.[101]

While highly important, the concept of human "dignity" remains ill-defined.[102] It derives from the Latin word "dignitas" (meaning "worth"), but in classical Roman thought it referred largely to "status," such that appointment to certain public offices might confer *dignitas*.[103] Even in some Roman writing, however, particularly that of Cicero, *dignitas* also referred to the dignity of humans as humans,

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101. *See, e.g.*, *id.* at 172–73; Hudson v. Michigan, 547 U.S. 586, 594 (2006) ("[T]he [Fourth Amendment] knock-and-announce rule protects those elements of privacy and dignity that can be destroyed by a sudden entrance."); Waldron, *supra* note 97, at 201; Miranda v. Arizona, 384 U.S. 436, 441, 460 (1966) (considering the "[Fifth Amendment] privilege against self-incrimination" and stating "the constitutional foundation underlying the privilege is the respect a government—state or federal—must accord to the dignity and integrity of its citizens"); McKaskle v. Wiggins, 465 U.S. 168, 170, 176–77 (1984) (considering a "defendant's Sixth Amendment right to conduct his own defense" and stating "[t]he right to appear *pro se* exists to affirm the dignity and autonomy of the accused"); Hope v. Pelzer, 536 U.S. 730, 738 (2002) ("The use of [a] hitching post under the[] circumstances [of the case] violated the 'basic concept underlying the Eighth Amendment[, which] is nothing less than the dignity of man.'" (fourth alteration in original) (quoting Trop v. Dulles, 356 U.S. 86, 100 (1958))); Kate Weisburd, *Punitive Surveillance*, 108 VA. L. REV. 147, 199 (2022) (referring to "dignity" as "a hallmark of the Court's Eighth Amendment jurisprudence"); *see also* Erwin Chemerinsky, *Assessing Chief Justice William Rehnquist*, 154 U. PA. L. REV. 1331, 1331 (2006).

102. *See* Neomi Rao, *Three Concepts of Dignity in Constitutional Law*, 86 NOTRE DAME L. REV. 183, 186 (2011) ("The fact that 'dignity' is an important yet slippery concept has become commonplace."); Schachter, *supra* note 97, at 849 ("We do not find an explicit definition of the expression 'dignity of the human person' in international instruments or (as far as I know) in national law."); Meg Leta Jones, *The Right to a Human in the Loop: Political Constructions of Computer Automation and Personhood*, 47 SOC. STUD. SCI. 216, 232 n.1 (2017) ("Although the US Supreme Court used the term 'human dignity' or its equivalent in 187 opinions between 1925 and 1982 and 91 times between 1980 and 2000, the references have been 'inconsistent and haphazard' . . . ." (quoting Rex D. Glensy, *The Right to Dignity*, 43 COLUM. HUM. RTS. L. REV. 65, 86 (2011))). Some commenters have doubted the utility of dignity due in part to its vagueness. *See, e.g.*, Henry, *supra* note 97, at 174–75 (citing sources).

103. McCrudden, *supra* note 33, at 656–57 ("Honour and respect should be accorded to someone who was worthy of that honour and respect because of a particular status that [they] had."); Schachter, *supra* note 97, at 849; Jeremy Waldron, *Dignity, Rights, and Responsibilities*, 43 ARIZ. ST. L.J. 1107, 1118 (2011).

not moored to any additional office or status.[104] In this second sense, then, humans are considered to have a certain innate worth.[105]

Over time, the concept has been invoked differently in differing contexts—from theology to philosophy—but certain uses seemingly recognized at least some degree of innate human worth.[106] For instance, during the Middle Ages, humanists argued mankind had "dignity because Man [was] made in the image of God, distinguishing Man from other species."[107] Similarly, respect for intrinsic worth also connects to the "Kantian injunction to treat every human being as an end, not as a means."[108]

In more recent years, scholars have continued to seek to define the contours of dignity. They have considered questions such as what type and degree of respect an individual (or group of individuals) can demand from the state and others.[109] Jeremy Waldron once offered the following general formulation of dignity:

> Dignity is the status of a person predicated on the fact that she is recognised as having the ability to control and regulate her actions in accordance with her own apprehension of norms and reasons that apply to her; it assumes she is capable of giving and entitled to give an account of herself (and of the way in which she is regulating her actions and organising her life), an account that others are to pay attention to; and it means finally that she has the wherewithal to demand that her agency and her presence among us as a human being be taken seriously and accommodated in the lives of others, in others' attitudes and actions towards her, and in social life generally.[110]

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104. McCrudden, *supra* note 33, at 657.

105. *Id.* at 657 ("In this use of dignity, man is contrasted with animals . . . ."); Schachter, *supra* note 97, at 849 (noting "*dignitas*" could mean "intrinsic worth").

106. McCrudden, *supra* note 33, at 658–63.

107. *Id.* at 658.

108. Schachter, *supra* note 97, at 849 ("Respect for the intrinsic worth of every person should mean that individuals are not to be perceived or treated merely as instruments or objects of the will of others. This proposition will probably be generally acceptable as an ideal[, but t]here may be more question about its implications.").

109. Rao, *supra* note 102, at 186–87.

110. Waldron, *supra* note 97, at 202 ("[D]ignity has to function as a normative idea: it is the idea of a certain status that ought to be accredited to all persons and taken seriously in the way they are ruled."); *see also* Waldron, *supra* note 103, at 1120 ("Every man a duke, every woman a queen, everyone entitled to the sort of deference and consideration, everyone's person and body sacrosanct, in the way that nobles were entitled to deference or in the way that an assault upon the body or the person of a king was regarded as a sacrilege.").

Martha Nussbaum has discussed an approach to human "capabilities," informed by the idea of a life worthy of human dignity.[111]

Scholars have also developed theoretical conceptions of dignity tied to legal precedent. Tables 1 and 2 set out two such illustrative categorizations.

111. MARTHA C. NUSSBAUM, WOMEN AND HUMAN DEVELOPMENT: THE CAPABILITIES APPROACH 5 (2000) (identifying "a list of central human capabilities").

TABLE 1: FIVE CONCEPTIONS OF DIGNITY[112]

Conception	Description	Sample Supreme Court Uses
Institutional Status as Dignity	Dignity (or worth) is a function of social status Dignity, for instance: (i) is not intrinsic (not all institutions or individuals will acquire it); and (ii) is not permanent (it can be lost)	Invoked "to describe the heightened respect owed to judges and courtrooms, foreign nations, and American states"
Equality as Dignity	Dignity recognizes "the equal worth of all human beings" Dignity, for instance: (i) is universal (intrinsic to all humans); (ii) is permanent (cannot be lost like "status"); and (iii) functions horizontally and relationally ("all humans owe respect to, and deserve respect from, each other as beings of equal worth")	Antidiscrimination jurisprudence or Fourteenth Amendment equal protection jurisprudence
Liberty as Dignity	Dignity reflects respect for humans "as free, autonomous, sovereign, and self-determined agents" Dignity, for instance, is neither universal nor intrinsic (meaning one has it only insofar as one can make autonomous choices, and since it is capacity driven, it can be lost or gained over time)	Fourteenth Amendment substantive due process jurisprudence
Personal Integrity as Dignity	Dignity turns both on how humans conduct themselves (do they convey virtuous characteristics?) and how humans are treated (are they prevented by circumstance from conveying virtuous characteristics?) Dignity, for instance: (i) is held by those "morally, mentally, and physically intact"; (ii) commands external and internal respect; (iii) is expressive and presentational (both how someone conducts themselves and how others treat them are relevant); and (iv) has an aesthetic element (those graceful, stately, polished, and poised exude dignity, but certain others may be considered less dignified)	Sixth Amendment self-representation jurisprudence or First Amendment defamation jurisprudence
Collective Virtue as Dignity	Dignity is concerned with how society values the entirety of human life Dignity, for instance: (i) reflects excellence of the whole human species (so is harmed when individuals are treated inhumanely or dehumanizingly): (ii) is expressive and iconographic (so treating someone inhumanely, or engaging in such undignified conduct, impacts the collective society and humanity); and (iii) may overcome arguments in favor of autonomy (so individual behavior may be constrained for society's benefit)	Eighth Amendment jurisprudence limiting certain forms of punishment or Fourth Amendment jurisprudence excluding certain evidentiary material

112. This Table and any quotations therein are drawn or derived from Leslie Meltzer Henry, *The Jurisprudence of Dignity*. Henry, *supra* note 97, at 189–229.

TABLE 2: THREE CONCEPTIONS OF DIGNITY[113]

Conception	**Description**	**Sample Supreme Court Uses**
Inherent Dignity	Dignity "focuses on the inherent worth of each individual" Dignity, for instance: (i) does not depend on intelligence, social status, or morality; (ii) inheres to all people without appraisal by any additional standard; (iii) presumes human equality (i.e., each individual is born with an equal amount of dignity); (iv) "encompasses the liberal notion of negative freedom—of creating a space for individual choice"	Fourth Amendment privacy jurisprudence or Sixth Amendment self-representation jurisprudence
Substantive Conceptions of Dignity	Dignity expresses or permits enforcement of certain values Dignity, for instance: (i) requires "living in a certain way" (e.g., behaving with courage or self-control); (ii) embodies a certain view of the good life and what leads "human life [to] flourish for the individual as well as the community"; (iii) depends on specific ideals, deeming individuals dignified or worthy to the extent they conform to such ideals; (iv) is not inherent since it can be lost or gained depending on how individuals measure up to socially defined standards	Fourteenth Amendment procedural due process jurisprudence
Dignity as Recognition	Dignity "is rooted in a conception of the self as constituted by the broader community—a person's identity and worth depend on [their] relationship to society" Dignity, for instance: (i) necessitates "recognizing and validating individuals in their particularity"; (ii) requires interpersonal respect; (iii) focuses on the attitude possessed by the state and others (rather than on living one's life with a specific type of dignity or having space for non-interference into one's inherent dignity); (iv) focuses on the subjective and unique feelings of self worth held by groups and individuals	Defamation jurisprudence or Fourteenth Amendment equal protection jurisprudence

113. This Table and any quotations therein are drawn or derived from Neomi Rao, *Three Concepts of Dignity in Constitutional Law*. Rao, *supra* note 102, at 187–269.

Notwithstanding the differing definitions and conceptions, dignity remains an important legal principle.[114] The form of dignity with which this Article is perhaps most closely concerned is inherent dignity in Table 2 (i.e., "the inherent worth of each individual") and connected to the Kantian concept of humans as "end[s], not . . . means."[115] But aspects of dignity as recognized in Table 2 (i.e., "a person's identity and worth depend[s] on [their] relationship to society") are also important for present purposes.[116]

2. Dignity and Human Confrontation

Dignity may be at stake in human-machine interactions.[117] Consider automated decision making as an emblematic example.[118]

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114. *See* Schachter, *supra* note 97, at 849 ("[I]t has been generally assumed that a violation of human dignity can be recognized even if the abstract term cannot be defined. 'I know it when I see it even if I cannot tell you what it is.'" (footnote omitted)).

115. *See supra* Table 2; Schachter, *supra* note 97, at 849; *see also supra* Part I (discussing automation).

116. *See supra* Table 2; *see also* Michael P. Goodyear, *Dignity and Deepfakes*, 57 ARIZ. ST. L.J. 931, 950–53 (2025).

117. *See, e.g.*, FRANK PASQUALE, NEW LAWS OF ROBOTICS: DEFENDING HUMAN EXPERTISE IN THE AGE OF AI 30 (1st ed. 2020) ("[Certain applications of AI] promote a rule of machines over persons, which sacrifices human dignity on the altar of efficiency."); PETER-PAUL VERBEEK, SUBJECT TO TECHNOLOGY: ON AUTONOMIC COMPUTING AND HUMAN AUTONOMY, *in* LAW, HUMAN AGENCY AND AUTONOMIC COMPUTING 55, 68 (Mireille Hilderbrandt & Antoinette Rouvroy eds., 2011); Leta Jones, *supra* note 102, at 220–30 (discussing privacy, data protection, and a divergent history between the United States and Europe); Andrea Roth, *Trial by Machine*, 104 GEO. L.J. 1245, 1282–84 (2016) (discussing technology in the criminal legal system); *see also* EUR. UNION AGENCY FOR FUNDAMENTAL RTS., GETTING THE FUTURE RIGHT: ARTIFICIAL INTELLIGENCE AND FUNDAMENTAL RIGHTS 60 (2020) ("Using AI-driven technologies broadly implicates the duty to respect human dignity . . . ."); Katherine J. Strandburg, *Rulemaking and Inscrutable Automated Decision Tools*, 119 COLUM. L. REV. 1851, 1879 (2019) ("Some view the use of automated decision tools as inherently dehumanizing or disrespectful, at least in some contexts."); Ben Green & Salomé Viljoen, *Algorithmic Realism: Expanding the Boundaries of Algorithmic Thought*, PROC. ACM CONF. ON FAIRNESS, ACCOUNTABILITY & TRANSPARENCY 19, 19 (2020) ("Algorithms can be . . . dehumanizing . . . ." (footnotes omitted)).

118. *See* Isak Mendoza & Lee A. Bygrave, *The Right Not to Be Subject to Automated Decisions Based on Profiling*, *in* EU INTERNET LAW: REGULATION AND ENFORCEMENT 77, 84 (Tatiana-Eleni Synodinou et al. eds., 2017) (discussing statements relating to an Article 22 of the European Union General Data Protection Regulation precursor and stating "we can discern not just fear about humans letting machines make mistakes but a concern to uphold human dignity by ensuring that humans (and not their 'data shadows') maintain the primary role in 'constituting' themselves"); Leta Jones, *supra* note 102, at 217 ("Values related to fairness, transparency, accuracy and accountability are not the only ones implicated when algorithms are addressed as objects of political scrutiny; there is, in addition, the indignity that results from automated decision making,

Recipients of automated decisions could feel treated as "objects" rather than as individuals (e.g., with correlations substituting for truly individualized determinations), or that their freedom and autonomy is limited (e.g., with actions taken based on reasoning and information humans cannot adequately contest).[119] Perhaps in part for these reasons, some legal systems have begun to push back on automated decision making.[120] In many contexts, one human saying

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or the lack of a human in the loop."); Lee A. Bygrave, *Minding the Machine: Article 15 of the EC Data Protection Directive and Automated Profiling*, 17 COMPUT. L. & SEC. REP. 17, 19 (2001) (referencing "protection of human integrity and dignity in the face of an increasingly automated and inhuman(e) world"); Rebecca Crootof, Margot E. Kaminski & W. Nicholson Price II, *Humans in the Loop*, 76 VAND. L. REV. 429, 480 (2023) ("Some argue that subjecting humans to algorithmic decisions on significant subjects violates human dignity."); *see also* Andrew D. Selbst & Julia Powles, *Meaningful Information and the Right to Explanation*, 7 INT'L DATA PRIV. L. 233, 233 (2017) ("Automated decisions without any human intervention or understanding would seem to flout European ideas of autonomy and personhood."). The United States has seemingly not gone as far as Europe in that regard. *See* Leta Jones, *supra* note 102, at 232 n.1 ("There was a push for American law to protect the dignity of individuals in light of new information technologies (namely the Polaroid box camera) and information practices (namely the press and public appetite for celebrity gossip) at the end of the 1800s and first decades of the 1900s, but dignity did not develop a firm hold or meaning the way it has in European countries."). Even in the context of automation specifically, not all may agree a dignitary harm is implicated. *See* Tal Z. Zarsky, *Transparent Predictions*, 2013 U. ILL. L. REV. 1503, 1552 (2013) ("Linking the lack of dignity and automation is, I believe, an anachronistic notion.").

119. Margot E. Kaminski, *Binary Governance: Lessons from the GDPR's Approach to Algorithmic Accountability*, 92 S. CAL. L. REV. 1529, 1541–47 (2019) (discussing three types of dignitary concerns).

120. Most famously, perhaps, European Union General Data Protection Regulation (GDPR) Article 22 protects "the right not to be subject to a decision based solely on automated processing." *See* Regulation (EU) 2016/679, of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation), 2016 O.J. (L 119), art. 22(1) [hereinafter GDPR]; Michael Veale & Lilian Edwards, *Clarity, Surprises, and Further Questions in the Article 29 Working Party Draft Guidance on Automated Decision-Making and Profiling*, 34 COMPUT. L. & SEC. REV. 398, 398–99 (2018) ("This right was ported to the GDPR from the Data Protection Directive (DPD) 1995, and itself borrowed from early French data protection . . . law."); *see also* Michael Veale, Reuben Binns & Lilian Edwards, *Algorithms That Remember: Model Inversion Attacks and Data Protection Law*, 376 PHIL. TRANSACTIONS ROYAL SOC'Y A 1, 2 (2018) ("The recent [GDPR], which strengthens data protection provisions and penalties, has been looked to internationally as a way forward . . . ."); GDPR, *supra*, art. 4 (reflecting that an "identified or identifiable natural person" may be a "data subject"). Dignity is one plausible justification for this right. *See* Tal Z. Zarsky, *Incompatible: The GDPR in the Age of Big Data*, 47 SETON HALL L. REV. 995, 1016–17 (2017) ("[O]ne can link this right to the notion of honor and respect;

something to a second human's face better recognizes the second human's innate worth.[121]

Central to the confrontation right is the defendant's dignitary interest in coming "face to face" with an accuser.[122] Where a defendant's freedom is at stake, dignity demands accusers confront defendants and acknowledge them as human beings.[123] This also

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when faced with crucial decisions, a human should be treated with the dignity of having a human decision-maker address his or her personal matter"); *see also* Bygrave, *supra* note 118, at 18 (discussing comments regarding a predecessor provision and noting a concern relating to "alienation and a threat to human dignity"). Related limitations have been adopted or contemplated elsewhere or in other contexts. *See, e.g.*, Huq, *supra* note 18, at 617–24; Alicia Solow-Niederman, *Can AI Standards Have Politics?*, 71 UCLA L. REV. DISC. 230, 236–37 (2024); Nancy Libin et al., *Land of 10,000 Data Lakes: Minnesota Consumer Data Privacy Act Signed Into Law*, DAVIS WRIGHT TREMAINE LLP INSIGHTS (June 4, 2024), https://perma.cc/4HEC-LBTK (discussing "the Minnesota Consumer Data Privacy Act").

Even where such rules are adopted, they may not necessarily always protect individuals in the criminal context. *See, e.g.*, GDPR, *supra*, art. 2(2) ("This Regulation does not apply to the processing of personal data . . . by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties . . . .").

121. *See* Roth, *supra* note 12, at 2041 ("To 'look me in the eye and say that' is to recognize me as a full person, worthy of respect." (quoting Coy v. Ohio, 487 U.S. 1012, 1018 (1988))); *see also Coy*, 487 U.S. at 1018–19 ("Given these human feelings of what is necessary for fairness, the right of confrontation 'contributes to the establishment of a system of criminal justice in which the perception as well as the reality of fairness prevails.'" (footnote omitted) (quoting Lee v. Illinois, 476 U. S. 530, 540 (1986))); Leta Jones, *supra* note 102, at 231–32 ("[T]o treat a human in a wholly computational manner reduces the individual's dignity and restoration of dignity can be provided by a human in the loop."); SARAH E. IGO, THE KNOWN CITIZEN: A HISTORY OF PRIVACY IN MODERN AMERICA 3 (2018) (noting, in certain contexts, dignity could demand "the validation of being named and seen"); Maggie Wittlin, *Theorizing Corroboration*, 108 CORN. L. REV. 911, 965 (2023) (discussing dignitary interest and hearsay); Sevier, *supra* note 33, at 648 ("[T]he [hearsay] rule affords defendants dignity and respect by requiring their accusers to look them in the eye."). In-person interactions among humans might also have positive physiological-type impacts not fully understood. *See, e.g.*, Chiara Succi, *Humans Bring to Work a Type of Intelligence That AI Cannot Match*, LSE BUS. REV. (Feb. 26, 2024), https://perma.cc/DFL5-PXPC.

122. Sklansky, *supra* note 30, at 57–65 ("Part of the intuitive appeal of the confrontation right is the idea that accusers should have to look into the eyes of the person they are accusing."); Sheley, *supra* note 33, at 230–35 ("[B]ecause a potentially innocent defendant's dignity is affronted by a witness's State-facilitated lies, such a defendant has a dignitary interest in imposing, through physical proximity, reciprocal costs on his false accuser, which is heightened in cases where the initial lie was made in a setting created or controlled by the State.").

123. As aptly noted by one scholar:

recognizes a defendant's "participatory interest" in their defense and guards against feelings of disempowerment and diminished self-worth.[124] Cross-examining machines—for instance, via bare production of code or out of court interrogatories—is much less humanizing.[125] While continually calling for a "representative" when speaking to an automated booking agent is annoying, the criminal procedure equivalent would be dystopian. A human witness can play an interface role by explaining and translating the system's mechanism, terminology, and outcomes.[126] Human witnesses also reinforce that a "person" rather than a "thing" is responsible for any

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> [Raleigh] compares the value of his human life and the value of something materially transient: a tenure of land. But he also renders Cobham as an embodied form—a human "accuser" who he wants to meet "face to face." He further emphasizes Cobham's human existence in declaring, "[i]f my accuser were dead or abroad, it were something. But he liveth, and is in this very house!" By insisting on the shared living, human embodiment of both himself and Cobham, he underscores the fact that it is the lack of a human, face-to-face encounter that threatens his dignity in this proceeding for his own life."

Sheley, *supra* note 33, at 231 (alteration in original) (footnotes omitted).

124. *See* Huq, *supra* note 18, at 656–57 ("A bare right to be involved in an important decision is often treated as meaningful even when it cannot be justified or explained in instrumental or accuracy-related terms."); *see also* Sheley, *supra* note 33, at 233 (discussing "the dignitary value of face-to-face confrontation" and noting "all criminal defendants have a right to assist in their defenses, a right which has both accuracy and dignity components"); Margot E. Kaminski & Jennifer M. Urban, *The Right to Contest AI*, 121 COLUM. L. REV. 1957, 2000–01 (2021) ("Affording a right to contest affords a form of respect to individual people in the system. It permits participation. It establishes agency."). Such a participatory interest is already embodied in Sixth Amendment jurisprudence. *See, e.g.*, Huq, *supra* note 18, at 658 (discussing the right to counsel and referencing precedent); *see also* Sheley, *supra* note 33, at 246 ("A defendant already has a right to participate in their own defense—a right generally assumed to promote accuracy because the defendant may understand the facts of the case better than their counsel does. Yet even in cases where, given the facts, that may not turn out to be true, there remains a dignitary valence to the defendant's right to be present during the State's presentation. That dignitary interest is compromised where the State alone has been the sole intended audience for an out-of-court testimonial statement that will ultimately be used at trial.").

125. Certain defendants might feel that facing humans is actually less dignified than facing machines. To meet this concern, the law could always require production of both humans and machines, such that defendants could choose. *See infra* Part IV (noting the confrontation right is waivable).

126. *See* Crootof et al., *supra* note 118, at 487. Receiving reasoning and rationales from automated systems is not the same. *See* Huq, *supra* note 18, at 656; Crootof et al., *supra* note 118, at 479 ("Humans, on the other hand, can give reasons for their decisions, and including a human in the loop can enable the entire hybrid system to provide more satisfactory or responsive justifications.").

accusations. The testifying human can be pushed to take an additional act in the presence of the accused: assert the accusation or disavow it.

The *Crawford* Court's originalist analysis also supports the primacy of "face to face" confrontation. *Crawford* emphasized the problematic practice of using prior magistrate examinations "in court in lieu of live testimony," and noted such procedure "occasioned frequent demands by the prisoner to have his 'accusers,' *i.e.* the witnesses against him, brought before him face to face."[127] The Court made clear it was not solely reliability considerations in the Raleigh trial that concerned the Framers, but also Raleigh's ability to literally face his accuser: "the problem was that the judges refused to allow Raleigh to confront [Lord] Cobham in court, where he could cross-examine him and try to expose his accusation as a lie."[128] Raleigh more than once invoked the need to come "face to face" with his accuser:

> But, my lords, I claim to *have my accuser brought here face to face to speak*; . . . I have learned that by the law and statutes of this realm in case of treason, a man ought to be convicted by the testimony of two witnesses if they be living.
>
> . . . .
>
> Good my lords, *let my accuser come face to face and be deposed*. Were the case but for a small copyhold, you would have witnesses or good proof to lead the jury to a verdict; and I am here for my life![129]

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127. *See* Crawford v. Washington, 541 U.S. 36, 43 (2004) (quoting 1 JAMES FITZJAMES STEPHEN, HISTORY OF THE CRIMINAL LAW OF ENGLAND 326 (1883)); *see also* Mattox v. United States, 156 U.S. 237, 242–43 (1895) (emphasizing the importance of the defendant having an opportunity to compel the witness "to stand face to face with the jury in order that they may look at him, and judge by his demeanor upon the stand and the manner in which he gives his testimony whether he is worthy of belief"); California v. Green, 399 U.S. 149, 158 (1970) ("Confrontation: (1) insures that the witness will give his statements under oath—thus impressing him with the seriousness of the matter and guarding against the lie by the possibility of a penalty for perjury; (2) forces the witness to submit to cross-examination, the 'greatest legal engine ever invented for the discovery of truth'; [and] (3) permits the jury that is to decide the defendant's fate to observe the demeanor of the witness in making his statement, thus aiding the jury in assessing his credibility." (quoting 5 Wigmore § 1367)).

128. *Crawford*, 541 U.S. at 62.

129. Mathew Lyons, *The Trial of Sir Walter Raleigh: A Transcript* (2026), https://perma.cc/R7QJ-XB7A (emphasis added); *see also* Sheley, *supra* note 33, at 230–31.

Admitting testimonial automated statements without supporting human testimony appears to be exactly the type of *ex parte* examination the Confrontation Clause was aimed at preventing.[130]

From a textual perspective, it is noteworthy that the Confrontation Clause uses the word "confronted" not "contested."[131] While machines could theoretically offer some degree of evidence contestation, only humans can be truly confronted.

IV. EFFECTIVE HUMAN CONFRONTATION

This Part considers what constitutes effective human confrontation. The Part reframes automation's challenge to confrontation as a "humans in the loop" (HITL) problem, discusses specific approaches consistent with that framing, and raises certain broader implications of human confrontation.

A. Reframing Challenge as "Humans in the Loop" Problem

Automation's challenge to confrontation should be viewed as an HITL problem. As employed in this Article, the HITL problem refers to the conundrum of what roles, if any, humans can or should play in connection with technological systems and processes.[132] Drawing on the scholarship and trade-offs associated with this problem may help inform decisions on where it makes sense to find—or place—a human confrontation witness.

The HITL conundrum has recently become an important theme in technology-governance literature.[133] HITL scholarship considers questions such as "whether keeping humans involved will improve the results of decision making (rendering those results safer or more accurate), and whether human involvement serves non-accuracy-related values like legitimacy and dignity."[134]

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130. *See supra* Part II.

131. *See* U.S. CONST. amend. VI. In the very dictionary relied upon by the *Crawford* Court for a definition of "witness," the word "confront" has several definitions, but only one that specifically mentions the context of courts and witnesses: "To set face to face; to bring into the presence of; as an accused person and a witness, in court, for examination and discovery of the truth; followed by with." 1 NOAH WEBSTER, AN AMERICAN DICTIONARY OF THE ENGLISH LANGUAGE 357 (1828) (emphasis omitted). Such definition emphasizes the importance of confrontation "face to face" and in "presence." *Id.*

132. *See infra* Section IV.A.

133. *See, e.g.*, Kiel Brennan-Marquez, Karen Levy & Daniel Susser, *Strange Loops: Apparent Versus Actual Human Involvement in Automated Decision Making*, 34 BERKELEY TECH. L.J. 745, 749 (2019); *see also* Orly Lobel, *The Law of AI for Good*, 75 FLA. L. REV. 1073, 1107–09 (2023) (discussing regulatory activities).

134. Brennan-Marquez et al., *supra* note 133, at 745 (footnote omitted). Some have pointed to risks or concerns associated with including HITL. *See, e.g.*, Charlotte A. Tschider, *Humans Outside the Loop*, 26 YALE J.L. & TECH. 324, 330

HITL implies at least some degree of involvement from humans, but the precise definition and contours of HITL is not fully agreed upon by scholars.[135] Should HITL be defined narrowly, for instance, limited to systems operating autonomously with provision for human override in situations of obvious error?[136] Or, should it be defined more broadly, for instance, also encompassing the human role in developing and supporting autonomous systems and the co-embeddedness of machines and humans in technology-assisted decisional environments?[137] Depending on the adopted definition, any of the following situations could theoretically constitute HITL systems: (1) a doctor deciding whether to utilize an AI diagnostic tool (i.e., humans have discretion to use the system to reach a decision); (2) an airline pilot who sometimes manually flies a plane and other times uses autopilot (i.e., humans and automated technology pass tasks back and forth); (3) a lawyer who reconfigures search parameters for an electronic discovery tool (i.e., humans alter algorithms during determination); or (4) a military officer who decides not to engage the target identified by an algorithm (i.e., humans determine how or whether to implement an automation-informed conclusion).[138]

(2024) ("In its most damaging form, a human in the loop shields the creator from liability when someone is harmed, functionally preventing the real examination of unsafe, ineffective, or unfair technology."); Andrew Keane Woods, *Robophobia*, 93 U. COLO. L. REV. 51, 112 (2022) ("[T]here is considerable evidence in a number of scenarios that keeping humans in the loop eliminates the advantages of having an automated system in the first place and, in some instances, actually makes things worse.").

135. Brennan-Marquez et al., *supra* note 133, at 749. The term "loop" might refer to an automated decisional process from beginning to end. Tschider, *supra* note 134, at 332. This may be "a cyclic process where the interactions with humans in prior loops serve as inputs for loops that follow." *Id.* Human-designed algorithms might make and record a decision once, while AI systems may change their algorithms over time—making decisions thousands or millions of times and refining results as they proceed. *Id.* The "loop," then, contemplates this ability to refine and evolve. *See id.* at 332–33.

136. Brennan-Marquez et al., *supra* note 133, at 749.

137. *See id.*; Crootof et al., *supra* note 118, at 441–44. Even when discussing narrower definitions—such as those seemingly targeted to the decisional component as opposed to the design-related component—not all enumerations of HITL are fully uniform. *Compare* Crootof et al., *supra* note 118, at 434 ("[A]n individual involved in a single, particular algorithmic decision."), *with* Brennan-Marquez et al., *supra* note 133, at 749 ("[A]ny decision-making system in which the initial triage or categorization of cases is performed by a machine, but a human agent exercises some degree of meaningful influence—up to and including override—over the disposition of particular cases.").

138. *See* Crootof et al., *supra* note 118, at 440. Even a defense system requiring timely human review of automated decisions prior to implementation could be considered an HITL system. *See id.* at 440–41.

HITL may be also be contrasted with related terms, such as "humans on the loop" and "humans out of the loop."[139] In the autonomous weapons context, weapon systems could, for instance, be classified as follows: (1) HITL (a robot "can select targets and deliver force only with a human command"); (2) humans on the loop (a robot "can select targets and deliver force under the oversight of a human operator who can override the [robot's] actions"); and (3) humans out of the loop (a robot is "capable of selecting targets and delivering force without any human input or interaction").[140] Another related term is "humans after the loop," which refers to situations where humans evaluate automated decisions after the fact, such as in an AI auditing context.[141]

With any adopted HITL definition, determining the precise required timing and degree of human involvement is challenging.[142] One means of allocating tasks between machines and humans is the so-called "MABA-MABA" approach (that is, task allocation based on what "Men Are Better At" and "Machines Are Better At").[143] Perhaps, for example, a designer feels automation is better at considering a large number of factors and ensuring like cases are determined similarly, while humans are superior at more nuanced, contextual analysis.[144] Although attractive for its simplicity, this method of

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139. *See* BONNIE DOCHERTY, LOSING HUMANITY: THE CASE AGAINST KILLER ROBOTS 2 (2012); Crootof et al., *supra* note 118, at 441 ("If no human reviews the process, evaluates the decisions, or provides any other form of oversight, humans are 'off' the loop. But if a human has the ability to intervene in an individual decision—to change it, approve it, or immediately implement it—then there is a human 'in' the loop.").

140. *See* DOCHERTY, *supra* note 139, at 2; *see also* Rebecca Crootof, *A Meaningful Floor for "Meaningful Human Control*,*"* 30 TEMP. INT'L & COMPAR. L.J. 53, 54 (2016); *see also* Maxwell Zeff, *The Pentagon Says AI is Speeding Up Its 'Kill Chain*,*'* TECHCRUNCH (Jan. 19, 2025), https://perma.cc/DG7H-RP7Q ("The word 'autonomy' is somewhat ambiguous and has sparked debates all over the tech industry about when automated systems—such as AI coding agents, self-driving cars, or self-firing weapons—become truly independent.").

141. Tschider, *supra* note 134, at 333–34. It may be helpful to have "meaningful human review" at such stage. *See* COLO. REV. STAT. § 24-18-303 (2026) ("An agency using a facial recognition service to make decisions that produce legal effects concerning individuals or similarly significant effects concerning individuals must ensure that those decisions are subject to meaningful human review."); Crootof et al., *supra* note 118, at 448, 478.

142. *See* Brennan-Marquez et al., *supra* note 133, at 749; *see also* Tschider, *supra* note 134, at 333–34.

143. *See* Crootof et al., *supra* note 118, at 460; S.W.A. Dekker & D.D. Woods, *MABA-MABA or Abracadabra? Progress on Human-Automation Co-Ordination*, 4 COGNITION TECH. & WORK 240, 240 (2002); *see also* Cary Coglianese & Alicia Lai, *Algorithm vs. Algorithm*, 71 DUKE L.J. 1281, 1309–14 (2022) (discussing things at which algorithms are better and humans are better).

144. *See* Crootof et al., *supra* note 118, at 475.

allocating responsibilities has been criticized.[145] For instance, critics point out that it focuses too heavily on the individual machine and human components of systems, rather than recognizing that these components "interact with, hamper, or amplify each other's weaknesses."[146] Or, it may be criticized for being predicated on a "presumption of fixed human and machine strengths and weaknesses."[147] For any given system and context, then, it is important to be thoughtful not just about whether to include HITL, but also why and how to include them.[148]

B. Approaches to Human Confrontation

If human confrontation is required, it will be necessary to adopt specific approaches to adequately effectuate such confrontation. Consistent with the HITL framing, this Article proposes a primary human confrontation approach and then discusses several possible supplemental approaches.

1. Proximate Witness Approach

For testimonial automated statements, this Article proposes confrontation of the closest sufficient human witness or witnesses. This will be referred to as the "Proximate Witness Approach."

a. Adequacy of Proximate Witnesses

The Confrontation Clause demands "effective" but not perfect confrontation.[149] Permitting one or more individuals to testify on behalf of an automated technology or process can meet this standard.[150]

First, utilizing proximate witnesses appears a balanced approach that adequately protects a defendant's dignity without disproportionately impeding a community's ability to preserve public

145. *Id.* at 460; Dekker & Woods, *supra* note 143, at 240–42.

146. Crootof et al., *supra* note 118, at 467.

147. Dekker & Woods, *supra* note 143, at 240, 243 (criticizing the "who does what" approach and asserting that "the more pressing question today is how to make humans and automation get along together").

148. *See* Crootof et al., *supra* note 118, at 473; Daniel J. Solove & Hideyuki Matsumi, *AI, Algorithms, and Awful Humans*, 92 FORDHAM L. REV. 1923, 1938 (2024).

149. *See supra* Part I. It is also perhaps noteworthy that the Supreme Court has recognized certain pre-constitutional carve-outs to confrontation, such as forfeiture by wrongdoing and dying declarations. *See* Ohio v. Clark, 576 U.S. 237, 248–49; Giles v. California, 554 U.S. 353, 357–61 (2008); *supra* Part I.

150. As previously noted, some may prefer to deem the identified person (or persons) the actual declarant of the machine statement. *See supra* Part II. Although this Article would accept such approach, the preference would be to consider the human testifying on behalf of the machine.

safety.[151] Proximate witnesses will not be able to answer all questions a defendant might wish to pose. But courts will still need to ensure that proximate witnesses afford a sufficient opportunity for confrontation, even though what constitutes sufficiency will likely be different in differing technological contexts.[152] And, even where courts find it acceptable that proximate witness cannot answer certain types of questions, the defendant might still derive some value from forcing the witness to admit lack of knowledge in front of the jury.[153] Where a court determines no sufficient proximate witnesses are present in connection with an automated technological system or process, any relevant testimonial statements would be excluded.

Second, utilizing a proximate witness is arguably no worse than confrontation potentially permissible in other contexts, such as production of certain witnesses with partial memory impairment.[154] Like the memory impaired witness, the proximate witness might not be able to answer all relevant questions, but could arguably offer a sufficient degree of cross-examination.

Third, in connection with forensic reports, the Court has seemingly suggested that the Confrontation Clause does not require production of all analysts involved in a relevant forensic analysis.[155] Correspondingly, production of one or more proximate witnesses could meet a defendant's confrontation right, even if that does not constitute all possible relevant witnesses.

Finally, the Court has, so far, not embraced the "surrogate witness" concept (i.e., permitting one analyst to testify on behalf of another).[156] However, even if surrogate testimony is never accepted by the Court, the Proximate Witness Approach is distinguishable. Surrogate testimony necessarily means that there was a theoretically "better" witness to confront, but the defendant is offered only a second-best substitute.[157] The proximate witness, in contrast, is intended to be the "best" human witness.[158]

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151. *Cf. Unanswered Questions*, *supra* note 12, at 750 ("Should algorithmic or AI statements be considered inadmissible as effectively unconfrontable?").

152. *See infra* Section IV.B.1.b.

153. *See supra* Part I; *cf. Memory Loss*, *supra* note 30, at 122–37.

154. *See Memory Loss*, *supra* note 30, at 122–27.

155. *See Multi-Analyst Problem*, *supra* note 53, at 196 n.225. It may be that the statements of certain analysts are not even testimonial. *Id.* at 197–99. The Constitution uses the text "witnesses against," not just "witnesses," and some witnesses are arguably offering evidence that is more "against" the defendant than other witnesses. *See* U.S. CONST. amend. VI.

156. Katso *and Mouse*, *supra* note 4, at 54–55.

157. *See* Mnookin & Kaye, *supra* note 73, at 110.

158. If the Court were one day to recognize "surrogate witness" testimony, the identification principles presented in this Article may be relevant in identifying an appropriate "surrogate." *See infra* Section IV.B.1.b.

b. Open Set of Identification Principles

This Article proposes an open set of principles to guide courts as to who could be deemed a sufficient proximate witness: involvement, knowledge, representativeness, and responsibility. These principles draw on the existing *Crawford* framework, focus on the minimum quantum of confrontation required, and preserve flexibility for refinement in the future as technology and legal rules further develop.

i. Involvement

The first identification principle is "Involvement." This refers to the extent of an individual's involvement in creation or operation of the technology, process, or evidence derived in the specific case.[159] It helps push back against professionalization of testifying witnesses by encouraging a testifying witness to know something about the specific case in question.

For certain testimonial statement situations, courts might determine the Proximate Witness Approach demands actual human involvement in connection with an automated process to support admissibility. These would become HITL-type situations.[160] Human involvement might mean: (1) *ex ante* involvement (i.e., involvement of humans before technology makes a testimonial statement); (2) concurrent involvement (i.e., involvement of humans during the course of an action or process resulting in a machine-generated testimonial statement); or (3) *ex post* involvement (involvement of humans after the machine makes a testimonial statement).[161] The law should consider whether it is advisable to involve a human, where precisely it might make sense to involve such a human, and what should be the nature and quality of any human involvement.[162] Any required human involvement should be meaningful rather than

159. Involvement in the test has been suggested as relevant for determining whether one individual could be a "surrogate witness" for another individual. *See* Katso *and Mouse*, *supra* note 4, at 54.

160. Use of "HITL-type" here is meant to include related terms such as "humans after the loop." *See supra* Section IV.A.

161. This categorization is derived from temporal and quality dimensions of other potential rights relating to automated decisionmaking. *See, e.g.*, Wachter et al., *supra* note 94, at 76–79 ("right to an explanation"); Veale & Edwards, *supra* note 120, at 399–400 (same); Edwards & Veale, *supra* note 94, at 48 (same); Huq, *supra* note 18, at 646–50 ("right to a human decision"). *But see* Selbst & Powles, *supra* note 118, at 240–41 (challenging *ex-ante*, *ex-post* distinction in GDPR "right to an explanation" context).

162. *See supra* Section IV.A. This is also consistent with scholarship relating to other potential automated decisionmaking-related rights. *See* Veale & Edwards, *supra* note 120, at 400; Huq, *supra* note 18, at 646–50.

ceremonial, with mere "rubber stamping" of an automated statement or *de minimis* involvement insufficient.[163]

In the automated DNA hypothetical described in the Introduction, the Confrontation Clause could, for instance, require *ex post* human involvement as a minimum.[164] Specifically, after the large language model drafts the report, the law could ensure that a laboratory analyst with sufficient time, support, informational access, willingness, and authority to overturn the automated decision: (1) reviews the report, quality controls it, and does any needed safety checks; (2) either rejects the automated assertion or adopts it as the laboratory's work product; and (3) becomes responsible for it.[165] The

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163. *See* Reuben Binns & Michael Veale, *Is That Your Final Decision? Multi-Stage Profiling, Selective Effects, and Article 22 of the GDPR*, 11 INT'L DATA PRIV. L. 319, 324 (2021) (discussing GDPR Article 22); David Lehr & Paul Ohm, *Playing with the Data: What Legal Scholars Should Learn About Machine Learning*, 51 U.C. DAVIS L. REV. 653, 716 (2017). Indeed, normative problems may arise where there is a misalignment between the appearance and actuality of HITL. Brennan-Marquez et al., *supra* note 133, at 747 (discussing, among other things, alienation, dignitary injuries, and deprivation of "a meaningful opportunity to contest decisions"). For instance, this may be the case where "a human appears to be in the loop, but in fact the decision-making system is fully automated." *Id.*

164. Certain criminal legal system technological processes may already contemplate some degree of human review, so it is seemingly feasible. *See, e.g.*, Commonwealth v. Weeden, 304 A.3d 333, 336–37 (Pa. 2023). The final step in a process may not, however, always be the most significant. *See, e.g.*, Binns & Veale, *supra* note 163, at 322–24 (noting, for instance, automation can play a "supporting," "triaging," or "summarization" role, and the implications may be different depending on the role played).

165. *See infra* Sections IV.B.1.b.ii–b.iv; *cf.* Binns & Veale, *supra* note 163, at 324 (discussing GDPR context); Frank Pasquale, *A Rule of Persons, Not Machines: The Limits of Legal Automation*, 87 GEO. WASH. L. REV. 1, 5 (2019); Ben Wagner, *Liable, But Not in Control? Ensuring Meaningful Human Agency in Automated Decision-Making Systems*, 11 POL'Y & INTERNET 104, 115 (2019). Of course, humans are far from perfect. Humans can be impacted by bias or could be more likely to "rubber stamp" decisions relating to one subgroup than another. *See* Binns & Veale, *supra* note 163, at 325; Lilian Edwards & Michael Veale, *Slave to the Algorithm? Why a 'Right to an Explanation' Is Probably Not the Remedy You Are Looking For*, 16 DUKE L. & TECH. REV. 18, 45 (2017) (noting "automation bias" is "a psychological phenomenon where humans either over or under-rely on decision support systems"); *see also* Strandburg, *supra* note 117, at 1864 ("Reason giving is a core requirement in conventional decision systems precisely *because* human decisionmakers are inscrutable and prone to bias and error, not because of any expectation that they will, or even can, provide accurate and detailed descriptions of their thought processes."). There are also the more general risks, for example, that humans may not always be able to adequately oversee or sufficiently challenge technology and that a human could be blamed when the system really should. *See, e.g.*, Tschider, *supra* note 133, at 328 ("[S]ociety should be cautious when expecting humans to challenge, interrupt, or supervise AI."); Kaminski, *supra* note 119, at 1594 n.331.

report might then be entered against a criminal defendant and the prosecution would need to produce this reviewing analyst in support of the report. While human involvement in any stage of the automated DNA process could theoretically be helpful to the defendant, the court may feel it is the statements in the report itself that seem most "specifically accusatory" and directly "against" the accused.[166] Individuals with only concurrent involvement and, in particular, *ex ante* involvement, might not be as well-positioned to speak to these specific ultimate assertive statements.[167]

But involvement is not an absolute requirement under the Proximate Witness Approach. There may be certain automated testimonial statement situations where the court feels human involvement is not helpful or is even problematic.[168] For instance, in the automated DNA hypothetical, suppose the Court determined that a drone merely carrying the previously collected crime scene sample to the automated testing process made a testimonial assertion. The assertion could be that the sample delivered to the laboratory was the crime scene sample.[169] In that instance, it might not make sense to force a human to actually observe the drone's flight to the laboratory.[170]

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166. *See supra* Part I. By finding *ex post* human involvement sufficient for confrontation purposes in the DNA hypothetical, the law would necessarily be accepting certain trade-offs discussed in the HITL literature, such as that decisions of an automated system could constrain or unduly influence subsequent human determinations or that fully automated processes could permissibly proceed prior to human involvement. *See, e.g.*, Binns & Veale, *supra* note 163, at 322–23; Crootof et al., *supra* note 118, at 445. Confrontation does not guarantee defendants accuracy of accusations, only sufficient means of confronting the accusations. *See supra* Part I.

167. In this vein, the "right to an explanation" scholarship may distinguish between *system functionality* (that is, "the logic, significance, envisaged consequences, and general functionality of an automated decision-making system") and *specific decisions* (that is, "the rationale, reasons, and individual circumstances of a specific automated decision"). *See* Wachter et al., *supra* note 94, at 78–79 (noting an explanation of both can be made only after a decision has been made). *But see* Selbst & Powles, *supra* note 118, at 239–40 (challenging the distinction in GDPR "right to an explanation" context). It would still be important that the testifying witness or witnesses were able to speak to other aspects of the technological process, such as how often the machines collecting the samples or making the DNA match are updated, checked, make errors, malfunction, or proceed unobserved.

168. *See supra* Section IV.A.

169. The Court might consider such delivery nontestimonial, since it could be seen as merely a chain of custody-related activity. *See Multi-Analyst Problem*, *supra* note 53, at 182–99.

170. For example, perhaps there it would better serve confrontation's values to require production of an engineer or designer connected to the drone technology utilized (i.e., someone arguably more knowledgeable about, and responsible for, the technological assertion). *See infra* Sections IV.B.1.b.ii,

ii. Knowledge

The second identification principle is "Knowledge." This refers to knowledge of the technology, process, laboratory or entity conducting the process, as well as of relevant procedures and other similar tests or processes.[171] Ideally, a relevant proximate witness would be able to answer questions relating to items such as how a machine or process works and what are its error rates. Prioritizing knowledge encourages testimony from individuals best able to answer questions regarding the relevant technology or process-type. It seeks to encourage transparency and work against the "black box."[172]

In the automated DNA hypothetical, if the court required an analyst to review and approve the report, such analyst would need to be sufficiently competent to understand the technology and procedures involved. Similarly, any engineers, designers, or operators testifying on behalf of the robots collecting the crime scene samples or the drones flying such samples to the laboratory would need to understand the technologies in question and be able to answer questions on them in court.

iii. Representativeness

The third identification principle is "Representativeness." This refers to the extent to which the testifying witness can sufficiently represent all the involved technologies, all stages of the involved processes, and the views of all other important potential testifying

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IV.B.1.b.iv. Theorizing that some situations may exist where involvement is not absolutely required does not violate the Supreme Court's *Melendez-Diaz* line of forensic report cases, since such cases did not treat fully automated forensic tests. *See supra* Part I.

171. Knowledge of other similar tests has been suggested as relevant for determining whether one individual could be a "surrogate witness" for another individual. *See* Katso *and Mouse*, *supra* note 4, at 54. Prioritizing knowledge also emphasizes that the individual should not be tantamount to a detached or poorly informed Rule 30(b)(6) witness. *See* FED. R. CIV. P. 30(b)(6) ("In its notice or subpoena, a party may name as the deponent a public or private corporation, a partnership, an association, a governmental agency, or other entity . . . . The named organization must designate one or more officers, directors, or managing agents, or designate other persons who consent to testify on its behalf . . . .").

172. *See* Roth, *supra* note 12, at 1977 ("Just as the 'hearsay dangers' are believed more likely to arise and remain undetected when the human source is not subject to the oath, physical confrontation, and cross-examination, black box dangers are more likely to arise and remain undetected when a machine utterance is the output of an 'inscrutable black box.'" (footnote omitted)); *see also* FRANK PASQUALE, THE BLACK BOX SOCIETY: THE SECRET ALGORITHMS THAT CONTROL MONEY AND INFORMATION 6–11 (2015). Confrontation does not seek to penetrate the human mind, but greater penetration of machines might be warranted, since defendants and juries may have comparatively less experience with, or understanding of, "black box" automated technologies. *See supra* Parts I–IV.

witnesses.[173] Utilizing this identification factor works against a nominally involved individual fully satisfying confrontation rights for an extremely broad and complicated technological process. It also preserves the ability to require more witnesses in more complex cases.[174]

In the automated DNA hypothetical, an analyst who observes the samples being input into the forensic process, monitors the analysis, and reviews and adopts the report would likely be more representative than someone who did only one of those things. Similarly, someone involved in designing more machines in the process would be more representative than someone involved in designing fewer such machines.

iv. Responsibility

The final identification principle is "Responsibility." This refers to responsibility for the technology or process, other individuals involved, and evidence derivation in the specific case. This does not necessarily mean the individual legally responsible for the technology or process, although if the law eventually assigns legal responsibility, this could be relevant in determining the responsible individual.[175]

In the automated DNA hypothetical, the head of the laboratory, the individual who handles quality control, or the individual who signs the report could theoretically be responsible depending on relevant procedures and standards. Such responsible analyst might then become a potential proximate witness.

Before closing discussion of the four identification principles, it is important to emphasize a few items. First, this Article prefers using

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173. The degree to which one individual can represent the views of others within a portion of a forensic process has been suggested as relevant in determining which of several forensic analysts must testify. *See Multi-Analyst Problem*, *supra* note 53, at 202–04.

174. *See id.*

175. One of the rationales for including HITL may be ensuring an individual is accountable for decisions of technological systems. *See* Crootof et al., *supra* note 118, at 482; *see also* Binns & Veale, *supra* note 163, at 324; Pasquale, *supra* note 165, at 5 (discussing legal automation and stating "[w]ithout attributing algorithmic judgments and interpretations to particular persons and holding them responsible for explaining those judgments, legal automation will undermine basic principles of accountability"); Wagner, *supra* note 165, at 115 (setting out seven criteria to "define cases of quasi-automation"). Human moral commitment may suffer when answerability for a statement is transferred to an automated technology, perhaps evoking similar concerns to 1950s nuclear debates. *See* Roth, *supra* note 12, at 2042 ("The court that first labeled the radar gun 'push button justice' akin to 'push button war' spoke only eight years after Hiroshima. Some view a 'push button war' as threatening in part because it is easier to wage when one does not have to see the people one is killing. Perhaps it is easier to accuse someone when one builds an algorithm to do so." (footnotes omitted)).

these principles over a single, bright-line sufficiency rule for proximate witnesses, since such a bright-line rule might lack adequate flexibility to account for differing technologies and developments in rules applicable to confrontation witnesses in non-automated contexts.[176] Second, and importantly, these principles do not establish a balancing test for applicability of the Confrontation Clause itself.[177] Confrontation would still attach based on testimoniality and these principles would merely help identify which individuals must testify for any automated testimonial statements. Third, to enhance certainty, courts could set default presumptions as to who must testify in connection with given categories of cases.[178] For instance, for automated DNA analyses, courts could establish that the testifying witness is normally the individual responsible for the laboratory process itself, the head of the laboratory, or someone working in a supervisory or quality control capacity at the laboratory. These defaults could be at a higher level (such as one set rule for automated forensics and another for facial recognition) or at a more granular level (such as one rule for automated DNA analysis and another for toxicology). Fourth, to be further prescriptive, courts could assign values to the identification principles. Courts could, for instance, weight the principles unequally to discourage balancing or even require that all principles be satisfied by at least one testifying proximate witness.[179] Finally, even if some residual uncertainty remained in the proposed identification process, it is certainly no

176. Setting clear general rules for the many different automated statement contexts might be challenging, especially since certain processes are multi-faceted, and it may not always be clear where the relevant "decision" or "statement" should be deemed made. *See* Binns & Veale, *supra* note 163, at 325–26.

177. The Court has seemingly disfavored case-by-case approaches to determining application of the Confrontation Clause. *See supra* Part I.

178. The Court's ability to offer specific guidance relating to specific technologies and processes may improve over time. For instance, determining the appropriateness, nature, and degree of any human involvement in a given process might become easier as more is known about that specific process and scholarship continues to refine the HITL concept. *See, e.g.*, Crootof et al., *supra* note 118, at 437 ("The law of the loop typically doesn't identify why a human is or is not in the loop; clarify what role(s) the human is supposed to play; account for the human's needs, skills, or frailties; or anticipate the ways in which working in tandem with a machine will channel and influence that human's behavior." (emphasis omitted)).

179. For instance, courts could decide to overweight human involvement to incentivize laboratories and law enforcement agencies to place HITL. Courts might reason that involved humans would make sufficient, readily identifiable proximate witnesses and laboratories are best-placed to bear any associated HITL costs. *Cf.* Guido Calabresi & Jon T. Hirschoff, *Toward a Test for Strict Liability in Torts*, 81 YALE L.J. 1055, 1059–60 (1972) (discussing accident avoidance and costs in torts context).

worse than the Court's current "primary purpose" approach, which purports to determine testimoniality itself.[180]

2. Possible Supplemental Approaches

Beyond the Proximate Witness Approach, there are many options for supplemental approaches. These include approaches that can mitigate human confrontation's burden on law enforcement or provide even stronger protection for the defendant.[181]

a. Mechanisms for Mitigating Law Enforcement Burden

Certain supplemental approaches could help mitigate the law enforcement burden of producing a human confrontation witness. Several examples are discussed here.

i. Notice and Demand Statutes

States could utilize "notice and demand" statutes in automated contexts.[182] Such provisions would generally obligate the prosecution to offer the defense notice of intent to utilize a forensic report, permitting the defense a set period of time to object to the evidence absent confrontation.[183] Absent objection, the prosecution may enter the evidence without producing a supporting witness.[184] Use of these statutes has seemingly been approved by the Supreme Court.[185] If, for instance, a defendant knew a seized substance was cocaine, and contesting that fact was not part of the defense's strategy, the defense might not demand confrontation of the toxicology report. As a practical matter, many defendants may choose to simply eschew calling for confrontation.[186]

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180. *See supra* Part I.

181. Not all possible supplemental approaches are discussed here, nor are approaches arguably inconsistent with human confrontation. For instance, it is unlikely that remote testimony—at least at current video conferencing technology levels—could meet a defendant's dignitary interest in human confrontation. *Cf.* Maryland v. Craig, 497 U.S. 836, 844–60 (1990). It is also noteworthy that, as a practical matter, the prosecution might present human testimony for other evidence-related purposes connected to admitting the statements. This suggests that human confrontation may not necessarily be too hefty an additional burden. However, the independent human confrontation requirement is still necessary for at least two reasons. First, state or federal evidence rules can be more easily changed than constitutional confrontation protections. Second, there may be circumstances where a witness testifying for another evidence-related purposes is not necessarily the appropriate confrontation witness.

182. Katso *and Mouse*, *supra* note 4, at 55.

183. Melendez-Diaz v. Massachusetts, 557 U.S. 305, 326 (2009).

184. Katso *and Mouse*, *supra* note 4, at 55.

185. *Melendez-Diaz*, 557 U.S. at 326.

186. *See* Squitieri, *supra* note 12, at 2039.

ii. Retesting

In appropriate contexts, law enforcement using technologies could rely on retesting—or rerunning the process—where confrontation is necessary. Many cases will not go to trial and even for those that do, defendants may choose not to demand confrontation.[187] For this reason, it might be efficient in certain contexts—such as DNA or toxicology tests—to generally use automated processes without excessive forethought as to an available proximate witness.[188] Then, for only the smaller subset of cases where confrontation is likely to be demanded, law enforcement could have the relevant test rerun with a proximate witness in mind. Automation may make retesting relatively easy. However, the underlying material to test would need to still exist, so this approach might require sufficient rules on sample and data preservation.[189]

iii. Unavailability

The Court could utilize unavailability as a mitigating mechanism. Recall that *Crawford* requires confrontation in appropriate cases unless "the declarant is unavailable" and "the defendant has had a prior opportunity to cross-examine" them.[190] Under the Proximate Witness Approach, the Court could determine testimony from multiple individuals is sufficient or even required. If certain such witnesses are available and others unavailable, the Court could consider excusing the unavailable witnesses without prior cross-examination, assuming at least one sufficient proximate witness testifies.[191]

iv. Risk- or Harm-Based Remedies

The Court could adopt a risk- or harm-based approach to confrontation remedies. In the data privacy context, there is a movement toward fashioning protections based on the harms or risks involved.[192] Confrontation might consider an analogous approach,

187. *See supra* Section IV.B.2.a.i.

188. Retesting has been suggested as a means of mitigation in the non-automated forensic reports context. *See* Katso *and Mouse*, *supra* note 4, at 37 n.97; Bullcoming v. New Mexico, 564 U.S. 647, 665–67 (2011).

189. *Bullcoming*, 564 U.S. at 665–66 (noting state law "require[d] the laboratory to preserve samples").

190. Crawford v. Washington, 541 U.S. 36, 59 (2004).

191. *See Multi-Analyst Problem*, *supra* note 53, at 206.

192. *See, e.g.*, Daniel J. Solove, *Data Is What Data Does: Regulating Based on Harm and Risk Instead of Sensitive Data*, 118 NW. U. L. REV. 1081, 1128 (2024). Regulation of artificial intelligence has also sometimes contemplated a risk-based approach. *See, e.g.*, Margot E. Kaminski, *Regulating the Risks of AI*, 103 B.U. L. REV. 1347, 1369 (2023) ("The [risk regulation] goals are . . . to prevent, reduce, or mitigate significant risks . . . . Risk regulation is often, though not always, ex ante, systemic, and concerned with aggregate outcomes.").

where a defendant is entitled to more confrontation based on how potentially damaging the evidence in question is. The textual hook here would be that the Confrontation Clause requires production of "witnesses against" not merely "witnesses."[193]

Those providing more potentially harmful evidence are arguably more "witnesses against" than those offering less damaging evidence. This approach could maintain the testimonial-nontestimonial distinction in the *Crawford* framework and simply provide a greater or lesser degree of confrontation within the cases involving testimonial statements. Or, this approach could flex the *Crawford* framework and afford at least some degree of confrontation remedies for nontestimonial statements, in particular in close cases that are currently deemed nontestimonial.[194]

v. Ex Ante *Certification*

The Court could consider affording weight to some type of *ex ante* certification system. In certain privacy-related contexts, for instance, entities may seek *ex ante* certifications to help illustrate regulatory compliance.[195] Confrontation could contemplate a similar approach if the Court offered very clear guidance on standards. At the time of deploying an automated system or process, an adopter or designer could seek certification from some trusted entity that the system or process meets the Court's human confrontation standards. This certification would not be binding on a court. But if the certifying body met relevant criteria—such as sufficient competence, trustworthiness, and neutrality—its certification could reduce uncertainty and might be afforded some weight over time.

b. Mechanisms for Additional Defendant Protection

Certain supplemental approaches could help provide additional protections for the defendant. Several examples are noted here.

193. *See* U.S. CONST. amend. VI; *see also* Part I (discussing "specifically accusatory" statements).

194. This version of risk-based confrontation would actually be more protective of certain defendants. Some have discussed potential confrontation protections for nontestimonial hearsay. *See, e.g.*, Bellin, *supra* note 64, at 46–47. As previously noted, however, the Court has seemingly expressed support for a bright-line confrontation rule. *See supra* Part I. For either version of a risk- or harm-based approach, key questions would include how riskiness or harmfulness are established and who is empowered to make relevant determinations.

195. Edwards & Veale, *supra* note 94, at 51–52; Edwards & Veale, *supra* note 165, at 79–80 (mentioning "trust seals like *TrustE*"). There have been calls for a police technology certification system, even though such a system would come with challenges. Barry Friedman et al., *Policing Police Tech: A Soft Law Solution*, 37 BERKELEY TECH. L.J. 701, 724, 748–55 (2022).

i. Human-Plus Approach

The law could require production of a human and a machine, which this Article refers to as the "Human-Plus Approach." It may be that, for instance, certain defendants feel they would benefit from confronting machine code along with a human witness. Or, perhaps some defendants feel uncomfortable facing a human accuser and would prefer to simply confront the code. The confrontation right is waivable.[196] Thus, a Human-Plus Approach could theoretically afford the defense autonomy to question a human, a machine, or both.

ii. Subpoena Power

If human confrontation failed to produce the type or degree of confrontation a defendant might want, the defendant would still retain the power to subpoena.[197] For instance, perhaps the identified proximate witness was not the only individual the defendant wanted to confront or perhaps the defendant wanted some type of machine testimony. Assuming such additional testimony were otherwise permissible, the defendant could utilize the subpoena power to compel the additional testimony.

iii. Explanation Confrontation or Due Process Confrontation

Pursuant to confrontation or due process rights, the courts could find a confrontation-related right to "transparency," "information," or "explanation."[198] Unlike a more general right to "transparency" or "explanation," this specific right would only apply as a targeted supplement to otherwise applicable confrontation rights.[199] For that

196. Melendez-Diaz v. Massachusetts, 557 U.S. 305, 314 n.3 (2009).

197. *See* U.S. CONST. amend. VI (protecting the accused's right "to have compulsory process for obtaining witnesses in his favor"); *see also Multi-Analyst Problem*, *supra* note 53, at 206. The subpoena power does not replace the confrontation right; it is merely supplemental. *See Melendez-Diaz*, 557 U.S. at 324–25.

198. *See Unanswered Questions*, *supra* note 12, at 750; Erin Murphy, *The Mismatch Between Twenty-First-Century Forensic Evidence and Our Antiquated Criminal Justice System*, 87 S. CAL. L. REV. 633, 659 (2014); *see also* Bellin, *supra* note 64, at 47–48 (discussing a possible role for "due process" in connection with admitting nontestimonial hearsay).

199. *Cf.* Babic & Cohen, *supra* note 20, at 861–66 (discussing issues relating to explainable artificial intelligence); Danielle Keats Citron, *Technological Due Process*, 85 WASH. U. L. REV. 1249, 1301 (2008) ("Legal scholars and systems experts must work together to shape the contours of due process in this automated age."); Kate Crawford & Jason Schultz, *Big Data and Due Process: Toward a Framework to Redress Predictive Privacy Harms*, 55 B.C. L. REV. 93, 128 (2014) (suggesting "procedural data due process" as response to big data's privacy challenges); Mireille Hildebrandt, *Privacy as Protection of the Incomputable Self: From Agnostic to Agonistic Machine Learning*, 20 THEORETICAL INQUIRIES L. 83, 114–19 (2019) (discussing transparency and explainability in the GDPR context); Kaminski & Urban, *supra* note 124, at 2003

reason, it might be referred to as "Explanation Confrontation" or "Due Process Confrontation," depending on the constitutional provision from which it is derived. It may be that true vindication of the Confrontation Clause in an automated policing age requires the defense to have sufficient information and understanding to formulate appropriate questions and attack incriminating evidence.[200] However, effectively scoping and implementing such a right might be challenging.[201]

C. Broader Implications of Human Confrontation

Beyond the dignitary and reliability interests served by human confrontation, such an approach has broader implications for technology and the criminal legal system. In particular, human confrontation may aid criminal legal system legitimacy, impact design of law enforcement technology, and ultimately act as a form of technology regulation.

1. Confrontation as Legitimacy

Human confrontation can promote criminal legal system legitimacy in a rapidly automating world. In addition to any innate benefits of safeguarding and improving institutional trust, increased perceived legitimacy may have the instrumental benefit of incentivizing continued citizen compliance with criminal law.[202] This legitimizing function might be called "confrontation as legitimacy."

("Contestation without an explanation . . . is largely meaningless."); Kiel Brennan-Marquez, *"Plausible Cause" Explanatory Standards in the Age of Powerful Machines*, 70 VAND. L. REV. 1249, 1280–81 (2017).

200. *See* Murphy, *supra* note 198, at 659 (discussing possibility of "a kind of collective confrontation right to transparency and accountability standards in forensic analysis"); *see also* Garrett & Rudin, *supra* note 25, at 568 ("[J]udges and lawmakers should firmly recognize a right to glass box AI in criminal cases."); Erin Murphy, *The New Forensics: Criminal Justice, False Certainty, and the Second Generation of Scientific Evidence*, 95 CALIF. L. REV. 721, 790–91 (2007) (discussing the importance of data access for defense in forensics context).

201. *See, e.g.*, Binns & Veale, *supra* note 163, at 332; *see also* Solon Barocas, Andrew D. Selbst & Manish Raghavan, *The Hidden Assumptions Behind Counterfactual Explanations and Principal Reasons*, PROCS. 2020 ASS'N FOR COMPUTING MACH. CONF. ON FAIRNESS, ACCOUNTABILITY & TRANSPARENCY 80, 80–81 (2020) (discussing certain "assumptions" and "tensions" in connection with "feature-highlighting explanations"); Andrew D. Selbst, *A Mild Defense of Our New Machine Overlords*, 70 VAND. L. REV. EN BANC 87, 93–95 (2017). It should be noted that "Due Process Confrontation" could also more broadly refer to any confrontation-related rights derived from the Due Process Clause, even though such broader rights are not fully explored in the present Article.

202. *See* Stephen J. Schulhofer, Tom R. Tyler & Aziz Z. Huq, *American Policing at a Crossroads: Unsustainable Policies and the Procedural Justice Alternative*, 101 J. CRIM. L. & CRIMINOLOGY 335, 344–49 (2013) ("In the context of

Recent years have seen public calls for police reform connected to the "Black Lives Matter" movement and the deaths of Michael Brown, George Floyd, and others.[203] While certain technology uses—such as body cameras to capture problematic officer behavior—may arguably promote legitimacy, automated technologies like facial recognition present potential legitimacy challenges.[204] Human confrontation may help safeguard legitimacy as certain law enforcement actions and decisions are delegated to automated systems.

First, the mere involvement of a human in the decisional process could increase perceived legitimacy. A recent study found, for example, that "human governance (human-in-the-loop) increased the perceived legitimacy of algorithmic systems, even when those decisions are likely to result in significant errors."[205] Human

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criminal justice, a large body of research confirms the links between perceived legitimacy and willingness to obey the law.").

203. *See* Ronald J. Coleman, *Measuring Police Body Camera Infrastructure*, 62 SANTA CLARA L. REV. 273, 275–76 (2022); Ronald J. Coleman, *Police Body Cameras: Go Big or Go Home?*, 68 BUFF. L. REV. 1353, 1359–63 (2020) [hereinafter *Go Big*]; Bennett Capers, *Race, Policing, and Technology*, 95 N.C. L. REV. 1241, 1248–49 (2017); SARAH A. SEO, POLICING THE OPEN ROAD: HOW CARS TRANSFORMED AMERICAN FREEDOM 5–6 (2019).

204. *See Go Big*, *supra* note 203, at 1359–62; Andrew Guthrie Ferguson, *Facial Recognition and the Fourth Amendment*, 105 MINN. L. REV. 1105, 1164–73 (2021); *see also* Capers, *supra* note 203, at 1283–85; Scott Skinner-Thompson, *Recording as Heckling*, 108 GEO. L.J. 125, 127 (2019).

205. Ari Waldman & Kirsten Martin, *Governing Algorithmic Decisions: The Role of Decision Importance and Governance on Perceived Legitimacy of Algorithmic Decisions*, 9 BIG DATA & SOC'Y 1, 1–2 (2022) (employing "factorial vignette survey methodology to survey individuals' normative judgments about algorithmic and human decisions"); *see also* Strandburg, *supra* note 117, at 1871 ("Reason giving legitimates governmental decisionmaking in a democracy because, as one scholar puts it, '[a]uthority without reason is literally dehumanizing. It is, therefore, fundamentally at war with the promise of democracy, which is, after all, self-government.'" (alteration in original) (quoting Jerry L. Mashaw, *Reasoned Administration: The European Union, the United States, and the Project of Democratic Governance*, 76 GEO. WASH. L. REV. 99, 118 (2007))); Brennan-Marquez et al., *supra* note 133, at 748 ("Whether affected parties view decisions—particularly adverse decisions—as legitimate often depends on the presence of visible indicia of procedural regularity and fairness."); Kiel Brennan-Marquez & Stephen E. Henderson, *Artificial Intelligence and Role-Reversible Judgement*, 109 J. CRIM. L. & CRIMINOLOGY 137, 139–40 (2019) (rationalizing maintaining HITL "even if it fails to increase—and may well diminish—accuracy and consistency" because "in a liberal democracy, there must be an aspect of 'role-reversibility' to certain judgments"). The Constitution also ensures "the accused . . . trial, by impartial jury." U.S. CONST. amend. VI. Permitting automated accusations without confrontation could be a first step toward seeking to automate judges and juries in criminal matters. *Cf.* Huq, *supra* note 18, at 625 ("[I]f the Sixth Amendment is violated by substitution of a judge for jurors, it is hard to see how the pivotal decisional role in a criminal trial could be played by a machine."); Brennan-Marquez & Henderson, *supra*, at 158–59

involvement may make maintaining truly "black box" technologies more challenging.[206] Depending on the circumstances, the Proximate Witness Approach might require or at least incentivize greater human involvement.

Second, human confrontation would introduce a degree of "friction" to automated law enforcement processes.[207] Requiring production of human witnesses to support admissibility would likely be harder for the prosecution than entering the evidence without such witnesses. It may also be more challenging for law enforcement or the technology companies to make humans sufficiently knowledgeable, responsible, or involved in processes. This friction can afford space and opportunity for the development of improved technological systems, processes, and policies.[208] Over time, such friction could help preserve legitimacy.

Third, human confrontation may facilitate both defendant participation and government reason-giving, each of which could promote legitimacy.[209] Human confrontation obligates the government to produce an individual answerable for relevant technological determinations. Such testifying witness could be faced with context and rationales from the defendant. The testifying witness would then need to provide explanations and justifications in response. These procedural elements could aid legitimacy.

Finally, human confrontation could help safeguard human capacity and continued system legitimacy over time. Broad use of automated technology without forcing human understanding and involvement could eventually blunt human ability to adequately supervise and alter the machines when needed.[210] If even those most closely involved with automated systems slowly lose their ability to

("[J]urors are reciprocally vulnerable to judgment's processes and effects: not only must they live in the same jurisdiction, subject to the same laws, they can be criminally punished for inappropriate conduct in deciding the case before them." (footnote omitted)).

206. One scholar has argued that "the more inscrutable a machine process, the more its accusatory conveyances threaten . . . the perceived legitimacy of the process." Roth, *supra* note 12, at 2042.

207. *See* Paul Ohm & Jonathan Frankle, *Desirable Inefficiency*, 70 FLA. L. REV. 777, 778–85 (2018); Diana R.H. Winters, *The Benefits of Regulatory Friction in Shaping Policy*, 71 FOOD & DRUG L.J. 228, 229 (2016); Crootof et al., *supra* note 118, at 506; Huq, *supra* note 18, at 625; Scott Skinner-Thompson, *Agonistic Privacy & Equitable Democracy*, 131 YALE L.J.F. 454, 457 (2021).

208. *See, e.g.*, Ohm & Frankle, *supra* note 207, at 778–85; Winters, *supra* note 207, at 229; Crootof et al., *supra* note 118, at 506.

209. *See* Strandburg, *supra* note 117, at 1863–69; Huq, *supra* note 18, at 661–63.

210. Shifting tasks to automation can "dull" human minds over time. Meg Leta Jones, *The Ironies of Automation Law: Tying Policy Knots with Fair Automation Practices Principles*, 18 VAND. J. ENT. & TECH. L. 77, 88 (2015) ("[R]elying on automation can make us less capable generally.").

explain, improve, or properly engage with such systems, legitimacy would erode over time. Human confrontation would push against such problematic trend by requiring presumptively testifying individuals to remain sufficiently knowledgeable about automated systems.

2. Confrontation by Design and Technology Regulation

Human confrontation could permit what this Article refers to as "confrontation by design" and "confrontation as technology regulation."[211] These are related concepts that contemplate clear court guidance driving designer behavior.

To adequately compete in the law enforcement technology market, designers of automated systems or processes need to make sure their systems or processes are adopted. Law enforcement agencies presumably want to use technology to both investigate crimes and compile evidence to support later prosecution of such crimes. All else equal, systems or processes capable of producing admissible evidence in criminal trials would seemingly have a competitive advantage over those systems incapable of producing such evidence. If courts were to set clear human confrontation standards, designers would theoretically be incentivized to design systems and processes adhering to such standards.[212] For instance, designers might design humans into the process or otherwise ensure human responsibility. Systems could also be designed to offer better information to any potential proximate witnesses, such as by providing more explicit data regarding probabilities, error rates, and other risks. If designers make design choices in response to clear confrontation rules, this may be viewed as confrontation by design.

In the aggregate, a sufficient courts-designers feedback loop could position confrontation as a form of technology regulation.[213] As noted, entities creating law enforcement-related technological

211. "Confrontation by design" is adapted from related concepts such as of "privacy by design" or "data protection by design." *See, e.g.*, Edwards & Veale, *supra* note 94, at 50; MIREILLE HILDEBRANDT, SMART TECHNOLOGIES AND THE END(S) OF LAW 220 (2015).

212. Scholars have recognized that, for example, confrontation rules could motivate laboratories to change their procedures. *See* Mnookin & Kaye, *supra* note 73, at 154.

213. This requires thinking collectively about criminal adjudication, remedies, and regulation. Jointly considering these differing system components can be helpful. *See* Rachel E. Barkow, *Criminal Law as Regulation*, 8 N.Y.U. J.L. & LIBERTY 316, 316–29 (2014) (discussing the U.S. criminal legal system as a regulatory system); Samuel Issacharoff & Adam Littlestone-Luria, *Remedy Becomes Regulation: State Making After the Fact*, 74 DEPAUL L. REV. 213, 215 (2025) (discussing "remedial regulation").

systems and processes would be directly incentivized to comply.[214] But spillover effects may be felt outside the law enforcement context, in particular when processes or systems—such as DNA analysis or facial recognition—are used both inside and outside law enforcement.

First, human testimony in court may make reporters and the public aware of any problematic features of these technologies, which could create public will for broader changes. Second, knowing individuals may be made publicly answerable for a product could dissuade such individuals from designing more problematic features. Being an anonymous member of a technology company is fundamentally different from having to defend decisions in open court. In the corporate prosecution context, for example, the Department of Justice has noted "[o]ne of the most effective ways to combat corporate misconduct is by holding accountable all individuals who engage in wrongdoing."[215] At a minimum, the testifying individual could no longer credibly claim ignorance of any issue raised to them in open court. Third, it may be more difficult for technology companies or users to have different processes and rules for law enforcement and non-law enforcement contexts. For instance, an automated DNA analysis might be used for criminal investigations, but also for paternity or matching wartime human remains.[216] In such contexts, designers and operators may choose to adopt a single, uniform process for cost or convenience purposes.

This does not mean human confrontation is an adequate substitute for more formal regulation. Appropriate *ex ante* regulations and guardrails for technology should still be fashioned.[217]

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214. *Cf.* Brennan-Marquez, *supra* note 199, at 1295 (discussing explanatory standards and noting "[a] perfect system of oversight . . . is one that never has to be mobilized, because its deterrent effect is that strong").

215. U.S. Dep't of Just., Just. Manual § 9-28.010 (2023).

216. *Multi-Analyst Problem*, *supra* note 53, at 198.

217. *See, e.g.*, Hannah Bloch-Wehba, *Algorithmic Governance from the Bottom Up*, 48 BYU L. REV. 69, 117–18 (2022); Andrew D. Selbst, *Disparate Impact in Big Data Policing*, 52 GA. L. REV. 109, 168 (2017); Aziz Z. Huq, *Constitutional Rights in the Machine-Learning State*, 105 CORN. L. REV. 1875, 1938–39 (2020); Kaminski, *supra* note 192, at 1367–69; *see also* Anupam Chander & Paul Schwartz, *Privacy and/or Trade*, 90 U. CHI. L. REV. 49, 77 (2023) (discussing "the California Consumer Privacy Act . . . , an influential state privacy law in the United States" (footnote omitted)); Julie E. Cohen, *What Privacy Is For*, 126 HARV. L. REV. 1904, 1927–32 (2013) (discussing privacy protection and regulation); Kevin E. Davis & Florencia Marotta-Wurgler, *Filling the Void: How E.U. Privacy Law Spills Over to the U.S.*, 1 J.L. & EMPIRICAL ANALYSIS 77, 77–78 (2024) (providing background on U.S. and EU privacy regulation); Wexler, *supra* note 90, at 1416; Margot E. Kaminski & Meg Leta Jones, *Constructing AI Speech*, 133 YALE L.J.F. 1212, 1213 (2024) ("Instead of asking whether the law can keep up with technology, we should be asking how the law shapes and intervenes in technology and how it can do so—or refrain from doing so—in ways that further important values.").

However, if legislators or regulators fail to sufficiently or appropriately act, human confrontation could play an important strategic role.[218]

CONCLUSION

This Article provides a broad theoretical framework for human confrontation. In the wake of increasing law enforcement automation, this framework requires production of a live human witness for testimonial automated statements, consistent with a defendant's dignitary interest in coming "face to face" with their accuser.[219] The Article proposes testimony from a closely connected proximate witness identified using an open set of suggested principles. If no sufficient proximate witness exists in connection with a relevant technological process or system, the evidence in question would be inadmissible.

Future work will be very important in refining human confrontation's contours and further understanding its broader implications. There are several avenues for such work. First, future work should set out more granular rules as to machine statement testimoniality. Should a single set of testimonial-nontestimonial guidelines apply to all technology-generated statements or should disparate categories of technologies have differing guidelines? If the latter approach is adopted, is there a typology of logically exhaustive, mutually exclusive technology categories that can guide courts? Second, it will be helpful to establish clearer rules on who is a sufficient proximate witness for the many different types of technological processes and systems. For instance, where, if at all, should humans be inserted in different technological contexts and what specific roles should they play with respect to each? How much knowledge is sufficient and to what extent does the complexity of the process necessitate additional proximate witnesses? Third, and relatedly, work should drill down on the open set of identification principles for proximate witnesses presented here and consider whether newly developing technologies, newly arising issues for criminal defendants, or updated understandings of the law in other areas justify adding or refining principles. If, for instance, criminal, tort, or administrative law eventually settled on who should be

218. It may be that more responsibility will fall to the courts in connection with certain regulatory matters. *Cf.* Loper Bright Enters. v. Raimondo, 144 S. Ct. 2244, 2273 (2024) (rejecting *Chevron* deference). Because the Supreme Court's *Crawford* framework is steeped in originalism, confrontation may have a broader support base within the Court than certain other plausible judicial mechanisms that could be used for technology regulation. *See supra* Parts I–III; Crawford v. Washington, 541 U.S. 36, 42–60 (2004).

219. It is possible that far in the future, society might change its definition of personhood. *Cf.* Kingwell, *supra* note 84, at 336–40. The framework proposed here might require revisiting in that instance.

responsible for automated system actions, that might be relevant for the "responsibility" principle.[220] The identification principles in this Article are intentionally left flexible and open to facilitate any such future refinements. Fourth, work could consider which, if any, of the supplemental approaches raised in this Article should be adopted. Finally, future work should explore the potential and operational mechanics of "confrontation by design" and "confrontation as technology regulation," including studying the feedback system between courts and non-court actors.

As law enforcement continues to automate, protecting confrontation rights will become both more challenging and more essential. Human confrontation helps buttress this "bedrock" constitutional protection, check the power of law enforcement, and recognize the dignity of criminal defendants.

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220. Automated systems may theoretically give rise to criminal, tort, or administrative liability. *See* Crootof et al., *supra* note 118, at 452; *see also* Rebecca J. Hamilton, *Platform-Enabled Crimes: Pluralizing Accountability When Social Media Companies Enable Perpetrators to Commit Atrocities*, 63 B.C. L. REV. 1349, 1352–58 (2022). Negligence or products liability law could, for example, assign which of the many individuals involved in a technological system should be responsible for its tortious conduct. *See, e.g.*, Mark A. Geistfeld, *Regulation of Artificial Intelligence in General and Autonomous Vehicles in Particular in the US*, *in* CIVIL LIABILITY FOR ARTIFICIAL INTELLIGENCE AND SOFTWARE 133, 145–47, 153–56 (Mark A. Geistfeld et al. eds., 2023) (discussing AI, autonomous vehicles, and state tort law); Catherine M. Sharkey, *A Products Liability Framework for AI*, 25 COLUM. SCI. & TECH. L. REV. 240, 241 (2024) (suggesting "a products liability conceptual framework" to "tackle many of the regulatory challenges posed by AI and machine learning"); Tschider, *supra* note 134, at 397–98; Andrew D. Selbst, *Negligence and AI's Human Users*, 100 B.U. L. REV. 1315, 1318–21 (2020); A. Michael Froomkin, Ian Kerr & Joelle Pineau, *When AIs Outperform Doctors: Confronting the Challenges of a Tort-Induced Over-Reliance on Machine Learning*, 61 ARIZ. L. REV. 33, 51 (2019) (discussing tort law and technological change); Jack M. Balkin, *Free Speech in the Algorithmic Society: Big Data, Private Governance, and New School Speech Regulation*, 51 U.C. DAVIS L. REV. 1149, 1163–68 (2018) (discussing "algorithmic nuisance"); Jack M. Balkin, *The Path of Robotics Law*, 6 CALIF. L. REV. CIR. 45, 52 (2015) ("We might hold many different potential actors liable, including the owner, operator, retailer, hardware designer, operating system designer, or programmer(s), to name only a few possibilities."). Rules eventually developed around other areas of law, like copyright, could also prove instructive. *See, e.g.*, Mark A. Lemley, *How Generative AI Turns Copyright Upside Down*, 25 COLUM. SCI. & TECH. L. REV. 190, 191–95 (2024); Shyamkrishna Balganesh, *Causing Copyright*, 117 COLUM. L. REV. 1, 77–78 (2017).