

2022

What Machines Can Teach Us about "Confrontation"

Andrea Roth

Follow this and additional works at: <https://dsc.duq.edu/dlr>



Part of the [Criminal Procedure Commons](#), [Evidence Commons](#), and the [Jurisprudence Commons](#)

Recommended Citation

Andrea Roth, *What Machines Can Teach Us about "Confrontation"*, 60 Duq. L. Rev. 210 (2022).
Available at: <https://dsc.duq.edu/dlr/vol60/iss2/3>

This Article is brought to you for free and open access by the School of Law at Duquesne Scholarship Collection. It has been accepted for inclusion in Duquesne Law Review by an authorized editor of Duquesne Scholarship Collection. For more information, please contact beharyr@duq.edu.

WHAT MACHINES CAN TEACH US ABOUT “CONFRONTATION”

*Andrea Roth**

INTRODUCTION	210
I. CONFRONTATION DOCTRINE’S “MACHINE WITNESS” PROBLEM	213
II. SUPPORT FOR CONSTRUING “CONFRONTATION” AS A MEANINGFUL OPPORTUNITY TO SCRUTINIZE THE GOVERNMENT’S PROOF	216
III. WHAT WOULD A BROADER VIEW OF “CONFRONTATION” MEAN?	221
CONCLUSION.....	226

INTRODUCTION

Adversarial criminal justice systems like that of the United States pride themselves on guaranteeing defendants tools to meaningfully scrutinize the government’s proof of guilt. The Sixth Amendment to the United States Constitution guarantees the accused several trial rights, including the right to be “confronted with the witnesses against him[.]”¹ The United States Supreme Court has recognized that the central purpose of the Confrontation Clause is to “ensur[e] that evidence admitted against an accused is reliable and subject to the rigorous adversarial testing that is the norm of Anglo-American criminal proceedings.”²

And yet, the Supreme Court has narrowly construed the right of confrontation as guaranteeing a right to scrutinize only a certain type of evidence (solemn declarations by human witnesses), through certain live in-court procedures (the oath, physical confrontation, and cross-examination at trial).³ Accordingly, the Court has

* Professor of Law, UC Berkeley School of Law. I owe much thanks to the UC Berkeley law faculty workshop participants; the participants in this Symposium; the Duquesne Law Review student editors; research assistants Katharine Currault, Kendra Dawson, and Nate Van Duzer; and David Sklansky for his previous work that inspired this project.

1. U.S. CONST. amend. VI.

2. *Maryland v. Craig*, 497 U.S. 836, 846 (1990).

3. See generally David Alan Sklansky, *Hearsay’s Last Hurrah*, 2009 SUP. CT. REV. 1 (2009) (noting the Court’s narrow definition of “confrontation”).

rejected arguments that the right of confrontation guarantees other means of scrutinizing the government's proof, beyond physical confrontation and live cross-examination. Specifically, the Court has declined to interpret the right of confrontation as guaranteeing access to a witness's potentially inconsistent prior statements; access to an (unprivileged) investigative file about the subject matter of the witness's testimony;⁴ the right to impeach an absent hearsay declarant with prior inconsistencies;⁵ or even the right to impeach a declarant with prior false allegations the declarant made against the defendant.⁶

Certain recent shifts in the nature of proof, however, have newly exposed this narrow "live in-court" conception of confrontation as untenable in a system that purports to care about verdict accuracy. Specifically, the steady rise of machine-generated information, the subject of this Symposium, has forced courts, scholars, and litigants to recognize that much of modern "testimony" is not offered by human declarants and thus cannot be physically confronted, cross-examined, or placed under oath. Meanwhile, machine conveyances of information raise issues of accuracy and completeness and even malfeasance, just as human testimony does. Without in-court tools of discovery and impeachment to help open an accusatory algorithm's "black box," litigants are hamstrung in their attempt to investigate and expose potentially critical impeachment evidence to help jurors accurately assess the probative value of what might be called "machine testimony."⁷

In this short Article, I argue that treating non-human conveyances of information—and other forms of evidence that cannot be cross-examined—as beyond the Confrontation Clause is unsatisfactory as a matter of text, history, logic, and principle. Instead, all of these clues lead to one conclusion: the right of confrontation is a right not only to physical presence of certain human witnesses to facilitate demeanor review and questioning, but to *a meaningful opportunity to scrutinize the government's proof, whatever its form.*⁸ That right would include out-of-court discovery of critical

4. *Pennsylvania v. Ritchie*, 480 U.S. 39, 54 (1987).

5. *Mattox v. United States*, 156 U.S. 237, 250 (1895).

6. *Nevada v. Jackson*, 569 U.S. 505, 511 (2013).

7. Andrea Roth, *Machine Testimony*, 126 *YALE L.J.* 1972 (2017).

8. Sklansky, *supra* note 3, at 67 (urging a view of confrontation as "a meaningful opportunity to test and to challenge the prosecution's evidence"); *see also id.* at 7 (quoting Daniel H. Pollitt, *The Right of Confrontation: Its History and Modern Dress*, 8 *J. PUB. L.* 381, 402 (1959)) ("The Confrontation Clause could be read broadly to guarantee criminal defendants a meaningful opportunity to challenge—to know, to examine, to explain, and to rebut—the proof offered against them.").

contextual information about the evidence, whether or not exculpatory, and a right to impeach, or attack, the evidence before the factfinder. As I discuss more comprehensively in other works in progress, our cross-examination-centric confrontation and evidence doctrine has more to do with the post-Founding ascendancy of lawyers, John Henry Wigmore's influential 1903 treatise, and path dependency than with any principled reason to interpret "confrontation" as synonymous with cross-examination.⁹

But what would a "meaningful opportunity to scrutinize the government's proof" and a "right to impeach" look like, if not live in-court oath-taking, physical confrontation, and cross-examination? In short, it would mean a right to more *out-of-court*, rather than live in-court, discovery, impeachment, and front-end conditions of admissibility. As I discuss below, this right would presumably include: access to prior conveyances of the machine on the same subject matter; a requirement for admissibility that the software at least be subject to independent software testing; access to evidence about the machine's error rates; the chance to submit written interrogatories about the machine's inner workings and assumptions; and, pretrial access to the algorithm and the ability to manipulate its inputs.¹⁰

As it turns out, this broader view of confrontation would not only bring the confrontation doctrine in line with the realities of accusatory machine conveyances, but would correct several other indefensible limits on confrontation imposed by the Court in previous cases with respect to *human witnesses* too. Correctly interpreted as a guarantee of a "meaningful opportunity to scrutinize the government's proof," the constitutional right of confrontation would guarantee access to prior statements of both in-court witnesses and hearsay declarants; would allow access to basic information about eyewitness identification or confession procedures followed in a given case; would allow basic impeachment evidence as to other non-human black-box proof, like dog alerts; and, would require more pretrial disclosure of potential impeachment evidence related to expert methodologies.

This short Article proceeds as follows: Part I explains confrontation's "machine problem"; that is, the rise of machine accusations as proof of guilt and the untenability of a confrontation doctrine that ignores machine witnesses. Part II makes the case for a

9. See discussion *infra* Part I.

10. David Sklansky and others have further argued that a broader right of confrontation would include the right to defense expert assistance. Sklansky, *supra* note 3, at 74; see also discussion *infra* Part II.

broader view of confrontation as a meaningful opportunity to scrutinize the government's proof, based on the Sixth Amendment's text, historical precedents, logic, and principle. It takes on counterarguments, including the cost of such an approach, the fact that some statutory doctrines (like *Daubert/Frye*) already potentially address machines, and the Supreme Court's oft-expressed insistence that there is no general constitutional right to discovery. Part III explains what a broader right of confrontation would actually mean in practice, both for machines and for other forms of proof, including human witnesses.

I. CONFRONTATION DOCTRINE'S "MACHINE WITNESS" PROBLEM

The Supreme Court's confrontation doctrine has, for over a century and a half, narrowly construed confrontation to mean live, in-court physical confrontation, the oath, and cross-examination. No other means of impeaching human witnesses, much less other types of evidence, are included in the Court's construction of the doctrine. In 1895, for example, the Court in *Mattox v. United States* upheld a trial court's refusal to allow a defendant to impeach a deceased hearsay declarant with witnesses who would testify that the declarant admitted to lying. Curiously, the Court never mentioned the Confrontation Clause, much less attempted to reconcile its holding with the right of confrontation.¹¹ "In so doing," Professor John G. Douglass writes, "the Court established a pattern that it never has broken."¹²

To be sure, the Court has intermittently hinted at a recognition that confrontation might require means of discovery and impeachment beyond cross-examination. For example, in 1897, the Court in *Carver v. United States*¹³ upheld a defendant's right to impeach a dying declaration with a prior inconsistent statement, declining to extend *Mattox* to a case "where the defendant has no opportunity by cross-examination to show that" the declarant "may have been

11. *Mattox v. United States*, 156 U.S. 237, 250 (1895); see John G. Douglass, *Beyond Admissibility: Real Confrontation, Virtual Cross-Examination, and the Right to Confront Hearsay*, 67 GEO. WASH. L. REV. 191, 201 n.45 (1999).

12. Douglass, *supra* note 11, at 201 n.45. To be sure, a small handful of lower courts have held that the Confrontation Clause guarantees a right to impeach hearsay of a nontestifying declarant. See, e.g., *Blackston v. Rapelje*, 780 F.3d 340, 356–57 (6th Cir. 2015), cert. denied, 577 U.S. 1019 (granting habeas petition of defendant who was denied the ability to impeach a non-testifying hearsay declarant whose prior testimony was admitted at trial with a prior recantation); see also Douglass, *supra* note 11, at 201 n.45 (listing a handful of pre-1999 cases).

13. 164 U.S. 694 (1897).

mistaken.”¹⁴ And in two cases in the 1950s, *Gordon v. United States*¹⁵ and *Jencks v. United States*,¹⁶ the Court used its supervisory power to hold that a defendant was entitled to the prior statements of witnesses and to information about a confidential informant. Justice William J. Brennan, the author of *Jencks*, noted in a decision two years later that *Jencks* had clear “constitutional overtones” grounded in the “common-law rights of confrontation.”¹⁷

Nonetheless, since *Jencks*, a majority of the Court has never again been willing to recognize such a right.¹⁸ In fact, in *Pennsylvania v. Ritchie*, a plurality explicitly concluded otherwise: that the Confrontation Clause does not entitle a defendant to such prior statements, nor to the contents of an investigative file regarding the subject matter of the witness’s testimony.¹⁹ Several commentators over the years have lamented this narrow conception of confrontation,²⁰ including after the Court’s most recent significant reworking of its confrontation doctrine in *Crawford v. Washington*.²¹

But these critiques should be rethought and expanded, and should gain new steam and acceptance with the rise of a particular kind of government proof that finally exposes the absurdity of viewing confrontation as simply in-court presence and questioning:

14. *Id.* at 698.

15. 344 U.S. 414, 420–21 (1953).

16. 353 U.S. 657, 668–69 (1957).

17. *Palermo v. United States*, 360 U.S. 343, 362–63 (Brennan, J., concurring in the result). Commentators noted the same. See, e.g., Evan Y. Sernerjian, *The Right of Confrontation*, 55 A.B.A. J. 152, 155 (1969) (noting *Jencks*’s “constitutional underpinnings”), with one Senator shortly after the decision noting that the Court in *Jencks* decided in accordance with “the time-honored Sixth Amendment right of an accused ‘to be confronted with the witnesses against him.’” Thomas F. Eagleton, *A State Prosecutor Looks at the Jencks Case*, 4 ST. LOUIS U. L.J. 405, 413 n.28 (1957) (quoting James Deakin, *Hennings Hails Supreme Court for its Defense of Freedoms*, ST. LOUIS POST-DISPATCH, July 8, 1957, at 14C).

18. Two exceptions arguably exist. In *Smith v. Illinois*, 390 U.S. 129 (1968), the Court held that a defendant had a Sixth Amendment right to elicit from a key government witness his true name and address, rather than merely a pseudonym, reasoning that “[t]he witness’ name and address open countless avenues of in-court examination and out-of-court investigation. To forbid this most rudimentary inquiry at the threshold is effectively to emasculate the right of cross-examination itself.” *Id.* at 131. Professor Paul Giannelli cites *Smith* as arguably “creat[ing] an opening for the Court to use the confrontation clause to constitutionalize criminal discovery.” See Paul Giannelli, *Expert Testimony and the Confrontation Clause*, 22 CAP. U. L. REV. 45, 66 (1993) (quoting James B. Haddad, *The Future of Confrontation Clause Developments: What Will Emerge When the Supreme Court Synthesizes the Diverse Lines of Confrontation Decisions?*, 81 J. CRIM. L. & CRIMINOLOGY 77, 96 (1990)). In *United States v. Wade*, the Court held that a defendant has a constitutional right to have his lawyer present at a pretrial lineup identification procedure, to “assure a meaningful confrontation at trial.” 388 U.S. 218, 236 (1967); see also *id.* at 235 (noting that the defendant would otherwise be “helpless to subject [the identification] to effective scrutiny at trial”).

19. 480 U.S. 39, 54 (1987).

20. See, e.g., Douglass, *supra* note 11, at 267–68; Giannelli, *supra* note 18, at 66; Sklansky, *supra* note 3, at 74.

21. 541 U.S. 36 (2004); see, e.g., Sklansky, *supra* note 3, at 4–5.

machine testimony. Machines cannot be cross-examined or put under oath, and they cannot physically “confront” the defendant. Nor would the specter of such procedures render machines any more likely to be “truthful.” And yet, machines convey information just like human witnesses do, and that information could be false or mistaken. Just as a human source might be insincere, inarticulate, or suffer memory or perception problems (the so-called “hearsay dangers”),²² a machine might misperceive or misanalyze an event or object due to programming errors, machine malfunctions, dataset limitations, or the like (what I have referred to as “black box dangers”).²³

Such concerns are not merely theoretical; in a recent homicide case, for example, two expert systems came to diametrically opposed results when interpreting the same DNA mixture.²⁴ In a recent letter to the White House explaining the need for transparency in algorithms used in criminal justice, Professors Brandon Garrett and Cynthia Rudin note the many algorithms that have gone awry in offering evidence of a defendant’s guilt or dangerousness, from Face Analysis, Comparison, and Evaluation (“FACE”) algorithms to risk assessment tools.²⁵ Several issues with accuracy of software-driven breath-alcohol machines have emerged,²⁶ as well as Global Positioning System (“GPS”) location records,²⁷ Fitbit data, and numerous other machine-generated results.²⁸

In the end, it is hard to imagine that the ratifiers of the Sixth Amendment would be fine with “trial by machine” without a meaningful ability to scrutinize the machine’s accuracy. Surely the same Founders that ostensibly cared so deeply about the ability to scrutinize human witnesses for evidence of bias, incompleteness, ambiguity, misperceptions, memory loss, and deliberate lies—who viewed as a grave injustice Sir Walter Raleigh’s inability to further

22. See Edmund M. Morgan, *Hearsay Dangers and the Application of the Hearsay Concept*, 62 HARV. L. REV. 177, 188 (1948).

23. Roth, *supra* note 7, at 1978, 1989–90.

24. See *id.* at 2019–20 (discussing *People v. Hillary*, No. 2015-15, NYLJ 1202766382606 (N.Y. St. Lawrence Cty. Ct., Aug. 26, 2016)) (noting that programs TrueAllele and STRMix disagreed as to whether Mr. Hillary was a contributor to a DNA mixture found under murder victim’s fingernail); *id.* at 1989–2000 (discussing various examples of machine errors caused by each black box danger).

25. Brandon L. Garrett & Cynthia Rudin, *AI & Criminal Procedure Rights*, DUKE UNIV. SCH. L. (Dec. 10, 2021), <https://wcsj.law.duke.edu/2021/12/letter-to-white-house-criminal-justice-ai-should-not-be-black-box-or-non-transparent/>.

26. See, e.g., *State v. Chun*, 943 A.2d 114, 120–21 (N.J. 2008).

27. See, e.g., *Atchison v. United States*, 54 A.3d 524, 539–41 (D.C. Ct. App. 2021) (Beckwith, J., dissenting) (raising accuracy concerns about GPS records);

28. See generally Roth, *supra* note 7, at 2021 (cataloging errors in machine-generated proof).

probe Lord Cobham's sworn letter to Privy Council accusing him of conspiring to commit treason, and who decried the practice of "trial by affidavit" facilitated by the Marian bail statutes²⁹—would also be deeply troubled by a defendant's conviction based on the claims of a proprietary black box algorithm, the processes and assumptions and demonstrated accuracy of which are often a near-complete mystery.³⁰

Thus, it would seem that the Sixth Amendment should have something to say about guaranteeing access to information critical to scrutinizing machine witnesses. Several scholars, and at least one judge, have argued as much.³¹ But so far, these arguments have not been particularly influential on courts or litigants, perhaps in part because scholars have not yet outlined the precise contours of what machine confrontation would look like, considered the full doctrinal implications of treating machine conveyances as "witnesses" for confrontation purposes, nor identified sufficient textual and historical arguments for a broader view of confrontation. The next Part outlines some of those arguments, in broad strokes. In a work in progress, I go further than this Article, explaining in greater depth how cross-examination became synonymous with confrontation and how the divide between so-called "testimonial" and physical evidence, for purposes of rules related to rights like confrontation and compulsory process, is largely illusory.

II. SUPPORT FOR CONSTRUING "CONFRONTATION" AS A MEANINGFUL OPPORTUNITY TO SCRUTINIZE THE GOVERNMENT'S PROOF

Perhaps the answer to confrontation's "machine witness" problem is simply that machine conveyances, along with animal witnesses and physical objects, are beyond the scope of the Confrontation Clause. If so, any concerns about a defendant's ability to scrutinize them would have to be met with legislatively enacted or court-crafted rules of evidence instead of the Constitution. To be

29. See *Crawford v. Washington*, 541 U.S. 36, 44 (2004) (discussing Raleigh's case and Marian bail statutes).

30. See generally Roth, *supra* note 7, at 1977 (discussing the "black box" dangers of machine-generated proof).

31. *People v. Lopez*, 286 P.2d 469, 483 (Cal. 2012) (Liu, J., dissenting) (expressing concern with the view that a machine can never be a "witness" under the Confrontation Clause); Edward K. Cheng & G. Alexander Nunn, *Beyond the Witness*, 97 TEX. L. REV. 1077, 1091 (2019); Erin Murphy, *The Mismatch Between Twenty-First Century Forensic Evidence and Our Antiquated Criminal Justice System*, 87 S. CAL. L. REV. 633, 657 (2014); Roth, *supra* note 7, at 1972; Christian Chessman, Note, A "Source" of Error: Computer Code, Criminal Defendants, and the Constitution, 105 CAL. L. REV. 179, 199 (2017).

sure, convincing particular legislatures to craft more expansive entitlements to discovery, impeachment, and front-end safeguards for machines is certainly an option that reformers can and should explore.

But there are strong textual, historical, logical, and policy-based arguments that confrontation is *not* synonymous with in-court presence and questioning of witnesses. With respect to the text, the right of compulsory process to obtain and present “witnesses” in the accused’s favor—the “cousin” of the right of confrontation—has, since the beginning of the republic, been recognized as applying not only to human witnesses, but to physical evidence as well.³² Moreover, as Professor David Sklansky noted a decade ago, the Sixth Amendment speaks of “confront[ation,]” not cross-examination.³³ Indeed, confrontation is an act done by the witnesses and prosecution, not by the defendant; it is the accused who has the right “to *be confronted with*” the witnesses against him.³⁴ Confrontation means that the witnesses must be presented before the accused. What happens as a result of this physical presence—the witness taking an oath, having their demeanor judged by the factfinder, and submitting to questioning—may be important justifications for confrontation, but they do not constitute confrontation itself. The Sixth Amendment also speaks of this right as attaching to “all criminal *prosecutions*,” not simply criminal *trials*.³⁵ Thus, if a machine “witness” offers critical accusations against a defendant, should not the prosecution be forced to confront the defendant with this accusation—before trial and outside the courtroom, if necessary—in a way that facilitates some sort of meaningful scrutiny of the accusation? The text of the Confrontation Clause would seem to support such a reading.

Treating the right of confrontation as synonymous with cross-examination is also ahistorical. At common law, cross-examination was neither guaranteed nor deemed sufficient to satisfy the right of confrontation. In pre-Founding England, defendants had a right to have their accusers present at trial, but did not have a broadly recognized right of cross-examination.³⁶ Even Sir Walter Raleigh, whose 1603 conviction for treason by the hands of an absent alleged accomplice looms large over the Supreme Court’s Confrontation

32. See *United States v. Burr*, 25 F. Cas. 187 (C.C.D. Va. 1807) (No. 14,694).

33. Sklansky, *supra* note 3, at 7.

34. U.S. CONST. amend. VI. See also Richard D. Friedman, Crawford, Davis, and *Way Beyond*, 15 J.L. & POL’Y 553, 575 (2007) (noting the Clause’s “passive phrasing”).

35. U.S. CONST. amend. VI (emphasis added).

36. See *generally* JOHN H. LANGBEIN, *THE ORIGINS OF ADVERSARY CRIMINAL TRIAL* (2003).

Clause cases, only claimed a right to be physically confronted with his accuser, not to *cross-examine* him.³⁷ Likewise, cross-examination in the early United States “was not necessarily ubiquitous or even commonplace. There are contentions, with documentary support, that cross-examination was either completely absent from or underutilized in many trials in the first years of the republic.”³⁸

On the other hand, other types of impeachment beyond cross-examination were, in fact, available to defendants. In pre-Founding England, defendants had access to transcripts of witnesses’ pretrial examinations for potential impeachment use.³⁹ By the mid-eighteenth century, these “pretrial examinations continued to be available at trial for impeachment,”⁴⁰ thereby “restrict[ing] the scope for subsequent vacillation” by the witnesses at trial.⁴¹ Meanwhile, though cross-examination also was not a routine part of pre-Founding inquisitorial continental trials, French defendants could offer character evidence to impeach or “reproach” a witness before the judge heard their testimony.⁴² And as John Douglass has pointed out, the right to impeach absent hearsay declarants—who are not subject to demeanor review and questioning but who could still be attacked with proof of prior falsehoods, inconsistencies, and other infirmities—has long been part of the common-law right of

37. See Frank R. Herrmann & Brownlow M. Speer, *Facing the Accuser: Ancient and Medieval Precursors of the Confrontation Clause*, 34 VA. J. INT’L L. 481, 545 (1994) (noting that Raleigh requested merely a right to physically confront his accuser Lord Cobham, not a right to cross-examine him).

38. Jules Epstein, *Cross-Examination: Seemingly Ubiquitous, Purportedly Omnipotent, and ‘At Risk’*, 14 WIDENER L. REV. 427, 431 (2009) (citing several sources). Bernadette Meyler cites examples of unopposed pretrial examinations being offered in American colonial trials in lieu of a witness’s live testimony, and criticizes the Supreme Court for relying exclusively on Old Bailey proceedings in concluding in recent confrontation cases that ex parte affidavits of non-testifying declarants were inadmissible by the time of the Framing. Bernadette Meyler, *Common Law Confrontations*, 37 LAW & HIST. REV. 763, 772–73 (2019); see also Herrmann & Speer, *supra* note 37, at 489, 537–40 (discussing Roman and medieval continental confrontation and noting that during Hadrian’s reign as well as in France, defendants had a right to be present and physically confront accuser, but not cross-examine).

39. LANGBEIN, *supra* note 36, at 15.

40. *Id.* at 41 n.156.

41. *Id.* at 41–42; see also *id.* at 42 n.157 (noting cases where defendants or accusers were impeached at trial with inconsistent statements from their pretrial depositions). I have been unable to determine whether such a right to prior statements existed at common law in the United States or colonial America, other than Wigmore’s claim, without citation, that defendants did not have access to prior statements “[a]t common law[.]” 3 JOHN HENRY WIGMORE, TREATISE ON THE ANGLO-AMERICAN SYSTEM OF EVIDENCE IN TRIALS AT COMMON LAW § 1859g (2d ed. 1923).

42. Meyler, *supra* note 38, at 769; see also Herrmann & Speer, *supra* note 37, at 521–22 (noting the right to reproach the witness before the judge received his testimony, but not a right of cross-examination or even presence during testimony).

confrontation (and codified in Federal Rule of Evidence 806), even if often overlooked by scholars and litigants.⁴³

So, how *did* confrontation doctrine go so far astray, allowing confrontation to be synonymous with cross-examination? Recent historical work by Professors Kellen Funk, Wendie Schneider, and others sheds new light on this question. With respect to England, Wendie Schneider argues in a recent book, along with Professor John H. Langbein and others,⁴⁴ that “[t]he growing confidence in cross-examination . . . accompanied the steady rise of the legal profession’s prestige” in mid-nineteenth century England.⁴⁵ While the practice was not unknown at the Old Bailey in the 1700s, it was controversial, viewed widely as a coarse, abusive, and unmannerly display of gamesmanship.⁴⁶ Schneider explains how cross-examination’s ultimate ability to overcome this rocky start coincided with the conspicuous failure of a number of other experimental methods of ensuring witness veracity in mid-nineteenth century England and British colonies: “Out of the welter of experimentation during the Victorian period, cross-examination lasted the longest. Other potential engines of truth—including criminal prosecution, shame sanctions, and the inquisitorial pursuit of perjurers—lay by the wayside.”⁴⁷

With respect to the United States, Kellen Funk explains in a forthcoming book about the Field Code (the influential 1850s precursor to modern rules of civil procedure) that cross-examination’s central role in American trials was not cemented at the time of the Founding. Before the 1850s, the reliability of testimony was largely

43. See, e.g., John Douglass, *Beyond Admissibility: Real Confrontation, Virtual Cross-Examination and the Right to Confront Hearsay*, 67 GEO. WASH. L. REV. 191, 191 n.250 (1999) (citing 3A JOHN HENRY WIGMORE, EVIDENCE IN TRIALS AT COMMON LAW § 1033, at 1037–39 & n.2 (James H. Chadbourn ed. 1970)); see also *id.* (discussing *Carver v. United States*, 164 U.S. 694 (1897)) (recognizing a defendant’s right at common law to impeach the declarant of a dying declaration with a prior self-contradictory statement made before she died).

44. LANGBEIN, *supra* note 36, at 246; see also George Fisher, *The Jury’s Rise as Lie Detector*, 107 YALE L.J. 575, 660 (1997) (“With lawyers, of course, came cross-examination, that greatest of tools for the ascertainment of truth.”); cf. Roger C. Park, *The Hearsay Rule and the Stability of Verdicts*, 70 MINN. L. REV. 1057, 1059–60 (1986) (predicting lawyerly opposition to elimination of the hearsay rule, given that “documentary evidence would become more important, sometimes replacing the drama and excitement of live testimony; [and] there would be less opportunity to exercise skills of cross-examination . . .”).

45. WENDIE ELLEN SCHNEIDER, *ENGINES OF TRUTH: PRODUCING VERACITY IN THE VICTORIAN COURTROOM 3* (2015).

46. See *id.*

47. SCHNEIDER, *supra* note 45, at 209; see also *id.* at 10 (“Cross-examination may have won out in the end, but it was not the only candidate under consideration.”); *id.* at 2 (“Cross-examination, initially reviled for the way in which it seemed to depend on competitive word-twisting rather than a serious concern for the truth, came to supersede perjury prosecutions as the primary means of guaranteeing witness veracity.”).

seen as guaranteed by the oath and strict witness competence rules (such as disallowing felons, atheists, the insane, parties with an interest in the case, and various racial minorities to testify).⁴⁸ It was only after the decoupling of law and religious warnings of damnation (that underlay the oath), as well as the abandonment of racial exclusion laws after the civil war, that cross-examination was broadly recognized as a sufficient guarantor of veracity.⁴⁹ While cross-examination was accepted as a legitimate and gentlemanly art far earlier in the United States than in England,⁵⁰ its dominance even here was unnecessary before the mid-nineteenth century.⁵¹

In future work, I discuss in greater detail the long shadow cast by cross-examination over the law of evidence and confrontation. For example, as cross-examination became more accepted, a “[c]oncern to promote cross-examination,” rather than the oath, “became the central justification for the hearsay rule.”⁵² And it was a full half-century after the Field Code that John Henry Wigmore declared in his influential 1904 treatise that cross-examination is the “greatest legal engine ever invented for the discovery of truth.”⁵³ Nearly 450 judicial opinions in this century alone have repeated that supposed truism.⁵⁴ As I explain, we ultimately have allowed

48. Kellen Funk has explained that the promoters of the Field Code, the precursor to the Federal Rules of Civil Procedure, argued that liberalizing witness competence rules would not jeopardize decisional accuracy, because cross-examination would offer sufficient context to jurors in judging witness credibility. See KELLEN RICHARD FUNK, *THE LAWYER'S CODE: THE TRANSFORMATION OF LEGAL PRACTICE 264–267* (forthcoming) (chapter on file with author). Professor Funk quotes Connecticut Supreme Court Justice William Storrs, an influencer of the Field Code, as stating in the 1850s that juries could “make the proper allowance for the interest and situation of the witnesses, especially as he is personally before the Court, and is subjected to the searching operation of a cross-examination.” *Id.* at 278.

49. *Id.* at 252. As Funk explains, “[t]he conviction that the threat of hell secured the solemnity, and thus truthfulness, of an oath rapidly deteriorated in early nineteenth-century America.” *Id.* at 261.

50. See *id.* at 275 (explaining that class divisions in England delayed the acceptance of cross-examination in a way that did not occur in the “comparatively less stratified” antebellum United States).

51. See *id.* at 289 (“In adapting and applying the code, legislatures and courts . . . le[ft] cross-examination to sift the truth apart from the solemnity of swearing. Codifiers and trial lawyers eagerly accepted the bargain, content to overlook a rising tide of self-interested perjury so long as their powers of courtroom oratory and examination exposed it to the trier of fact.”).

52. LANGBEIN, *supra* note 36, at 245; see also SCHNEIDER, *supra* note 45, at 60 (“In arguing for the centrality of cross-examination, barristers benefited from changes in the conceptualization of evidence law. By the mid-nineteenth century, jurists had come to accept that cross-examination was essential to establishing the truth of matters before the court. Evidence treatises of the time increasingly settled on the absence of cross-examination as the rationale for the hearsay rule.”).

53. 2 JOHN HENRY WIGMORE, *A TREATISE ON THE SYSTEM OF EVIDENCE IN TRIALS AT COMMON LAW* § 1367 (1904).

54. As of March 5, 2022, the Westlaw search “da (aft 1999) & ‘greatest legal engine ever invented #for the discovery #of truth’” in both federal and state courts yielded 446 hits.

the tail to wag the dog by equating credibility testing with cross-examination, and then allowing that equation to dictate which types of evidence (“testimony”) we deem worthy of credibility testing (answer: only the types that would most benefit from cross-examination!).

III. WHAT WOULD A BROADER VIEW OF “CONFRONTATION” MEAN?

Instead of being viewed as synonymous with cross-examination, confrontation should be viewed for what it is—a requirement that the government place its proof before the defendant to be scrutinized and further understood and, if the defendant identifies something that casts doubt on the evidence’s reliability, impeached. This should ultimately not be a controversial premise. Even Wigmore acknowledged that “[c]ross-examination . . . has for its first utility the extraction of the remaining qualifying circumstances, if any, known to the witness but hitherto undisclosed by him”;⁵⁵ it offers the “security for completeness” of the evidence.⁵⁶ Others after Wigmore have similarly described the purpose of confrontation as being to minimize inferential error by giving the jury sufficient context to understand the probative value of the evidence.⁵⁷

So, how would this broader view of confrontation actually work in a case involving machine-generated proof? Professors Ed Cheng and Alex Nunn have recently addressed what confrontation might look like for “process-based” proof such as machine conveyances.⁵⁸ They argue that confrontation of a process rather than a person would mean, among other things, a right to “[d]iscovery of calibration results, performance reviews, standard operating procedures, company policies, design documents, and the like,” which “all enable an opponent to scrutinize the process that created the process-based evidence and challenge its reliability.”⁵⁹ For example, “[i]f a

55. WIGMORE, *supra* note 53, at § 1368.

56. *Id.* at § 1367 (quoting JEREMY BENTHAM, RATIONALE FOR JUDICIAL EVIDENCE bk. II, ch. IX, § 1 (1827)).

57. See, e.g., *Maryland v. Craig*, 497 U.S. 836, 846 (1990) (quoting *Dutton v. Evans*, 400 U.S. 74, 89 (1970) (plurality opinion)) (“The mission of the Confrontation Clause is to advance a practical concern for the accuracy of the truth-determining process in criminal trials by assuring that ‘the trier of fact [has] a satisfactory basis for evaluating the truth of the [testimony].’”); Douglass, *supra* note 43, at 231 (explaining that the Clause’s purpose is not to ensure the reliability of evidence; “[i]nstead, the aim of the testing process is to give the jury the tools to decide for itself what is truth and what is not”); Pollitt, *supra* note 8, at 351 (“[Confrontation] is designed to ensure that those who must decide disputed factual issues will arrive at a correct decision.”).

58. Cheng & Nunn, *supra* note 31, at 1106.

59. *Id.*

mass spectrometer provides critical evidence in a case, the opponent may wish to test that machine using known samples. If a laboratory used a standard procedure to test for cocaine, then the opponent may wish to send blinded (but known) test samples to challenge the lab's accuracy."⁶⁰

Other possibilities for machine "confrontation" (which, if refused, would violate the Sixth Amendment) include pretrial access to algorithms in a way that allows for manipulation of inputs;⁶¹ access to the "Jencks" of the machine (meaning prior output of the machine that relates to the same subject matter of the conveyance relied on by the government); and, a minimum standard of reliability analogous to the "oath," such as conditioning admissibility on the algorithm's having been subject to independent software testing. In certain cases, the defense (or other reviewing body) might even need access to the source code to meaningfully understand machine output in the form of a score (like a credit score or likelihood ratio) for which there is no available "ground truth" against which to judge the machine through black-box validation testing alone. Perhaps, with the advance of artificial intelligence, some machines might even require as a condition of admissibility the ability to withstand the scrutiny of a fellow machine designed to test the limits of its algorithmic cousin—a form of "delegated confrontation," if you will.

One objection to this new view of confrontation might be that statutory solutions, including existing *Daubert/Frye* reliability requirements for expert testimony, are sufficient without unnecessarily "constitutionalizing" the problem.⁶² To be sure, judges have applied some existing rules to machine conveyances—such as authentication rules for "physical" evidence⁶³ and *Daubert/Frye*.⁶⁴ But these basic requirements are far from the sort of scrutiny human assertions receive; after all, a human expert, after surviving a *Daubert* challenge, is still subject to discovery disclosures and physical confrontation and cross-examination at trial. One is a minimal

60. *Id.* at 1107.

61. *Cf.* Jennifer L. Mnookin, *Repeat Play Evidence: Jack Weinstein, "Pedagogical Devices," Technology, and Evidence*, 64 DEPAUL L. REV. 571, 588 (2015) (arguing that demonstrative evidence in the form of complex algorithms should have this as a condition of admissibility).

62. *See* Roth, *supra* note 7, at 1981–82 (discussing *Daubert/Frye* and explaining modifications to these reliability requirements that would better fit machine-generated proof).

63. *See, e.g.*, FED. R. EVID. 901(b)(9); 902(13),(14); *United States v. Lizarraga-Tirado*, 789 F.3d 1107, 1110 (9th Cir. 2015) (concluding that Google Earth results are not "hearsay" and are instead physical, governed by rules of authentication).

64. *See, e.g.*, *United States v. Gissantaner*, 990 F.3d 457 (6th Cir. 2021) (applying *Daubert* to STRMix, a DNA mixture interpretation program).

reliability requirement, akin to the oath; the others are robust means of discovering and sharing impeachment evidence.

It is also surely true that further statutory protections could and should be pursued, such as software testing or open source software requirements;⁶⁵ enhanced pretrial discovery and access rights; modifications to *Daubert/Frye* and Federal Rule 16 to include expert systems; impeachment of machines with prior inconsistent conveyances; corroboration requirements (such as a two-machine rule for conviction based on a machine conveyance alone); and, better jury instructions.⁶⁶ Congressman Mark Takano, a Democrat from California, recently introduced the “Justice in Forensic Algorithms Act of 2021” (reintroduced from 2019) which would subject machine-generated proof in criminal cases to more rigorous testing, pretrial disclosure requirements, and defense access, and remove any trade secret privilege with respect to proprietary source code.⁶⁷ But these interventions require political will and legislative approval. In the meantime, defendants with a strong constitutional claim to these materials should have access to them now.

It is also worth noting that a broader view of confrontation would affect evidence beyond machine conveyances—animals, human hearsay declarants, and even in-court human witnesses whose flaws are not easily shown through live discovery and impeachment, such as experts and eyewitnesses—would all be affected. Numerous commentators, for example, have pointed out that cross-examination is largely ineffective as a means of testing certain hearsay dangers, such as misperception of eyewitnesses.⁶⁸

65. See, e.g., Nathaniel Adams, *What Does Software Engineering Have to Do with DNA?*, CHAMPION, May 2018, at 58, 61 (arguing that software should be subject to industry standard IEEE-approved independent software testing); see generally A. Morin et al., *Shining Light into Black Boxes*, 336 SCI. 159 (2012) (arguing for open source software for public law uses); Roth, *supra* note 7 (arguing for independent software testing as admissibility requirement).

66. See generally Cheng & Nunn, *supra* note 31 (suggesting enhanced discovery and testing requirements for “process-based” evidence such as machine results); Roth, *supra* note 7 (suggesting numerous machine safeguards).

67. H.R. 2438, 117th Cong. (2021). The work of my colleague, Professor Rebecca Wexler, on the trade secrets question brought these issues to the attention of Representative Takano’s office, and of a legal technology fellow in the office, Emily Paul, a graduate of Berkeley’s School of Information.

68. See, e.g., Jonathan Clow, *Throwing A Toy Wrench in the “Greatest Legal Engine”: Child Witnesses and the Confrontation Clause*, 92 WASH. U. L. REV. 793, 794 (2015) (noting that cross-examination of child witnesses is often counterproductive in reaching the truth because of capacity and suggestibility issues); Epstein, *supra* note 38, at 437–38 (“Other problematic circumstances [where cross-examination is ineffective] include cases where the witness is lying or mistaken but no impeaching evidence such as a prior inconsistent statement or criminal record exists; where a scientific laboratory has conducted flawed tests or discarded contradictory results; or where an accepted scientific technique is presented as reliable, only to be proved inaccurate years later after further research and new scientific developments.”); Richard O. Lempert, *Built on Lies: Preliminary Reflections on Evidence Law*

Under a broader view of confrontation, such evidence would be more meaningfully subject to scrutiny as well. Confrontation of these witnesses and declarants would include not cross-examination (or in the case of eyewitnesses and experts, not *just* cross-examination) but extrinsic impeachment as well, such as proof of a prior inconsistent statement, proof of a prior instance of falsehood, proof specifically contradicting a witness's factual claim, or proof of a witness's bias or incapacity. It would include construing *Jencks* to apply to all credibility-dependent human acts and utterances, including hearsay declarants but also those making "implied assertions," particularly the "malicious gossip" of co-conspirators.⁶⁹ For experts, it might mean access to proficiency testing results and validation studies (or requiring these as a condition of admissibility). For eyewitnesses, it might mean access to the stationhouse procedures used to create the identification, as recently required by the New Jersey Supreme Court.⁷⁰

Another objection to this broader view of confrontation might be that the Clause says "witnesses,"⁷¹ not physical evidence, and that machine conveyances are more akin to physical evidence than witnesses. There are several answers to this objection. First, the Compulsory Process Clause's reference to "witnesses" in the accused's favor has been interpreted for over two hundred years, with little fanfare, as applying to physical evidence as well as human

as an Autopoietic System, 49 HASTINGS L.J. 343, 345 (1998) ("[T]he likely effectiveness of cross-examination in getting at the truth is seldom examined—numerous court opinions and commentaries rely on Wigmore's conclusion . . . rather than on empirical evidence."); Douglas M. Lucas, *The Ethical Responsibilities of the Forensic Scientist: Exploring the Limits*, 34 J. FORENSIC SCIS. 719, 724 (1989) ("If cross-examination is to be the only way to discover misleading or inadequate testimony by forensic scientists, then too much is being expected from it."); Jacqueline McMurtrie, *The Role of the Social Sciences in Preventing Wrongful Convictions*, 42 AM. CRIM. L. REV. 1271, 1277 (2005) ("Although cross-examination is a powerful tool for exposing lies, it is not particularly effective when used against eyewitnesses who believe they are telling the truth."); Suedabeh Walker, Comment, *Drawing on Daubert: Bringing Reliability to the Forefront in the Admissibility of Eyewitness Identification Testimony*, 62 EMORY L.J. 1205, 1205 (2013) ("Further, [eyewitness ID evidence] is not susceptible to the traditional protections of the adversarial system, such as confrontation and cross-examination. These features set eyewitness identification testimony apart from other types of evidence, warranting special attention by courts.").

69. *Bourjaily v. United States*, 483 U.S. 171, 197 (1987) (Blackmun, J., dissenting). It may be true, as some commentators have argued, that few wrongful convictions can be traced to admission of implied assertions. See Roger C. Park, *I Didn't Tell Them Anything About You: Implied Assertion as Hearsay under the Federal Rules of Evidence*, 74 MINN. L. REV. 783, 837–38 (1990). But co-conspirator statements in particular are notoriously unreliable, and are often implied assertions. See, e.g., *State v. Dullard*, 668 N.W.2d 585 (Iowa 2003) (excluding co-conspirator's implied assertion and noting hearsay dangers of implied assertions). They are admissible under an agency theory, but should still be subject to impeachment by inconsistency or otherwise.

70. *State v. Henderson*, 27 A.3d 872, 919 (N.J. 2011).

71. U.S. CONST. amend. VI.

witnesses.⁷² Second, the complexity of modern algorithms puts the lie to any attempt to cordon off human assertions from the assertions of, say, deep neural networks as something worthy of special treatment in terms of scrutiny. Third, it may well be that the categories of “testimonial” and “physical” evidence are fluid and overlapping, rather than discrete and mutually exclusive.⁷³ Viewed properly, as I explore more fully in future work, all evidence is a mix of “process”- and “person”-based proof,⁷⁴ and of “distributed cognition” between humans, animals, machines or standardized processes, and natural occurrences.⁷⁵ The more a conveyance of information is the product of a human witness alone, the more in-court modes of discovery and impeachment might be meaningful. Conversely, the more a conveyance of information is the product of a machine-driven or mechanical or physical “process,” the more out-of-court modes of discovery and impeachment will be meaningful.

Finally, on a preemptive note, this broader view of confrontation does not entail a full-scale constitutionalization of “open file” discovery. Under the theory proposed above, the government need not

72. *Id.*; see also *United States v. Burr*, 25 F. Cas. 30, 34 (C.C.D. Va. 1807) (No. 14,692d) (recognizing that the right of compulsory process includes not only the right to compel the presence of witnesses, but also to compel witnesses to bring material items with them—subpoenas “duces tecum”).

73. This argument borrows from insights of scholars who have argued that “direct” and “circumstantial” proof are also not discrete mutually exclusive categories. See, e.g., Richard Greenstein, *Determining Facts: The Myth of Direct Evidence*, 45 HOUS. L. REV. 1801, 1804 (2009) (“[T]here simply is no category of evidence that brings us into direct contact with crucial facts because no such contact is possible.”); James S. Liebman et al., *The Evidence of Things Not Seen: Non-Matches As Evidence of Innocence*, 98 IOWA L. REV. 577, 658 (2013) (“No jurisdiction tells jurors the truth—that all evidence is indirect and circumstantial and that all evidence of *identity*, including eyewitness identifications and confessions, gains strength through the aggregation of ‘circumstantial’ matches between the defendant and what is known about the crime or criminal.”); Robert P. Burns, *Some Realism (and Idealism) About the Trial*, 31 GA. L. REV. 715, 762 n.171 (1997) (“But since the credibility of a witness always rests on circumstantial evidence, the probative value of all evidence is circumstantial.”); Note, *Sufficiency of Circumstantial Evidence in A Criminal Case*, 55 COLUM. L. REV. 549, 556 (1955) (“To the extent that the jury draws its own inferences from the circumstances, the lines of direct and circumstantial proof may be equally attenuated.”); see also *Commonwealth v. Harman*, 4 Pa. 269, 272–73 (1846) (“The only difference between positive and circumstantial evidence is, that the former is more immediate, and has fewer links in the chain of connection between the premises and conclusion[.]”).

74. See Andrea Roth, *Beyond Cross-Examination: A Response to Cheng and Nunn*, 97 TEX. L. REV. ONLINE 193, 193–94 (2019) (critiquing the authors’ suggested dichotomy between “process” and “person” based proof).

75. See, e.g., Itiel E. Dror & Jennifer L. Mnookin, *The Use of Technology in Human Expert Domains: Challenges and Risks Arising from the Use of Automated Fingerprint Identification Systems in Forensic Science*, 9 L. PROB. & RISK 47, 48–49 (2010) (explaining “distributed cognition” in the context of human expert testimony). The term was coined by cognitive scientist Edward Hutchins and colleagues at the University of California, San Diego in the early 1990s. See Yvonne Rogers & Judi Ellis, *Distributed Cognition: An Alternative Framework for Analysing and Explaining Collaborative Working*, 9 J. INFO. TECH. 119, 121 (1994).

turn over investigative leads it never pursued, that would offer no further contextual information to understand the proof it *does* introduce at trial. Even if such information were exculpatory and outcome-determinative, it would not necessarily come within the scope of the Confrontation Clause if it did not relate to impeaching government evidence offered at trial. The Due Process Clause⁷⁶ would still have a gap-filling role to play there, such as in *Brady v. Maryland*,⁷⁷ or the dictum in *Arizona v. Youngblood*⁷⁸ that bad faith destruction of material evidence, even if not yet known to be exculpatory, might violate due process.⁷⁹

CONCLUSION

The rise of machine witnesses has finally put the lie to the cramped and ahistorical view of confrontation as simply in-court physical presence and questioning under oath. The obvious constitutional problem with leaving machine accusations of guilt largely unscrutinized offers a unique opportunity to convince courts that “confrontation” means something broader—a right to a meaningful opportunity to scrutinize, and impeach, the government’s proof. While machine witnesses offer the inspiration for this rethinking of confrontation doctrine, a broader conception of confrontation has clear application beyond machines as well, to hearsay declarants, animals, physical evidence, and human witnesses such as experts and eyewitnesses not easily impeached through in-court methods. With machines as our inspiration, we can finally remove confrontation doctrine from cross-examination’s long shadow.

76. U.S. CONST. amend. V.

77. 373 U.S. 83, 85–86 (1963).

78. 488 U.S. 51, 57–58 (1988).

79. The Supreme Court in *United States v. Bagley* made clear that impeachment evidence is “favorable” evidence for *Brady* purposes. 473 U.S. 667, 676 (1985). Indeed, the lower court in *Bagley* deemed the non-disclosure of impeachment evidence (as compared to affirmatively exculpatory evidence) to be *more*, not *less*, problematic under *Brady*, citing the Confrontation Clause. *Bagley v. Lumpkin*, 719 F.2d 1462, 1464 (9th Cir. 1983). Nonetheless, in later cases, the Court has privileged affirmatively exculpatory evidence over impeachment evidence for certain *Brady* purposes. *See, e.g.*, *United States v. Ruiz*, 536 U.S. 622, 633 (2002) (holding that the failure to disclose impeachment material does not render a plea invalid, and suggesting in dictum that affirmatively exculpatory evidence would be different).