

DUQUESNE LAW REVIEW



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FROM BEYONCÉ TO BOHEMIA: REFORMING JOINT
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Foreword to the Symposium, The Death of Eyewitness Testimony and the Rise of Machine

By Jane Campbell Moriarty and Erin McCluan***

Artificial intelligence, machine evidence, and complex technical evidence are replacing human-skill-based evidence in the courtroom. This may be an improvement on mistaken eyewitness identification and unreliable forensic science evidence, which are both causes of wrongful convictions. Thus, the move toward more machine-based evidence, such as DNA, biometric identification, cell service location information, neuroimaging, and other specialties may provide better evidence. But with such evidence comes different problems, including concerns about proper cross-examination and confrontation, reliability, inscrutability, human bias, constitutional concerns, and both philosophic and ethical questions.

The publication of Professor Andrea Roth's groundbreaking articles—*Trial by Machine*,¹ and *Machine Testimony*²—inspired Duquesne Law's Conference, *The Death of Eyewitness Testimony and the Rise of Machine Evidence*, and Professor Roth graciously agreed to be our keynote speaker for the event. We envisioned that the conference and this written symposium would consider the shift toward machine evidence from constitutional, evidentiary, jurisprudential, and ethical perspectives.

These articles address the confrontation of machine evidence, philosophic evaluations of technological evidence, and the problem of inscrutability that plagues many forms of expert evidence. The authors address biometric evidence, particularly in the widespread use of facial recognition evidence, considering both the reliability of such evidence and the constitutional dangers it poses. One article challenges the existing structure of medical examiners providing

* Jane Campbell Moriarty, Carol Los Mansmann Chair in Faculty Scholarship and Professor of Law, Duquesne University School of Law

** Erin McCluan will receive her J.D. in May 2022 from Duquesne University School of Law, where she served as an associate editor on the Duquesne Law Review. She obtained her undergraduate degree in nursing from Ohio University in 2017. The authors of the Foreword would like to thank the Duquesne University School of Law for its support, the editors and members of Duquesne Law Review for their great work and continual patience, and the contributors to this Symposium who wrote wonderful articles.

1. 104 GEO. L.J. 1245 (2016).
2. 126 YALE L.J. 1972 (2017).

opinions about both manner and cause of death. The articles are cutting edge, compelling, and fascinating.

Professor Andrea Roth's article, *What Machines Can Teach Us About "Confrontation"*, leads the Symposium. Her article recognizes the shortcomings of cross-examination to confront machine evidence, advocating for a broader definition of confrontation.³ She explains how machine-generated evidence is not able to be physically confronted, cross-examined, or placed under oath and this shift in the nature of proof in criminal cases requires a different understanding of meaningful confrontation.

Drawing on text, history, logic, and principle, she concludes that "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.*"⁴ That right, as she explains, includes "out-of-court discovery of critical contextual information about the evidence, whether or not exculpatory, and a right to impeach, or attack, the evidence before the factfinder."⁵

Professor Roth's article argues that this richer understanding of confrontation would provide defendants with greater out-of-court discovery, impeachment, and "front-end" conditions of admissibility. She proposes several mechanisms to increase transparency of algorithmic evidence that would allow defendants to "confront" the machine, including, for example, evidence about the machine's error rates and inner workings as well as requirements that the machine be subject to independent testing.⁶

Professor Roth provides historical, textual, and policy-based support for the proposition that confrontation should include the criminal defendant's right to confront "machine witnesses" to address the inherent risks of programming errors, malfunctions, and data limitations.⁷ Her argument is a compelling reconsideration of what it means to confront the evidence.

Professor Jane Campbell Moriarty authored *The Inscrutability Problem: From First-Generation Forensic Science to Neuroimaging Evidence*, addressing the difficulty the judicial system has in scrutinizing much expert evidence and recognizing that inscrutability

3. Andrea Roth, *What Machines Can Teach Us About "Confrontation"*, 60 DUQ. L. REV. 210 (2022).

4. *Id.* at 211 (citing David Alan Sklansky, *Hearsay's Last Hurrah*, 2009 SUP. CT. REV. 1, 4 (2009)).

5. *Id.* at 211–12.

6. *Id.* at 212.

7. *Id.* at 217.

takes on different shapes in varying contexts.⁸ With first-generation forensic identification, such as fingerprints and toolmark comparison, the inscrutability rests on its subjectivity and the lack of black box studies to assess its accuracy. Courts have been unwilling to address the foundational reliability concerns this type of evidence presents. Instead, they recast the problem as a matter for cross-examination.

With machine evidence, however, the inscrutability problem arises from both its inherent complexity and the known problems of laboratory negligence and fraud that have infected the integrity of the evidence.⁹ Much of the evidence, she explains, is simply taken on faith in the courtroom. Lawyers infrequently challenge the evidence and, as Professor Roth explains, the human experts who testify are often “mere scrivener[s]’ of the machine on the witness stand.¹⁰

Neuroimaging evidence, as Professor Moriarty explains, presents multiple problems of inscrutability. Explaining different types of structural and functional imaging, she focuses on the increasingly frequent use of Diffusion Tensor Imaging (DTI) in the courtroom.¹¹ While DTI is in the research phase and has not been accepted for clinical practice, experts are seeking to introduce it as evidence. Some courts are admitting it, some are excluding it. What is clear, however, is that courts are struggling to understand whether the evidence is sufficiently reliable and generally accepted in the medical profession.¹² One helpful step to address neuroimaging’s inscrutability is for courts to give greater deference to consensus opinions in medicine and science; a shift that could improve the quality of the evidence in the courtroom.

Professor Dana Neacșu’s article, *Technology - Revealing or Framing the Truth? A Jurisprudential Debate*, considers technology from both a determinist and phenomenological perspective, addressing the pursuit of legal truth.¹³ Discussing the determinist approach, Professor Neacșu explains that the use of technology in the law achieves unquestionably accepted results that otherwise would not

8. Jane Campbell Moriarty, *The Inscrutability Problem: From First-Generation Forensic Science to Neuroimaging Evidence*, 60 DUQ. L. REV. 227 (2022).

9. *Id.* at 236 (addressing the Massachusetts’ state drug lab fraud that resulted in the dismissal of more than thousands of convictions).

10. *Id.* at 237 (quoting Andrea Roth, *Machine Testimony*, 126 YALE L.J. 1972, 1979 (2017)).

11. *Id.* at 238.

12. *Id.*

13. Dana Neacșu, *Technology - Revealing or Framing the Truth? A Jurisprudential Debate*, 60 DUQ. L. REV. 246 (2022).

be possible, “just because they are technology-induced.”¹⁴ Discussing *Kyllo v. United States*, 533 U.S. 27, 40 (2001), which involved a thermal-imaging search of a home, for example, she remarks how the determinist approach to technology unquestionably views it in a positive angle:¹⁵ “Technologically-produced results are taken for granted, as positive and truth enabling in any set of circumstances any time technology is used, at the expense of any reflexive thinking about what exactly technology is, what is produced or used, and to what consequences.”¹⁶ But as she notes, while technology benefits from this view, it comes with a high price: “a less knowledgeable, inquisitive, democratic society.”¹⁷

Professor Neacșu suggests that “had anyone raised the issue of the role of technology as legal truth producer, it might have opened the door to a richer discussion about what constitutes legal truth.”¹⁸ She defines legal truth as “a construct, evidentiarily established, and incorporating technological results.”¹⁹ She contrasts the determinist approach to technology which tends to reduce the reflective, investigative thinking of the factfinder with a phenomenological view of technology which “exposes legal meaning as connected not to the essence of things but to human behavior.”²⁰

The phenomenological view encourages a relational approach to meaning-making and its emphasis on the interaction among humans, technology, and the world. This view would open the ways to experience the world, permitting reflections on that experience. Explaining the philosophies of both Edmund Husserl and Martin Heidegger, Professor Neacșu submits that technology “is an intermediary prosthetic device of unlimited imaginative power. It threatens to replace decision-making reflective processes with automated, computing thinking, because of its versatility.”²¹

To this end, Professor Neacșu warns against the “mindless use” of technology as a truth-revealing tool and argues that it should be used as an instrument for reflective thought.²² She proposes that “[t]echnology as truth-making rather than truth-finding is dangerous in a democratic society.”²³ Professor Neacșu cautions against

14. *Id.* at 250.

15. *Id.* (observing that “[o]nly the method of obtaining the temperature was questioned in court, not the reliability of temperature itself.”).

16. *Id.* at 251.

17. *Id.* at 252.

18. *Id.* at 250.

19. Neacșu, *supra* note 13, at 253.

20. *Id.*

21. *Id.* at 258.

22. *Id.* at 267.

23. *Id.* at 268.

the use of technology and science to avoid thinking and remarks that the progress of both disciplines requires reflective, time-consuming thought.²⁴ Ultimately, Professor Neacșu argues in favor of technology as a chalice that “frames and reveals truth or even the appearance of truth mediated by evidentiary rules.”²⁵

Professor Valena Beety’s article, *Considering “Machine Testimony”: The Impact of Facial Recognition Software on Eyewitness Identifications*, examines the impact of facial recognition software on eyewitness identification.²⁶ As is well known, human eyewitness identification is unreliable and the leading cause of wrongful convictions. Yet such evidence is widely relied upon in prosecutions. In 2014, the National Academy of Sciences (“NAS”) investigated eyewitness identification, publishing *Identifying the Culprit: Assessing Eyewitness Identification*. This study reviewed thirty years of scientific studies and heard presentations, recommending an overhaul of eyewitness identification procedures by police and prosecutors.²⁷

As the NAS Report was published, police had begun using facial recognition software. This software, as Professor Beety notes, has “fundamental accuracy problems” that undermine its reliability. Moreover, Professor Beety asks questions about the “cascading influence of facial recognition software on eyewitnesses,” given the use of such technology.²⁸ She explains how the use of unreliable facial recognition software can increase the chance of eyewitness misidentification and offers potential solutions to address the problems.

For example, she argues that the National Institute of Standards and Technology’s subcommittee for Facial Identification should begin “contemplat[ing] the impact of facial recognition software on eyewitness identification . . . to focus on quality control and best practices, in line with the extensive research in the field.”²⁹ She contends that “[b]y treating eyewitness identification as more scientific, the false divide between human and machine identification can collapse.”³⁰ Such a shift could pave the way for parties to

24. Neacșu, *supra* note 13, at 269.

25. *Id.*

26. Valena Beety, *Considering “Machine Testimony”: The Impact of Facial Recognition Software on Eyewitness Identifications*, 60 DUQ. L. REV. 271 (2022).

27. *Id.* at 277–79 (such recommendations include, for example, training law enforcement officers in eyewitness identification, implementing double-blind lineups and photo array procedures, standardized witness instructions, and related procedures).

28. *Id.* at 277.

29. *Id.* at 281.

30. *Id.*

“present robust data and research in court about the similarities and differences, and the potential influences of one form of identification on the other.”³¹

Professor Beety concludes by offering a window into the future of machine testimony for eyewitness identifications.³² The justice system can enhance the reliability of eyewitness identification if it recognizes the connections between machine and human identifications. Existing structures heighten the scientific reliability of machine identifications, and proposals for law enforcement can increase the accuracy of human identifications.

Professor Margaret Hu’s article, *Biometrics and an AI Bill of Rights*, contends that an informed discussion of an AI Bill of Rights requires us to grapple with biometric data collection and its integration into emerging AI systems.³³ Recognizing the threats posed by biometric AI systems, she argues for the creation of an AI Bill of Rights to protect our most fundamental rights. These biometric systems are increasingly categorized as “high-risk” when used in ways that may impact fundamental constitutional and human rights.³⁴ Professor Hu argues that the biometric AI systems must be seen as a constitutive force behind conceptualizing an AI Bill of rights. To explain the potential harms, she focuses on facial recognition technology.

Professor Hu details the rapid expansion of the wide-ranging collection of biometric data since the terrorist attacks of September 11, 2001. Noting that with “biometric AI systems promulgated under predictive policing and national security objectives, biometric cybersurveillance tools fuse biometric and biographic data with social media profiling to assess risk.”³⁵

Focusing on the criminal procedure risks of biometric AI, Professor Hu explains how biometric AI and cybersurveillance are vulnerable to failing to conform to protections of the Fourth, Fifth, and Sixth Amendments. She contends that the collection, use, and storage of facial images by law enforcement, particularly if the initial collection was for an administrative purpose, raises significant Fourth Amendment privacy concerns because this information falls outside of the warrant requirement.³⁶ She argues that facial recognition technology also raises self-incrimination concerns under the

31. *Id.*

32. Beety, *supra* note 26, at 281.

33. Margaret Hu, *Biometrics and an AI Bill of Rights*, 60 DUQ. L. REV. 283 (2022).

34. *Id.* at 285.

35. *Id.* at 289.

36. *Id.* at 285.

Fifth Amendment, providing the example of a recent case attempting to compel a defendant to unlock a digital device using biometric data.³⁷

Professor Hu addresses Professor Roth's view that machine testimony raises Sixth Amendment concerns where "machine sources of accusation—particularly proprietary software created for litigation—might be 'witnesses against' a defendant under the Confrontation Clause."³⁸ She discusses the potential for wrongful arrests and jail time due to the fallibility of facial recognition software, noting that these tools have been shown to produce racially biased results.³⁹ Additionally, she examines the constitutional threats inherent to the use of "predicative policing systems" that target specific "at risk" individuals by gathering more biometric data about individuals who might commit a crime in the future.⁴⁰

Professor Hu emphasizes the need to conduct a comprehensive risk assessment of the dangers posed by biometric AI and the fundamental rights sought to be protected by an AI Bill of Rights.⁴¹ Professor Hu proposes that these protections should guarantee that criminal defendants have "the right to know the source of the data collected and used, the nature of the algorithm, the interpreter of the AI-enabled outcome—to be 'informed of the nature and cause of the accusation.'"⁴² Professor Hu urges us to look to the European Union's proposed AI Act, which "recognizes the link between AI technologies, biometric identification, and the risk to fundamental rights" as a model for the development of an AI Bill of Rights in the United States.⁴³

Professors Findley and Strang's article, *Ending Manner-of-Death Testimony and Other Opinion Determinations of Crime*, questions the admissibility of manner of death and injury opinion testimony under existing evidentiary rules, arguing that such testimony exceeds the scope of a physician's medical expertise and fails to meet the standards of Rule 702 of the Federal Rules of Evidence and *Daubert v. Merrill Dow Pharmaceuticals, Inc.*⁴⁴

37. *Id.* at 288.

38. Hu, *supra* note 33, at 293 (citing Andrea Roth, *Machine Testimony*, 126 YALE L. J. 1972, 1983 n. 47 (2017)).

39. *Id.* at 294.

40. *Id.* at 295.

41. *Id.* at 297.

42. *Id.* at 298.

43. *Id.* at 290.

44. Keith A. Findley & Dean A. Strang, *Ending Manner-of-Death Testimony and Other Opinion Determinations of Crime*, 60 DUQ. L. REV. 302 (2022).

In the United States, medical examiners and other physicians routinely testify to their opinions about both cause and manner of death and about whether injuries were produced by criminal activity or something else. While “cause” refers to the physiological findings for the death (heart attack or gunshot), “manner” refers to the conclusions about whether the death was homicide, suicide, accident, natural, or undetermined.⁴⁵ Professors Findley and Strang argue that manner determinations usually depend on ordinary factual evidence—the type of evidence juries routinely evaluate without the assistance of experts—and thus, manner determinations are not helpful to juries.⁴⁶ Indeed, the authors note that according to a collective of pathologists: “Manner determination is not a ‘scientific’ determination. It is a cultural determination that places a death in a social context”⁴⁷

The article explains the “historical accident” that created the practice of manner of death determinations and reviews the three competing approaches that courts use in considering the admissibility of cause and manner of death of opinions. Additionally, they examine the nature of the manner-of-death determinations and consider whether such evidence is properly admissible under the Federal Rules of Evidence. They conclude that these manner-of-death or injury opinions are almost never proper under existing evidentiary rules. The manner determinations produce opinions that exceed the scope of a physician’s medical expertise and, as they are not diagnostic (unlike cause determinations), they fail to meet reliability standards. Additionally, because such opinions are dependent on factual evidence, they are not “helpful” to the finder of fact, as required by the rules. And finally, these opinions also import a tacit opinion on the mental state of the actor, which the Rules prohibit. They warn that inserting ordinary facts into medical opinion evidence increases the chances that the jury will inappropriately defer its responsibility to the expert.⁴⁸ In other words, “the lab coat will decide the case, not the evidence.”⁴⁹

45. *Id.* at 303–04.

46. *Id.* at 319 (citing FED. R. EVID. 702)(“A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if: (a) the expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue[.]”).

47. *Id.* at 318 (citing Brian Peterson et al., *Letter to the Editor: Commentary on: Dror IE, Melinek J, Arden JL, Kukucka J, Hawkins S, Carter J, et al. Cognitive bias in forensic pathology decisions*, 66 J. FORENSIC SCI. 2541, 2542 (2021)).

48. *Id.* at 306.

49. *Id.*

Professors Findley and Strang propose that manner of death opinions should be inadmissible in every case; these decisions are for the jury alone. Additionally, “cause-of-death determinations, while generally dependent on medical expertise and discernible from medical expertise, sometimes also are dependent on ordinary, non-medical evidence, and accordingly should be inadmissible in those cases, on a case-by-case basis.”⁵⁰ They discuss how judicial approaches on the admissibility of this evidence are inconsistent, as some courts admit medical expert testimony on both cause and manner in almost every case, while others admit the evidence “on a case-by-case basis, depending on whether the opinion was based on medical evidence from the autopsy or instead almost entirely on non-medical evidence.”⁵¹

50. Findley & Strang, *supra* note 44, at 339.

51. *Id.* at 309.

WHAT MACHINES CAN TEACH US ABOUT “CONFRONTATION”

*Andrea Roth**

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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. Semerjian, *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).

The Inscrutability Problem: From First-Generation Forensic Science to Neuroimaging Evidence

*Jane Campbell Moriarty**

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ABSTRACT

Expert testimony continues to turn away from human-based skills to embrace machine-based evidence. Technology is used to identify and locate individuals, unlock encrypted devices, and even to evaluate criminal responsibility. Perhaps this is a positive change. The shortcomings of first-generation forensic identification specialties are substantial and include the inscrutability of its subjective comparisons. As such, this newer generation of evidence may well be an improvement. Yet the inscrutability problem adopts many forms. Machine-based evidence relies on hardware, software, algorithms, statistics, and engineering to reach results—ones created and interpreted by humans subject to bias and cognitive error; results the justice system often does not fully appreciate. Taking one example of machine evidence—neuroimaging—this Article examines its foundational reliability and complexity, explaining why

* Jane Campbell Moriarty, J.D., M.A., Carol Los Mansmann Chair in Faculty Scholarship and Professor of Law, Duquesne University School of Law. Many thanks to Duquesne University and the School of Law for supporting both the live Conference and this written symposium. Many thanks to the keynote speaker, Professor Andrea Roth, and the other great presenters and authors for their patience throughout the long delay and for their wonderful contributions to the Conference and this symposium, *The Death of Eyewitness Identification* and *The Rise of the Machine*. Thanks to the Editors of the *Duquesne Law Review* for their excellent work. Many thanks to my terrific students in *Expert Evidence* (Spring 2022)—all of you helped me think deeply about the problems I wrote about here and you did a fabulous job with difficult questions that challenge even federal judges. I'm so proud of all of you.

such evidence is often inscrutable to courts and what might help courts to be better gatekeepers of such evidence.

INTRODUCTION

Between 2005 and 2012, the Supreme Court of the United States considered foundational neuroscience research and neuroimaging studies on juvenile brains in a trilogy of decisions about sentencing juvenile offenders.¹ The amicus brief submitted by the American Medical Association and others² in *Roper v. Simmons* relied extensively on neuroimaging studies to support its argument that adolescents' immaturity "mirrors the anatomical immaturity of their brains."³ The *Graham v. Florida* and *Miller v. Alabama* Courts both opined that "developments in psychology and brain science continue to show fundamental differences between juvenile and adult minds[.]"⁴ As the Supreme Court's language suggests, the research on structural and functional differences between adolescent and adult brains appears to have been influential to the Court in deciding these cases.⁵

Many believe these decisions were long overdue, recognizing that juveniles are fundamentally different from adults and appropriate punishment should reflect those differences. The neuroimaging evidence discussed in the amicus briefs in those cases about juvenile brain development was based on decades of neuroimaging research to accumulate data about longitudinal brain development

1. *Miller v. Alabama*, 567 U.S. 460, 465 (2012) ("We therefore hold that mandatory life without parole for those under the age of 18 at the time of their crimes violates the Eighth Amendment's prohibition on 'cruel and unusual punishments.'"); *Graham v. Florida*, 560 U.S. 48, 79 (2010) ("The State has denied [the petitioner] any chance to later demonstrate that he is fit to rejoin society based solely on a nonhomicide crime that he committed while he was a child in the eyes of the law. This the Eighth Amendment does not permit."); *Roper v. Simmons*, 543 U.S. 551, 578 (2005) ("The Eighth and Fourteenth Amendments forbid imposition of the death penalty on offenders who were under the age of 18 when their crimes were committed.")

2. See Brief of the Am. Med. Ass'n et al., *Roper v. Simmons*, 543 U.S. 551 (2005) (No. 03-633), 2004 WL 1633549. This brief was also joined by the American Psychiatric Association and other groups. *Id.*

3. *Id.* at 9–10.

Modern brain research technologies developed a body of data in the late 1990s . . . that provides a compelling picture of the inner workings of the adolescent brain. Adolescents' behavioral immaturity mirrors the anatomical immaturity of their brains. To a degree never before understood, scientists can now demonstrate that adolescents are immature not only to the observer's naked eye, but in the very fibers of their brains.

Id.

4. *Miller*, 567 U.S. at 471–72 (quoting *Graham*, 560 U.S. at 68).

5. See Laurence Steinberg, *Adolescent Brain Science and Juvenile Justice Policymaking*, 23 PSYCH. PUB. POL'Y & L. 410, 414–16 (2017) (discussing court's reliance on the neuroscience and neuroimaging evidence in these cases).

throughout adolescence, providing a framework to understand juveniles generally.⁶ These studies certainly confirm both social science and personal beliefs. But the quality of the studies cited in those amicus briefs is not always reflected in other neuroimaging evidence admitted to the court, particularly where neuroimaging is applied to a particular individual. Neuroimaging in the courtroom, when applied to individual cases, poses concerns about foundational reliability, reliability as applied, and appropriate expertise.⁷ Many of these concerns are ones about which courts are understandably unaware. The inscrutability of the evidence to both litigants and courts is a problem worthy of deeper consideration.⁸

The inscrutability of expert evidence is a long-standing problem that can take different shapes. With first-generation forensic identification, such as fingerprints and toolmark comparison, the inscrutability rests on its subjectivity and the lack of black box studies to assess its accuracy. With next-generation machine evidence, such as gas chromatography, the inscrutability involves the complexity of the machines and the lack of access defendants have to assess reliability. With neuroimaging, the inscrutability problem is multi-faceted, as explained in this article. The neuroscience research community are addressing issues of the foundational reliability of neuroimaging,⁹ but there are additional concerns about its use as courtroom evidence.

Addressing the inscrutability of machine evidence may require multiple approaches. For example, in her explanation of the insufficiency of cross-examination to meaningfully confront machine evidence, Professor Andrea Roth provides several ideas for deeper and more robust discovery of such evidence pretrial in criminal cases.¹⁰ These excellent suggestions attack the problems of error rate and

6. See, e.g., Brief of the Am. Med. Ass'n, et al., *Roper*, 543 U.S. 551 (2005) (No. 03-633).

7. For a deeper discussion about many of these issues, see Jane Campbell Moriarty, *Neuroimaging Evidence in US Courts*, in *LAW AND MIND: AT THE INTERSECTION OF LAW AND THE COGNITIVE SCIENCES* 370 (Bartosz Brożek et al. eds., 2021) [hereinafter Moriarty, *Neuroimaging Evidence in US Courts*].

8. Inscrutable is defined as “not being able to be understood; impenetrable; or enigmatic.” *Inscrutability*, *THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE* (1975).

9. See, e.g., Thomas E. Nichols et al., *Best Practices in Data Analysis and Sharing in Neuroimaging Using MRI*, *NATURE NEUROSCIENCE*, Feb. 2017, at 299, 299 (addressing concerns about the reproducibility of scientific findings and suggesting best practices for data analysis, results reporting, and algorithm and data sharing to promote transparency, reliability and collaboration); Russell A. Poldrack et al., *Editorial, Introduction to the Special Issue on Reproducibility in Neuroimaging*, *NEUROIMAGE*, Sept. 2020, <https://doi.org/10.1016/j.neuroimage.2019.116357> (addressing concerns about neuroimaging); see also discussion *infra* Part III.

10. See Andrea Roth, *What Machines Can Teach Us About “Confrontation”*, 60 *DUQ. L. REV.* 210 (2022).

unreliability by providing meaningful access to the evidence before the case is tried. Enhanced discovery of this type might provide courts with better information to provide more rigorous gatekeeping of potentially unreliable evidence. Improved judicial gatekeeping to help also could help regulate evidence that has substantial error rates or serious concerns about both foundational reliability and reliability as applied.

Part I of this Article provides a brief explanation of first-generation forensic science, highlighting the inscrutability of such evidence due to the lack of proof of foundational reliability and its subjective nature. It also explains the shift to machine evidence as used in criminal cases. Part II explains the rise of neuroimaging evidence in the court as a categorical example of machine evidence. While neuroimaging research is impressive, its complexity presents serious challenges for those in the justice system attempting to evaluate its reliability as evidence. Currently, neuroimaging evidence is a mosaic of good quality and poor quality, and a great deal of it is simply evidence created for purposes of litigation.¹¹

Part III explains the concerns about foundational reliability of neuroimaging and suggests ways courts can address the inscrutability of such evidence.

I. FROM OLD FORENSIC EVIDENCE TO NEW: RISE OF THE MACHINE

Throughout the twentieth and twenty-first centuries, law enforcement has relied on multiple feature-comparison methods (“FCM”)¹² such as fingerprints, handwriting, hair, fibers,

11. The Advisory Committee notes that in evaluating reliability, courts consider whether experts are “proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying.” See FED. R. EVID. 702 advisory committee’s note to the 2000 amendment.

12. See PRESIDENT’S COUNCIL OF ADVISORS ON SCI. & TECH., EXEC. OFFICE OF THE PRESIDENT, FORENSIC SCIENCE IN CRIMINAL COURTS: ENSURING SCIENTIFIC VALIDITY OF FEATURE COMPARISON METHODS 44–65 (2016) [hereinafter PCAST REPORT], https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf. “Feature-Comparison Methods” is the term used by the President’s Council on Science and Technology in the PCAST report. FCM

[R]efer[s] to the wide variety of methods that aim to determine whether an evidentiary sample (e.g., from a crime scene) is or is not associated with a potential source sample (e.g., from a suspect) based on the presence of similar patterns, impressions, features, or characteristics in the sample and the source. Examples include the analyses of DNA, hair, latent fingerprints, firearms and spent ammunition, tool and toolmarks, shoeprints and tire tracks, bitemarks, and handwriting.

Id. at 23. Others have used the phrase “pattern matching” specialties, “individualization,” and other terms. See NAT’L RSCH. COUNCIL OF THE NAT’L ACADS., STRENGTHENING FORENSIC

toolmarks, bullets, shoeprints, and bitemarks to identify perpetrators.¹³ Most FCM method evidence was admitted without scrutiny and many of these methods received their “judicial imprimatur without a critical evaluation of the supporting scientific research.”¹⁴ During the last two decades, many individuals and groups have challenged the accuracy of FCM evidence. National groups composed of scientists, statisticians, and legal experts recognized the serious shortcomings of such FCM evidence and their role in wrongful conviction.¹⁵ With the advent of DNA profiling, advocates were able to improve perpetrator identification and, simultaneously, provide a way to exonerate some defendants who had been convicted with these FCM evidence.¹⁶ And scholars around the country wrote about the shortcomings of the non-DNA FCM methods and the need for change.¹⁷

In 2006, the National Academy of Sciences (“NAS”) established a committee to evaluate forensic science specialties. In 2009, the NAS released a groundbreaking report, *Strengthening Forensic Science in the United States: A Path Forward* (“NAS Report”). The NAS Report addressed multiple areas of forensic science that involved pattern matching (or FCM) and found many of the specialties lacked proof of reliability. “With the exception of nuclear DNA analysis, however, no forensic method has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual or source.”¹⁸ While the critical NAS Report was groundbreaking and widely reported on, law enforcement and the judiciary virtually ignored it.¹⁹

SCIENCE IN THE UNITED STATES: A PATH FORWARD 7, 162 (2009) [hereinafter NAS REPORT], <http://www.nap.edu/catalog/12589.html>.

13. See Paul C. Giannelli et al., *Reference Guide on Forensic Identification Expertise*, in REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 55, 57–60 (3d ed. 2011), <https://www.nap.edu/catalog/13163/reference-manual-on-scientific-evidence-third-edition> (discussing the history of forensic science in the United States).

14. *Id.* at 59.

15. See NAS REPORT, *supra* note 12, 14–21.

16. See Giannelli et al., *supra*, note 13, at 62. For more on the exonerations, see THE INNOCENCE PROJECT, <https://innocenceproject.org> (last visited April 7, 2022). See also BRANDON L. GARRETT, CONVICTING THE INNOCENT: WHERE CRIMINAL PROSECUTIONS GO WRONG 84–117 (2011) (discussing the role of faulty forensics in wrongful convictions).

17. See Michael J. Saks & Jonathan J. Koehler, *The Coming Paradigm Shift in Forensic Identification Science*, 309 SCIENCE 892, 892 (2005).

18. See NAS REPORT, *supra* note 12, at 7. The report explained the shortcomings of various specialties and made multiple suggestions for improving forensic science. *Id.* at 14.

19. For further discussion of the judiciary’s disregard of the problems of forensic science, see Paul C. Giannelli, *Forensic Science: Daubert’s Failure*, 68 CASE W. RES. L. REV. 869 (2018); David H. Kaye, *How Daubert and Its Progeny Have Failed Criminalistics Evidence and a Few Things the Judiciary Could Do About It*, 86 FORDHAM L. REV. 1639 (2018); Jane

Despite the serious concerns raised about whether many of these specialties could achieve what they claimed, most courts continued to admit FCM evidence, generally without limitations, and often claiming the matter was for cross-examination.²⁰ Shifting the concerns about reliability to confrontation and cross-examination also allowed the courts to sidestep the concern about foundational validity.

Scholars, lawyers, and scientists continued to express concern about these forms of forensic science and the very real danger of wrongful conviction that such evidence posed. President Barack Obama voiced concern about whether there were steps on the scientific side that could be taken to help ensure the validity of forensic science and appointed a blue-ribbon panel to study the matter. The result of this study was the publication of the President's Council on Science and Technology *Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods* in 2016 ("PCAST Report").²¹

The PCAST Report evaluated the scientific reliability of both the "foundational validity" and "validity as applied" of feature comparison methods,²² explaining their shortcomings and providing recommendations to strengthen the scientific underpinnings of the forensic disciplines.²³ The PCAST Report explains that as a matter of foundational validity, "the procedures that comprise it must be shown, based on empirical studies, to be repeatable, reproducible, and accurate, at levels that have been measured and are appropriate to the intended application."²⁴ Validity as applied requires proof that the examiner is capable of reliably applying the method, and must have actually done so. As the PCAST Report notes, the "only way to establish scientifically that an examiner is capable of applying a foundationally valid method is through appropriate empirical

Campbell Moriarty, *Deceptively Simple: Framing, Intuition, and Judicial Gatekeeping of Forensic Feature Comparison Method Evidence*, 86 FORDHAM L. REV. 1687 (2018) [hereinafter *Deceptively Simple*]; Jane Campbell Moriarty, *Will History Be Servitude?: The NAS Report on Forensic Science and the Role of the Judiciary*, 2010 UTAH L. REV. 299 (2010).

20. See, e.g., *United States v. Otero*, 849 F. Supp. 2d 425, 438 (D.N.J. 2012) (denying defendant's motion to exclude firearm identification and leaving questions about the strength of the evidence to the jury). The Supreme Court, in discussing the NAS Report and role of confrontation, counseled that the shortcomings of forensic science could be the "focus in the cross-examination of experts." *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 321 (2009); see also *id.* at 319 n.6.

21. See PCAST REPORT, *supra* note 12.

22. *Id.* at x–xi (discussing the work of the committee).

23. *Id.*

24. *Id.* at 47 (emphasis omitted).

testing to measure how often the examiner gets the correct answer.”²⁵

The Report also noted that “[w]ithout appropriate estimates of accuracy, an examiner’s statement that two samples are similar—or even indistinguishable—is scientifically meaningless: it has no probative value, and considerable potential for prejudicial impact. Nothing—not training, personal experience nor professional practices—can substitute for adequate empirical demonstration of accuracy.”²⁶ Among the suggestions the PCAST Report made was one directed at the judiciary: “When deciding the admissibility of expert testimony, [f]ederal judges should take into account the appropriate scientific criteria for assessing scientific validity[.]”²⁷ As with the NAS Report, most courts have not heeded the advice, and have—with some notable exceptions—continued to admit the evidence without restriction.²⁸ Courts generally base their decisions to admit the evidence without restrictions on heuristics such as “long history of use” or claims that shortcomings are for cross-examination.²⁹

For example, in *United States v. Bonds*, the Court of Appeals for the Seventh Circuit stated that fingerprint comparison was a foundationally valid subjective methodology, “albeit with a false positive rate that is substantial and is likely to be higher than expected by many jurors based on longstanding claims about the infallibility of fingerprint analysis.”³⁰ The court also explained the multiple concerns the evidence posed with respect to validity as applied.³¹ As with other courts, the trial judge admitted this evidence without any limitation. In writing for the Court of Appeals for the Seventh Circuit affirming the conviction, Judge Frank Easterbrook recognized the “troubling” error rate of the evidence but asked “[w]hat

25. *Id.* at 57.

26. *Id.* at 46.

27. *Id.* at 145. For additional commentary on the PCAST Report, see 4 DAVID L. FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY § 29:11–29:15 (2021); 1 PAUL GIANNELLI ET AL., SCIENTIFIC EVIDENCE § 1.08[2] (6th ed. 2021); 2 PAUL GIANNELLI ET AL., SCIENTIFIC EVIDENCE §§ 13.04, 14.03, 16.01 (6th ed. 2021) [hereinafter SCIENTIFIC EVIDENCE].

28. Some courts have excluded conclusions of a match or limited the degree of certainty that may be expressed in the area of firearm and toolmark comparison. See SCIENTIFIC EVIDENCE, *supra* note 27, at §13.06[4][b] (collecting cases). Additionally, a few courts have decided that FCM specialties like handwriting comparison may not have foundational reliability or reliability as applied. See *e.g.*, *Almeciga v. Center for Investigative Reporting, Inc.*, 185 F. Supp. 3d 401 (S.D.N.Y. 2016) (excluding the testimony and providing a detailed critique of the evidence); *State v. McPhaul*, 808 S.E.2d 294 (N.C. Ct. App. 2017) (excluding fingerprint comparison where the witness did not explain how she reached her conclusion).

29. For an in-depth discussion of how judges use heuristics to decide these cases, see *Deceptively Simple*, *supra* note 19, at 1706–08.

30. 922 F.3d 343, 345 (7th Cir. 2019).

31. *Id.* at 345–46.

are the alternatives[,]” comparing the evidence to lying witnesses, poor eyewitness identification, and grainy bank surveillance photos. While refusing to exclude the evidence, or to limit the conclusions of a match to reflect the few high-quality proficiency studies, the court noted that what the judicial system can do is “subject the forensic evidence to cross-examination about a method’s reliability and whether the witness took appropriate steps to reduce errors.”³²

The Seventh Circuit is hardly alone in suggesting that cross-examination is the proper method for challenging evidence with foundational concerns.³³ Trial court decisions to bypass the difficult evaluation about foundational reliability and outsource the question to the jury is misguided. Foundational reliability and applied reliability are judicial issues. Where the evidence does not meet the requirements of reliability, cross-examination is rarely capable of making meaningful inroads, particularly in criminal cases where juries are likely to be skeptical of defense cross-examination. Trial courts, not juries, are charged with “the responsibility of acting as gatekeepers to exclude unreliable expert testimony”³⁴ The distinction between exclusion of unreliable subjective evidence and cross-examination of such evidence is critical, given the subjective nature of the match, the serious concerns about error rate, and the potential for wrongful conviction.

The 2021 Proposed Amendment to Federal Rule of Evidence 702 address some of these concerns and provides a helpful Committee Note addressing forensic expert’s testimony.³⁵ As of the time this

32. *Id.* at 346 (emphasis omitted). According to the PCAST Report, the two properly designed “black box” proficiency tests yielded a false positive error rate between 1 in 306 and 1 in 18. PCAST REPORT, *supra* note 12, at 95–96. The Committee recommended that it would be “appropriate to inform jurors that (1) only two properly designed studies of the accuracy of latent fingerprint analysis have been conducted and (2) these studies found false positive rates that could be as high as 1 in 306 in one study and 1 in 18 in the other study. This would appropriately inform jurors that errors occur at detectable frequencies, allowing them to weigh the probative value of the evidence.” *Id.* at 96.

33. *See* *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 596 (1993) (“Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.”).

34. FED. R. EVID. 702 advisory committee’s note to 2000 amendment.

35. *See* Committee on Rules of Practice and Procedure Judicial Conference of the United States, Proposed Amendments to the Federal Rules of Appellate, Bankruptcy, Civil, and Criminal Procedure and the Federal Rules of Evidence (Feb. 16, 2022), https://www.uscourts.gov/sites/default/files/preliminary_draft_of_proposed_amendments_-_august_2021_0.pdf. As the Committee note explains:

Forensic experts should avoid assertions of absolute or one hundred percent certainty—or to a reasonable degree of scientific certainty—if the methodology is subjective and thus potentially subject to error. In deciding whether to admit forensic expert testimony, the judge should (where possible) receive an estimate of the known or potential rate of error of the methodology employed, based (where appropriate) on

article was written, the proposed amendment is still in the comment stage and has not been enacted. However, if enacted, perhaps this will be the nudge courts need to become more robust gatekeepers with respect to the evidence. Many courts, however, may continue to evaluate evidence as they always have, given that the neither the Daubert trilogy, the 2000 Amendments to Rule 702, the NAS Report, nor the PCAST Report seemed to move the needle.³⁶

Thus, the move toward more machine-based evidence in criminal cases—also termed “second-generation forensic evidence” may be an improvement.³⁷ It provides one answer to Judge Easterbrook’s question—“what are the alternatives”—but with it comes its own concerns about reliability, confrontation, and the problem of inscrutability.

Machine evidence plays a substantial role in many courtrooms, given the admission of breathalyzer evidence, mass spectrometer evidence, cell service location evidence (“CSL”), biometric evidence, and DNA evidence in trials.³⁸ These machine-generated forms of evidence may provide more certainty, known error rates, fewer opportunities for cognitive error and human bias, and more reliable results than the metrological forms of forensic science.³⁹ Some of these specialties are quite reliable—particularly some forms of DNA evidence, mass spectrometer evidence, and the breathalyzer, for example.

studies that reflect how often the method produces accurate results. Expert opinion testimony regarding the weight of feature comparison evidence (i.e., evidence that a set of features corresponds between two examined items) must be limited to those inferences that can reasonably be drawn from a reliable application of the principles and methods.

Id.

36. Professor Giannelli also questions why judges have not changed and suggests “a different paradigm is needed, one that assigns an independent agency the responsibility of evaluating foundational research.” Giannelli, *Daubert’s Failure*, *supra* note 19, at 875. This is a fine suggestion and one worth implementing but there seems to be little willingness to implement this concept, which was also suggested in the PCAST and NAS Reports.

37. Professor Erin Murphy notes that some of these new methods will be a “marked advance over the rudimentary techniques of old, and will surely stake a central and indispensable role in the future administration of criminal justice.” Erin Murphy, *The New Forensics: Criminal Justice, False Certainty, and the Second Generation of Scientific Evidence*, 95 CALIF. L. REV. 721, 723 (2007). Professor Murphy’s article explains many concerns, however, about this second-generation evidence. *Id.*

38. For a detailed explanation of these forms of evidence, see SCIENTIFIC EVIDENCE, *supra* note 27. As Professor Brian Sites explains, the potential number of “machine accusers directly relevant to criminal proceedings is staggering[.]” citing multiple forms of machine evidence admitted in criminal trials. See Brian Sites, *Machine Ascendent: Robots and the Rules of Evidence*, 3 GEO. L. TECH. REV. 1, 2–3 (2018).

39. See Andrea Roth, *Machine Testimony*, 126 YALE L.J. 1972, 1976 (2017) [hereinafter *Machine Testimony*] (“[The] shift from human- to machine-generated proof has, on the whole, enhanced accuracy and objectivity in fact finding.”).

Even with the most reliable forms of machine evidence, there is ample proof that operators create error through both negligence and fraud, which is often not discovered during trial. As the Supreme Court has remarked, “[f]orensic evidence is not uniquely immune from the risk of manipulation.”⁴⁰ Massachusetts uncovered egregious misconduct in one of its state drug labs, where one of its analysts committed fraud over a ten-year period.⁴¹ As a result of this fraud, the Supreme Judicial Court of Massachusetts exercised its general superintendence power to ameliorate the damaging effects of the crisis. The court appointed special magistrates to review the legality of plea colloquies in cases relating to these laboratory results.⁴² Ultimately, the court dismissed more than 20,000 convictions with prejudice.⁴³

Of course, one reason this fraud went undiscovered for a decade is that much machine-generated evidence, like FCM evidence, is also inscrutable and is essentially taken on faith in the courtroom. Lawyers often stipulate to the evidence, and the high rate of guilty pleas ensures very little machine evidence will be challenged.⁴⁴ Moreover, even when there is a trial, few lawyers can challenge this evidence competently. First, these lawyers often do not understand how the machine functions. Second, discovery is generally non-existent in these cases. And third, there are few effective avenues for

40. *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 318 (2009).

41. *See* *United States v. Hampton*, 109 F. Supp. 3d 431, 433–34 (D. Mass. 2015) (citing OFF. INSPECTOR GEN., COMMONWEALTH MASS., INVESTIGATION OF THE DRUG LABORATORY AT THE WILLIAM A. HINTON STATE LABORATORY INSTITUTE 2002–2012 (2014), <https://www.mass.gov/doc/investigation-of-the-drug-laboratory-at-the-william-a-hinton-state-laboratory-institute-2002-0>). These acts included dry-labbing (certifying, without testing, that a substance was the suspected drug), placing samples from different cases together on her bench, “[b]atching” samples together and testing some but not others, intentionally contaminating a sample by using a known drug from a completed test, falsifying other chemists’ initials on quality control/confirmatory documents, falsely certifying having run quality control/confirmatory test samples, failing to properly calibrate her scales to ensure the accuracy of the drug weights measured by the chemist, and communicating directly with prosecutors about specific cases. *Id.*; *see also* SCIENTIFIC EVIDENCE, *supra* note 27, at § 4.01.

42. *See generally* *Bridgeman v. District Attorney for Suffolk District*, 30 N.E. 3d 806 (Mass. 2015) (“*Bridgeman I*”); *Commonwealth v. Scott*, 5 N.E.3d 530 (Mass. 2014).

43. *See* *Bridgeman v. District Attorney for Suffolk County*, ACLU MASSACHUSETTS, <https://www.aclum.org/en/cases/bridgeman-v-district-attorney-suffolk-county> (last updated Apr. 19, 2017).

44. *See* Giannelli, *supra* note 19, at 933 (quoting Peter J. Neufeld, *The (Near) Irrelevance of Daubert to Criminal Justice and Some Suggestions for Reform*, 95 Am. J. Pub. Health S107, 107 (2005)). In many cases, defense lawyers do not have time to investigate the case in which their client is entering a guilty plea, are given little if any discovery, and often do not receive Brady material. *See, e.g.*, Peter A. Joy & Rodney J. Uphoff, *Systemic Barriers to Effective Assistance of Counsel in Plea Bargaining*, 99 IOWA L. REV. 2103, 2108–12 (2014); Jane Campbell Moriarty & Marisa Main, “Waiving” Goodbye to Rights: *Plea Bargaining and the Defense Dilemma of Competent Representation*, 38 HASTINGS CONST. L.Q. 1029, 1040–47 (2011).

cross-examining the analyst who simply explains the function and reports the outcome.⁴⁵ As Professor Roth explains, “[h]uman experts often act as ‘mere scrivener[s]’ on the witness stand, regurgitating the conveyances of machines. Their testimony might create a veneer of scrutiny when in fact the actual source of information, the machine, remains largely unscrutinized.”⁴⁶ The concerns about inscrutability multiply when the “machinery” becomes more complex and the conclusions more inferential, such as occurs with neuroimaging testimony. This Article examines neuroimaging evidence, focusing on the growing use of Diffusion Tensor Imaging (DTI) evidence.

II. THE RISE OF NEUROIMAGING EVIDENCE

Neuroscience and neuroimaging evidence have entered the courtroom in dramatically increasing numbers over the last two decades.⁴⁷ Defendants in criminal cases are primary users of the evidence in trials and sentencing, usually to provide brain-based proof of impaired cognition and aberrant behavior, executive function disorders, and impulse control problems.⁴⁸ Additionally, as empirical studies show, the failure of defense counsel to investigate relevant neuroscientific evidence in capital cases renders counsel more likely to be ineffective.⁴⁹

“Neuroscience” and “neuroimaging” are distinct terms. Neuroscience is the study of the brain and nervous system and encompasses multiple disciplines. Neuroimaging refers to the process of producing images of the nervous system, generally depicting brain structure and function.⁵⁰ Structural imaging reveals the anatomy of the brain and skull and can be performed using x-ray, magnetic resonance imaging (“MRI”), or computed tomography (“CT”) scans.

45. For a discussion of the shortcomings of cross-examination, the need to meaningfully confront the problems inherent in machine testimony, and suggestions for meaningful confrontation, see Roth, *supra* note 10.

46. *Machine Testimony*, *supra* note 39, at 1979 (quoting *Bullcoming v. New Mexico*, 564 U.S. 647, 672 (2011) (Sotomayor, J., concurring)).

47. See Deborah Denno, *The Myth of the Double Edge Sword*, 56 B.C. L. REV. 493 (2015) (discussing the myriad ways that neuroscience is used in criminal cases); Nita A. Farahany, *Neuroscience and Behavioral Genetics in US Criminal Law: An Empirical Analysis*, 2 J.L. & BIOSCIENCES 485 (2016) (discussing the growth of neurobiological evidence in the criminal justice system); John B. Meixner, Jr., *The Use of Neuroscience Evidence in Criminal Proceedings*, 3 J.L. & BIOSCIENCES 330 (2016) (reviewing studies tracking neuroscience evidence).

48. See Moriarty, *Neuroimaging Evidence in US Courts*, *supra* note 7, at 381–82.

49. See Deborah W. Denno, *Neuroscientific Evidence in Context*, in LAW AND MIND: AT THE INTERSECTION OF LAW AND THE COGNITIVE SCIENCES 412 (Bartosz Brożek et al. eds. 2021) [hereinafter Denno, *Neuroscientific Evidence in Context*] (discussing her research).

50. Neuroimaging also include electroencephalogram evidence (“EEG”) and quantitative EEG (“QEEG”) but are not addressed in this article.

Functional imaging techniques purport to show activation in the brain—rather than simply structure—and include positron emission computed tomography (“PET”), single-photon emission computed tomography (“SPECT”), and functional MRI (“fMRI”).⁵¹

fMRI was developed in the early 1990s and has had a phenomenal impact on basic cognitive research.⁵² fMRI attempts to measure regions of brain activation while the subject is either at rest (“resting state fMRI”) or in response to a task (“brain activation fMRI”). The primary technique used in fMRI research is termed blood-oxygen-level-dependent contrast (“BOLD”), and measures changes in oxygenated blood in the brain.⁵³ Although most neuroscience studies are done with fMRI, it is rarely used in forensic matters. However, MRI, PET, and SPECT are often relied on in criminal cases. When criminal defendants rely on neuroimaging evidence, prosecutors may also introduce expert witnesses on the subject.⁵⁴

Neuroimaging evidence has also expanded into civil cases, with plaintiffs relying on neuroimaging to prove traumatic brain injury (“TBI”), often mild TBI (“mTBI”), and the behavioral and cognitive deficits they allege that are caused by such injury.⁵⁵ TBI may influence physical, cognitive, and psychological disorders and is often linked with serious functional impairment, including impulsivity, impaired attention and decision making, and reduced executive function.⁵⁶

During the last decade, some Plaintiffs have sought to introduce another type of neuroimaging, Diffusion Tensor Imaging (“DTI”), as proof of TBI or mTBI—brain injuries that may appear normal when imaged with CT or MRI.⁵⁷ Researchers are studying DTI to attempt

51. See Moriarty, *Neuroimaging Evidence in US Courts*, *supra* note 7, at 370–74 (describing the various forms of imaging).

52. Nikos K. Logothetis, *What We Can Do and What We Cannot Do With fMRI*, 453 NATURE 869, 869 (2008).

53. *Id.* at 870.

54. For an example of the competing testimony about structural and functional neuroimaging evidence in a capital case, see, for example, *State v. Kirkland*, 157 N.E.3d 716, 745–47 (Ohio 2020).

55. For a helpful discussion, see Valerie Gray Hardcastle, *Traumatic Brain Injury, Neuroscience, and the Legal System*, 8 NEUROETHICS 55 (2015).

56. See Nino Stocchetti, & Elisa R. Zanier, *Chronic Impact of Traumatic Brain Injury on Outcome and Quality of Life: A Narrative Review*, 20 CRITICAL CARE 148 (2016); Neil Krishan Aggarwal & Elizabeth Ford, *The Neuroethics and Neurolaw of Brain Injury*, 31 BEHAV. SCI. & L. 789 (2013).

57. See, e.g., *Ward v. Carnival Corp.*, 2019 WL 1228063, at *8–9 (S.D. Fla. Mar. 14, 2019); *Ruppel v. Kucanin*, 85 Fed. R. Evid. Serv. 859, 2011 WL 2470621, at *7–12 (N.D. Ind. 2011) (collecting cases). For recent New York cases disagreeing about whether DTI is sufficiently generally accepted, compare *Lee v. Troge*, 160 N.Y.S.3d 579, 2022 WL 534342, at *4 (Sup. Ct. 2022) (ruling that DTI “is a reliable and accepted diagnostic tool within the scientific medical community[.]” and “MRI with DTI is one appropriate test that can be used in identifying

to better visualize white matter tracts within the nervous system⁵⁸ and ongoing DTI research to map white matter tracts of the brain.⁵⁹ DTI's visually arresting three-dimensional pictures are assumed to represent the organization of axonal fiber bundles in the brain.⁶⁰ To date, DTI is being studied and is "the most promising technique available today for detecting diffuse axonal injury . . ."⁶¹ The American College of Neuroradiology Head Injury Institute and other national neuroradiology societies agree that more research is necessary before general clinical use is warranted, never mind forensic use.⁶² While some researchers believe DTI may be particularly useful for imaging axonal damage following mild traumatic brain injury (which CT and MRI generally do not detect),⁶³ DTI is still in the investigatory phase. As a 2018 article explains, although it "is beginning to be used clinically, it remains largely within the purview of research."⁶⁴

As courts are being asked to rule on this form of neuroimaging, judges are challenged by the inscrutability of the technology, its reliability, and whether to consider the role of clinical acceptance. "The march of science is inexorable," one court remarked with respect to DTI evidence, asking: "How is a Judge, a presumed expert in jurisprudence, but a lay person in science, to make such a

abnormality in the brain . . .") with *Brouard v. Convery*, 70 N.Y.S.3d 820, 823–24, 2018 WL 829103, at *3 (Sup. Ct. 2018) ("DTI technology is not generally accepted as yet in the field of neurology for use in the clinical treatment of individual patients.").

58. For a detailed explanation of DTI, see Lauren J. O'Donnell & Carl-Fredrik Westin, *An Introduction to Diffusion Tensor Image Analysis*, 22 NEUROSUGERY CLINICS N. AM. 185 (2011).

59. Yaniv Assaf & Ofer Pasternak, *Diffusing Tensor Imaging (DTI)-based White Matter Mapping in Brain Research: A Review*, 34 J. MOLECULAR NEUROSCIENCE 51 (2007). For an interesting article about the origins of mapping water diffusion in the brain, see Denis Le Bihan, *Diffusion MRI: What Water Tells Us About the Brain*, 6 EBMO MOLECULAR MED. 569 (2014).

60. *Id.*

61. Martha E. Shenton et al., *Mild Traumatic Brain Injury: Is DTI Ready for the Courtroom?*, 61 INT'L J.L. & PSYCHIATRY 50, 61 (2018).

62. Mark Wintermark et al., Am. Coll. Radiology Head Injury Inst., *Imaging Evidence and Recommendations for Traumatic Brain Injury: Advanced Neuro- and Neurovascular Imaging Techniques*, 36 AM. J. NEURORADIOLOGY E1 (2015). This article is endorsed by the American College of Radiology Head Injury Institute, the American Society of Neuroradiology, the American Society of Functional Neuroradiology, and the American Society of Pediatric Neuroradiology. See also Mark Wintermark et al., Am. Coll. Radiology Head Injury Inst., *Traumatic Brain Injury Imaging Roadmap*, 36 AM. J. NEURORADIOLOGY E12 (2015) (on behalf of the American College of Radiology Head Injury Institute). Other commentators agree. See Robert P. Granacher, Jr., *Traumatic Brain Injury*, in NEUROIMAGING IN FORENSIC PSYCHIATRY: FROM THE CLINIC TO THE COURTROOM 43, 56 (Joseph R. Simpson ed., 2012) ("[L]awyers are currently ahead of the science."); Shenton et al., *supra* note 61, at 61.

63. For more research on the use of DTI for mTBI, see Sumit N. Niogi & Pratik Mukherjee, *Diffusion Tensor Imaging of Mild Traumatic Brain Injury*, 25 J. HEAD TRAUMA REHAB. 241 (2010).

64. Shenton et al., *supra* note 61, at 61.

determination?”⁶⁵ In that case, the court found “insufficient evidence supporting the routine clinical use of advanced neural imaging for diagnoses and/or prognostications at the individual patient level[,]” citing a consensus position paper on DTI approved by three national institutes of radiology/neuroradiology.⁶⁶ By contrast, another court determined the same publication was not an impediment to the admission of DTI evidence in another case, ruling DTI was reliable and accepted as a diagnostic tool.⁶⁷ Other federal courts have held that the multiple studies about DTI and TBI indicate that the evidence is sufficiently reliable under Rule 702 and is therefore admissible.⁶⁸

DTI, like other forms of machine evidence, is understandably daunting to judges, particularly when they only have competing experts to help explain whether the evidence is foundationally reliable and reliable as applied.

III. FOUNDATIONAL CONCERNS ABOUT NEUROIMAGING AND THE LEGAL QUESTION OF RELIABILITY.

Neuroimaging evidence, like other forms of machine evidence, is largely inscrutable to courts. Courts are generally unaware of serious concerns about foundational neuroimaging research,⁶⁹ and may not grasp the concerns about reliability as applied in which experts compare an individual to research data. Additionally, few lawyers and judges understand the multiple choices about research design, statistical interpretation, and the various types of technology used to generate images.

As with other fields of science, there is a recognized crisis in neuroimaging research with respect to studies’ reproducibility, replication, and reliability. At the same time, some experts have begun to rely more on neuroimaging to supplant (and complement) psychiatry or psychological diagnoses.⁷⁰ Some of those experts are testifying about such neuroimaging. The turn toward hard science evidence is reflective of our ever-growing dependence on machines and may be a natural sequela of the so-called “*Daubert* revolution” where the Supreme Court jettisoned the *Frye* test of general

65. *Brouard v. Convery*, 70 N.Y.S.3d 820, 821, 2018 WL 829103, at *2 (Sup. Ct. 2018).

66. *Id.* at 822–23, 2018 WL 829103, at *2.

67. *See Lee v. Troge*, 160 N.Y.S.3d 579, 2022 WL 534342, at *4 (Sup. Ct. 2022).

68. *See, e.g., Ward v. Carnival Corp.*, 2019 WL 1228063 (S.D. Fla. Mar. 14, 2019).

69. *See Poldrack, supra* note 9 (discussing these problems).

70. Martha J. Farah & Seth J. Gillihan, *Diagnostic Brain Imaging in Psychiatry: Current Uses and Future Prospects*, 6 *AMA J. Ethics* 464 (2012) (discussing the minority of practitioners using brain imaging for psychiatric diagnosis, despite the lack of reliable evidence proving its utility for such a purpose).

acceptance⁷¹ and discovered a reliability requirement in Rule 702 of the Federal Rules of Evidence governing expert evidence.⁷² The foundational reliability of neuroimaging should be central to courts' decisions about admissibility, yet it is likely most courts are unaware of the concerns.

The *Daubert* revolution⁷³ has ushered in some important and substantive changes in how cases are prepared and tried, which cases lawyers will accept, where judges spend their time and energy (particularly in civil trials), and in our collective understanding of what constitutes reliable evidence. Perhaps considering the need for expert evidence that satisfies the *Daubert* standard and the enhanced requirements of Rule 702, lawyers embraced neuroimaging evidence.⁷⁴

Some neuroimaging, particularly where there is long-standing medical acceptance, is currently admissible in court with little complaint. For example, neuroimaging may provide reliable proof of severe brain damage from assault or trauma, and can bridge the gap between some forms of illness or injury and physical or mental behavior, particularly when there is a well-accepted clinical use of such technology.⁷⁵ In a case involving a question of competence to draft a will, for example, a neuroimage created at the time of the will's execution might be helpful proof that a person had Alzheimer's disease at the time of execution.⁷⁶ Given that the disease is correlated with irrational thoughts and behavior, the neuroimaging evidence would be relevant, helpful, and significantly probative,

71. *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 589 (1993) (“*Frye* made ‘general acceptance’ the exclusive test for admitting expert scientific testimony. That austere standard, absent from, and incompatible with, the Federal Rules of Evidence, should not be applied in federal trials.”) (referring to *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923)).

72. *Daubert*, 509 U.S. at 589 (“[U]nder the Rules the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable.”). In a trilogy of cases, the United States Supreme Court established a reliability standard governing expert evidence: *Daubert*, *General Electric v. Joiner*, 522 U.S. 136 (1997); and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999). The 2000 Amendment to FRE Rule 702 reflects the requirements set forth in the trilogy.

73. *Daubert* has been cited more than 30,000 times by courts, approximately 15,000 times in secondary sources, and more than 100,000 times in trial court documents. The word “revolution” is an apt description. See *Daubert*, 509 U.S. 579 (on Westlaw, navigate to “Citing References”).

74. See Meixner, Jr., *supra* note 47, at 332.

75. See Denno, *Neuroscientific Evidence in Context*, *supra* note 49, at 419. (“[N]euroimaging techniques are nearly always accompanied by nonimaging tests as well as other indicators of brain trauma across time.”).

76. A form of positron emission tomography, ¹⁸FDG-PET, is a functional technique that captures glucose metabolism and is routinely used in diagnosing brain tumors and Alzheimer's disease. See Susan E. Rushing et al., *PET and SPECT*, in *NEUROIMAGING IN FORENSIC PSYCHIATRY: FROM THE CLINIC TO THE COURTROOM* 3, 17–20 (Joseph R. Simpson ed., 2012).

particularly because it is clinically accepted for diagnosing Alzheimer's.⁷⁷ Looking forward, neuroimaging testimony may also become helpful to judges forced to make such a decision about brain death.⁷⁸ But in many cases, the inferential gap between the image and the use of it in court may be very wide.

The helpfulness of such testimony is dependent on the foundational (and applied) reliability of such evidence.⁷⁹ Pursuant to Federal Rule of Evidence ("FRE") 702, the proponent must establish foundational reliability and that "[t]he expert has reliably applied the principles and methods to the facts of the case."⁸⁰ Neuroimaging evidence seems to fit neatly within the research paradigm that suggests reliability, yet a deeper inquiry evokes serious questions about its reliability.⁸¹ As with other forms of machine evidence, its very sophistication may allow it to slip imperceptibly through the reliability net.

Neuroimaging evidence involves hidden choices in the research paradigms. Some of these choices are structured directly by humans, others will be made indirectly by algorithmic selection. As Professor Andrea Roth explains about machine evidence, "[u]ltimately, all machines are 'purposeful organization[s] for a strictly predetermined end,' executing the instructions of human programmers based on data or material inputted by human operators. As such, they reflect the factual assumptions and value choices of their creators."⁸²

With neuroimaging evidence, these choices are legion—from what technology to use, how to set the parameters of specificity and sensitivity, which region of interest in the brain upon which to

77. *Id.* at 20.

78. See, e.g., Derek MacDonald et al., *The Role of Neuroimaging in the Determination of Brain Death*, 28 J. NEUROIMAGING 374 (2018) (discussing neuroimaging research on brain death).

79. *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 594 (1993).

80. FED. R. EVID. 702 provides:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

(a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;

(b) the testimony is based on sufficient facts or data;

(c) the testimony is the product of reliable principles and methods; and

(d) the expert has reliably applied the principles and methods to the facts of the case.

Id.

81. This Article primarily addresses the foundational reliability issue. For more on the issue of reliability of applied, see Moriarty, *Neuroimaging Evidence in US Courts*, *supra* note 7.

82. Andrea Roth, *Trial by Machine*, 104 GEO. L.J. 1245, 1270 (2016) (quoting 2 LEWIS MUMFORD, *MYTH OF THE MACHINE* 87 (1970)).

focus, and so on.⁸³ Moreover, even the choice of humans from which the brain data is derived also reflects a researcher's choice. These choices do not necessarily result in unreliable evidence—if one is studying Alzheimer's, one needs subjects with the disorder. But these choices can affect foundational reliability of such evidence.

However, the critical concerns are the small size of the studies and lack of replication and reproducibility in the field. According to leaders in the field of neuroimaging, analytic variability, statistical power, and test-retest reliability have “raised alarms” regarding the potential for results that cannot be reproduced.⁸⁴

The lack of scientific reproducibility is often termed a crisis in scientific research.⁸⁵ Professor Russell A. Poldrack and Dr. Kirstie Whitaker explain the meaning of reproducibility, replication, and reliability in neuroscience research:

“[R]eproducibility” [is] a blanket term encompassing all aspects of the ability to reproduce a result, from same data/same analysis to different data/different analysis “[R]eplication” . . . refer[s] specifically to the ability for a finding to be reproduced—qualitatively found again—in a separate dataset “[R]eliability” . . . mean[s] the degree to which a measurement is stable across multiple repeated measurements.⁸⁶

At this point, there are concerns about all three. Achieving such scientific reproducibility requires research transparency and openness. The current practice of academic science rewards innovation, not verification,⁸⁷ focusing on novelty and positive results, at the cost of verification and replication.⁸⁸ In fact, as noted in a surprising 2021 publication reviewing scientific research publications, nonreplicable publications are cited more often than replicable ones.⁸⁹

83. See Guillaume A. Rousselet et al., *Promoting and Supporting Credibility in Neuroscience*, 3 *BRAIN & NEUROSCIENCE ADVANCES* 1, 2 (2019) (discussing the statistical choices that neuroscience researchers make).

84. Poldrack et al., *supra* note 9. They also highlight the problem of failed replications and meta-analytic null results as concerns studies of group and individual differences. See, e.g., Veronika I. Müller et al., *Altered Brain Activity in Unipolar Depression Revisited Meta-analyses of Neuroimaging Studies*, 74 [J]AMA PSYCHIATRY 47 (2017).

85. See B. A. Nosek et al., *Promoting an Open Research Culture*, 348 *SCIENCE* 1422 (2015); Poldrack et al., *supra* note 9.

86. Poldrack et al., *supra* note 9.

87. Nosek et al., *supra* note 85, at 1422.

88. Marta Serra-Garcia & Uri Gneezy, *Nonreplicable Publications are Cited More Than Replicable Ones*, *SCI. ADVS.*, May 2021, at 1.

89. *Id.*

Substantive critiques about the true value of neuroimaging studies include their low statistical power (due to small sample sizes),⁹⁰ lack of transparency, and undetected software problems.⁹¹ Given the concerns that these researchers express about foundational neuroscience research, there are troubling implications for a legal system that has little knowledge or understanding of these problems.

Although the critiques are well-grounded, there is optimism that greater size and reproducibility of neuroscience studies are possible.⁹² Additionally, there is much agreement that a core objective of neuroscience research must be the use of “scientific practices that aim to improve the reproducibility, replicability and reliability of neuroscience research.”⁹³ However, much of this ongoing work is out of the view of the judicial system.

It may be that advances in artificial intelligence (“AI”) will improve the foundational validity of neuroimaging evidence. Much of the interplay between neuroscience and AI has been AI’s use of brain-inspired models to create artificial neural networks and to adapt the brain’s reinforcement mechanism to improve computations.⁹⁴ But neuroscience research has also made use of AI, in which machine learning has “transformed the analysis of neuroimaging data.”⁹⁵ As machine learning become more prominent in neuroscience research, it may well push the field toward greater inscrutability. Due to their inherent complexity, “the products of AI research often remain ‘black boxes’; we understand only poorly the

90. Katherine S. Button et al., *Power Failure: Why Small Sample Size Undermines the Reliability of Neuroscience*, 14 NATURE REV. NEUROSCIENCE 365 (2013). The article further explains at length how low sample sizes and/or small effects “negatively affect[] the likelihood that a nominally statistically significant finding actually reflects a true effect.” *Id.* at 365.

91. Rick O. Gilmore et al., *Progress Toward Openness, Transparency, and Reproducibility in Cognitive Neuroscience*, 1396 ANN. N.Y. ACAD. SCI. 5 (2017). The article further discusses problems of reproducibility, transparency, low statistical powers, undetected software errors, and the lack of large-scale studies. *Id.*

92. See Gilmore et al., *supra* note 91. Accord Geoffrey K. Aguirre, *Functional Neuroimaging: Technical, Logical, and Social Perspectives*, HASTINGS CTR. REP., Mar./Apr. 2014, at S8, S13 (noting that “progress is being made in overcoming many practical barriers” in neuroscience research).

93. See Rousselet et al., *supra* note 83, at 1 (discussing the British Neuroscience Association’s plan to ensure its journal, *Brain and Neuroscience Advances*, exemplify such practices).

94. See, e.g., Demis Hassabis et al., *Neuroscience-Inspired Artificial Intelligence*, 95 NEURON 256 (2017); Tom Macpherson, et al., *Natural and Artificial Intelligence: A Brief Introduction to the Interplay Between AI and Neuroscience Research*, 144 NEURAL NETWORKS 603 (2021); Shimon Ullman, *Using Neuroscience to Develop Artificial Intelligence*, 363 SCIENCE 692 (2019).

95. Hassabis, *supra* note 94, at 253. Accord MacPherson et al., *supra* note 94, at 604 (discussing how AI is “rapidly becoming an invaluable tool in neuroscience research”).

nature of the computations that occur, or representations that are formed, during learning of complex tasks.”⁹⁶

For the trial court managing such evidence, the complex questions about foundational reliability and reliability as applied cannot simply be outsourced to the jury as courts have done with FCM evidence. Juries lack the knowledge and ability to work through the competing expert testimony to decide whether the subject matter is foundationally reliable. That is not to underestimate the burden this puts on the trial judge—this is arduous task for even the most science-knowledgeable judge.

Perhaps the best way for the trial court to manage this problem is to follow the science, rather than letting expert witnesses get ahead of it. While litigants have always pushed the evidence envelope, it is up to courts to push for greater proof of foundational reliability and reliability as applied. One important way for courts to do this is to follow the consensus opinions of the experts in the field.⁹⁷ This eases the burden on the trial court and may provide for a more coherent approach to the admission of neuroimaging evidence.

CONCLUSION

Inscrutability takes on many forms in evidence. First generation forensic science evidence is inscrutable due to its subjectivity. There are multiple ways to address this problem. With respect to this evidence, improved black box testing is the most helpful way to provide better scrutiny. But the judiciary’s role as gatekeepers for unreliable evidence is equally critical. Perhaps the amendments to Rule 702, if enacted, will aid courts in that role.

With respect to machine evidence, the inscrutability grows out of its complexity and the lack of access to the process by which the evidence was created. For neuroimaging evidence, the task of judicial gatekeeping is formidable. Greater reliance on medical and scientific consensus opinion is one method that might help the courts in determining whether such evidence is foundationally reliably.

96. Hassabis, *supra* note 94, at 253.

97. As a co-author and I have written, “[a]nother critical way to help bridge the divisions among science, medicine and law is greater reliance upon practice guidelines of the relevant professional groups” Jane Campbell Moriarty & Daniel D. Langleben, *Who Speaks for Neuroscience? Neuroimaging Evidence and Courtroom Expertise*, 68 CASE W. RES. L. REV. 783, 804 (2018).

Technology — Revealing or Framing the Truth? A Jurisprudential Debate

Dana Neacșu*

“And ‘truths’ is the (philosophical) name of what interpolates itself into the continuity of ‘there is’.”¹

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* *Dana Neacșu is Associate Professor of Legal Skills at Duquesne University School of Law and Director of the Duquesne Center for Legal Information & the Allegheny County Law Library. She would like to thank the Duquesne Law Review Executive Board and Professor Jane Moriarity for organizing Duquesne University School of Law's Symposium “The Death of Eyewitness Testimony and the Rise of the Machine,” and for including this Article among those presented. As always, this is for Izzie and ZouZou.

1. ALAIN BADIOU, LOGICS OF WORLDS: BEING AND EVENT, 2, at 4–5 (Albert Toscano trans., Continuum Int’l Publ’g Grp. 2009)) (2006).

INTRODUCTION

Technology is so much more than a prosthetic. But how much more? And what else is it? In the legal realm, its role is not yet clear. Such a lack of elucidation becomes problematic, especially when technology has the ability to convert assumptions into facts, and it takes on a truth-making, rather than a mere truth-revealing mission. This Article argues that it is problematic to enable technology to stand in for reflective thinking, and calls attention to the fact that evidentiary rules enable technology to decide what can be proven, *ergo* what truth is.

Technology is a fork in the road of the legal meaning making process. It may simultaneously obscure and reveal legal truth. Given this position in the process of negotiating the appearance of legal truth, this Article discusses technology from a determinist and phenomenological perspective, directing the reader's gaze to what constitutes legal truth. Then, it guides it to a brief discussion of the role of technology within the evidentiary context of DNA sample testing,² to embrace the view of "technology" as mediator of truth, closer to its Greek origins as *techné*: bringing-forth the truth, and similar to "the *poiésis* of the fine arts."³

I. TECHNOLOGY – A PHILOSOPHICAL AND JURISPRUDENTIAL APPROACH

A) *Greek Epistemic and Ontological Roots*

All Western philosophical thought lives on the basis of its Greek beginning, as a way to investigate reality through reason or reflective thinking.⁴ Greek roots are also evident when thinking about technology linguistically and philosophically, ontologically. Etymologically, "technology" comes from the root *techné*.⁵

2. See 18 U.S.C. § 3600 (requiring courts to use DNA testing in certain cases where defendants have been sentenced to imprisonment or death).

3. See Mark Blitz, *Understanding Heidegger on Technology*, 41 *NEW ATLANTIS* 63, 76 (2014).

4. BERTRAND RUSSELL, *A HISTORY OF WESTERN PHILOSOPHY* 11–15 (1945).

5. See generally DAVID ROOCHNIK, *OF ART AND WISDOM: PLATO'S UNDERSTANDING OF TECHNE* (1996). David Roochnik comprehensively analyzes the Greek word *techné*, typically translated as "art," but also as "craft," "skill," "expertise," "technical knowledge," and even "science." *Id.* Roochnik maintains that Plato spoke of both the goodness of *techné*, as well as its severe limitations and consequent need to be supplemented by "nontechnical" wisdom. *Id.*

Ontologically, *techné* made its first appearance as the earliest form of instruction offered by Greek rhetoricians. The early sophists used *techné* as synonymous to art or skill, when describing their knowledge-purveying activity.⁶ Protagoras, an early sophist, as imagined by Plato in the dialogue with the same title,⁷ described his instruction as *techné*.⁸

In the same dialogue, Plato introduces a major conceptual development of craft, art, or *techné*, as a practical skill which does not need to be mechanical. The knowledge and technique of using fire, under the umbrella of *techné*, is the beginning of humanity in its most simple and complex possibility. This is also the beginning of *techné* as a type of experience, similar to what we would call today “know-how”⁹:

Prometheus was at his wits' end to find a means of preservation for mankind, so he stole from Hephaestus and Athena their *technical skill* along with the use of fire—for it was impossible for anyone to acquire or make use of that *skill* without fire—and that was what he gave to man. That is how man acquired his *practical skill* . . .¹⁰

Plato also uses *techné* in his dialogue, *Phaedrus*,¹¹ where he “suggests that the ability to adapt arguments to various types of people is central to a true art or *techné* of rhetoric.”¹² The speaker “must discover the kind of speech that matches each type of nature,”¹³ to be effective and impart knowledge or, perhaps, rumors. With Plato, *techné* evolved from a skill to truth-making.

Plato's bifurcation of *techné* into the true and the sham reaches a new level of development (or confusion) with Aristotle's

6. JAMES A. HERRICK, THE HISTORY AND THEORY OF RHETORIC: AN INTRODUCTION 59 (4th ed. 2009).

7. RUSSELL, *supra* note 4, at 80–87.

8. PLATO, PROTAGORAS 14–16 (C.C.W. Taylor ed., Oxford Univ. Press 1996) (399–380 B.C.E.). For Plato instruction has a technical side, which can be professional or not. “You didn't learn any of those things in a technical way, with a view to becoming a professional yourself, but simply for their educational value, as an amateur and a gentleman should.” *Id.* at 7.

9. For example, in *Van Products Co. v. General Welding & Fabricating Co.*, the Pennsylvania Supreme Court defined “know-how” to include trade secrets. 213 A.2d 769, 777 (Pa. 1965). The “concept of ‘know-how’ is . . . a very fuzzily defined area, used primarily as a short-hand device for stating the conclusion that a process is protectible. It covers a multitude of matters, however, which in the broad sense are not protectible, e.g., an employee's general knowledge and skill.” *Id.*

10. PROTAGORAS, *supra* note 8, at 18 (emphasis added).

11. PLATO, PHAEDRUS (Benjamin Jowett trans., Mass. Inst. Tech.) (360 B.C.E.), <http://classics.mit.edu/Plato/phaedrus.html>.

12. HERRICK, *supra* note 6, at 71.

13. *Id.*

classification of art. For Aristotle, art covered the domain of productive knowledge, which creates both beautiful and useful objects.¹⁴ Thus, with Aristotle, *techné* becomes a model of knowledge.¹⁵ Aristotle's *Rhetoric* is considered an example of a complete *techné*, or art of rhetoric.¹⁶ Moreover, Aristotle links *techné* with knowledge production (*epistémé*) in Book VI of the *Nicomachean Ethics*,¹⁷ finding that knowledge needs *techné* to be imparted: "Again, every science is thought to be capable of being taught, and its object of being learned."¹⁸

Nevertheless, they are different activities. From skill, through know-how and knowledge production, *techné* begins its ascent into the mechanical, or *instrumentum*. According to the Oxford English Dictionary, *instrumentum* is "an object, device, or apparatus designed or used for a particular purpose or task."¹⁹ The following sections discuss technology framing and negotiating knowledge, producing legal truth, and the societal challenges associated with each of these roles.

B) *A Determinist View of Technology as a Human Extension*

Ontologically, combining Plato's view of *techné*—as both skill and knowledge, such as writing, which records knowledge and creates it in the process²⁰—with Aristotle's, technology ends up as a hydra with multiple heads. Technology, with its roots in *techné* is an instrument of knowledge, its medium. Sometimes, like an understudy, *techné* can stand in for thinking because it records it. This

14. See Christopher Shields, *Artistotle*, STAN. ENCYCLOPEDIA PHIL., <https://plato.stanford.edu/entries/aristotle/> (last updated Aug. 25, 2020) (providing background information on Aristotle's *Rhetoric*); see also HERRICK, *supra* note 6, at 79 ("[R]hetoric and dialectic . . . represent two complimentary arts of reasoning to probable conclusions . . .").

15. See JANET M. ATWILL, *RHETORIC RECLAIMED: ARISTOTLE AND THE LIBERAL ARTS TRADITION* 162–63 (1998).

16. See SHARON CROWLEY & DEBRA HAWHEE, *ANCIENT RHETORICS FOR CONTEMPORARY STUDENTS* 89–90 (5th ed. 2012). Isocrates, Aristotle's contemporary, also referred to his instruction as a logon techne, or art of discourse. *Id.* at 21. See also HERRICK, *supra* note 6, at 46–49.

17. See ARISTOTLE, *NICOMACHEAN ETHICS* bk. IV (W.D. Ross, trans., Mass. Inst. Tech.) (350 B.C.), <http://classics.mit.edu/Aristotle/nicomachaen.6.vi.html>; see also ERIC SCHATZBERG, *TECHNOLOGY: CRITICAL HISTORY OF A CONCEPT* 20 (2018).

18. See ARISTOTLE, *NICOMACHEAN ETHICS* bk. IV (W.D. Ross, trans., Mass. Inst. Tech.) (350 B.C.), <http://classics.mit.edu/Aristotle/nicomachaen.6.vi.html>.

19. *Instrumentum*, OXFORD ENGLISH DICTIONARY (3d ed. 2017). This entry has been updated (OED Third Edition, March 2017; most recently modified version published online December 2021).

20. [Socrates:] [W]ho should leave in writing or receive in writing any art under the idea that the written word would be intelligible or certain; or who deemed that writing was at all better than knowledge and recollection of the same matters?
PHAEDRUS, *supra* note 11.

is why the philosophical roots of both the determinist approach to technology as an infallible recording instrument, and those of the phenomenological view of technology as intermediating experiential thinking spring from its Greek, *techné*, roots.

Nevertheless, as argued in this Article, in the legal realm, it appears that the determinist view of technology has influenced its legal use to a larger degree. A welcome extension of human capabilities and never a hindrance, technology has become a welcome prosthetic in the service of law, of the factfinder.²¹ Results that otherwise would not have been imaginable, not only are now achievable but are unquestionably accepted, just because they are technology-induced.

Scanning devices, for example, opened the door to law enforcement officers to gather information unreachable to them because of location. Thirty years ago, using an Agema Thermovision 210 thermal imager, from the passenger seat of a passing vehicle, special agents thermally scanned Danny Kyllo's home temperature.²² The temperature results obtained from the scanner were never questioned in court, partly due to this determinist approach to technology, which unquestionably views it from a positive angle.²³ Only the method of obtaining the temperature was questioned in court, not the reliability of the temperature itself:

Where, as here, the Government uses a device that is not in general public use, to explore details of the home that would previously have been unknowable without physical intrusion, the surveillance is a "search" and is presumptively unreasonable without a warrant.²⁴

However, had anyone raised the issue of the role of technology as a legal truth producer, it might have opened the door to a richer

21. See discussion *infra* Part II.

22. Sean D. Thueson, *Fourth Amendment Search—Fuzzy Shades of Gray: The New "Bright-Line" Rule in Determining When the Use of Technology Constitutes a Search*, 2 WYO. L. REV. 169, 169–70 (2002) (citations omitted). In the *Kyllo* case, the defendant was suspected of growing marijuana in his home. Detectives used a thermal imager to scan his home from a police vehicle while parked on a public street. Thermal imagers passively record infrared information to indicate relative temperature, a phenomenon which cannot be readily observed without the aid of such a device. *Id.* (citations omitted); see also *Kyllo v. United States*, 533 U.S. 27, 29–31 (2001). Writing for the majority, Justice Scalia invalidated the legal value of the truth finding result, as obtained against constitutional protections against unwarranted search and seizure. *Id.* at 40.

23. See *Kyllo*, 533 U.S. at 29–31.

24. *Id.* at 40.

discussion about what constitutes legal truth.²⁵ Perhaps the process of marijuana decriminalization would have started in earnest thirty years ago,²⁶ if technology was not regarded monolithically as a factfinder prosthetic, but as a tool to negotiate social meaning: what was the social meaning of high temperature coming from the garage of the owner of a Floridian triplex? Is it criminal? Does it have to be criminal? Are there any other possible explanations?

This positive view of technology as a welcome prosthetic impacts both its use and how it influences different practices and settings. This conceptualization of technology creates a dogmatic trust in accepting its results without any questions. Technologically-produced results are taken for granted, as positive and truth enabling in any set of circumstances any time technology is used, at the expense of any reflexive thinking about what exactly technology is, what is produced or used, and to what consequences.

Without reflection and introspection, it is often forgotten that all evidence, direct or circumstantial, is equally problematic.²⁷ Ironically, evidence produced by technological advancements receives less introspective evaluation, though it is often circumstantial.²⁸ Direct testimony from a witness to the events under investigation would never be perceived as more probative than circumstantial evidence obtained from technology. The reverse, however, has become inevitable, as technologically produced evidence holds more probative value.²⁹ Think only about a witness visiting the *Kyllos* and testifying afterward that the temperature inside felt normal to rebut evidence obtained through that new method or technology that it was much higher than normal. Uncontestably, a thermometer is more reliable telling temperature than a human experiencing it and recording: “I feel hot” or “I feel cold.” Similarly, the infrared technology is even more advanced than a thermometer to read temperatures, but neither “reading” is infallible because a mere mechanical recording of temperatures does not tell the entire story. For

25. Or it might have even started the conversation about how one decides to transform a garage into a commercial solarium to grow marijuana plants at the risk of many years of incarceration. *See id.* at 29–30 (describing facts related to Danny Kyllo’s life).

26. *See* Paul J. Larkin, Jr., *Cannabis Capitalism*, 69 *BUFF. L. REV.* 215, 216 (2021). “The last 25 years have witnessed a revolutionary change in the status of cannabis under American law. Before 1996, state and federal law uniformly outlawed its distribution. By contrast, today 36 states allow marijuana to be sold for its potential medical use and 15 (along with the District of Columbia) also permit its recreational use.” *Id.*

27. As far as jury instructions are concerned, the law makes no distinction between direct and circumstantial evidence. *Holland v. United States*, 348 U.S. 121, 140 (1954); 26 *MOORE’S FEDERAL PRACTICE—CRIMINAL PROCEDURE* § 630.32 (2021).

28. *See, e.g., Kyllo v. United States*, 533 U.S. 27 (2001).

29. This is the case with DNA testing. *See* 18 U.S.C. § 3600(a)(3).

instance, thermometers can also be faulty, broken, or the temperature recorded does not tell the “truth.” Holding a thermometer near a burning oven might indicate that the temperature inside that dwelling is high, but without direct testimony that mere recording, while “true,” would confuse the fact finder in a case similar to *Kyllo*.

Philosophically and then scientifically, knowledge and technology have never been meant to overlap. As shown earlier in this Article, they did not overlap for Plato, nor for Aristotle. But, somehow, the instrumental view of technology evolved into dogmatic determinism. Maybe this happened because of the undemocratic roots of philosophy—reflective thinking taught to the young, well-off Athenian (male³⁰) citizens, was not a widespread human activity, given its rarefied circles. By association, technology, especially as skills intermediating knowledge, slipped rather easily into the role of a welcome replacement to knowledge produced through reflective thinking. Given this expedient transition, technology has benefited from a determinist, unquestionably positive view. But expedience comes with a high societal price: a less knowledgeable, inquisitive, democratic society. Knowledge relies on technology as a modality of engaging the thinking process, guiding and finalizing it, as shown below. Technology predisposes knowledge building. Especially in law, where truth is not metaphysical, a matter of how things are,³¹ but how they are shown and perceived. When technology determines appearance, it also determines judicial outcomes. A more nuanced role of technology might deepen our democratic principles of an open society.

C) *A Phenomenological View of Technology as Historical and Experiential*

Phenomenology can be described as the study of a phenomenon, or appearance.³² It does not mean that phenomenology deals with “mere appearance as opposed to reality, with a mental image instead of persistent thing.”³³ A very succinct definition of

30. This Article cannot comment on more than the gender of Athenians. They were Europeans, yes, but commenting on the whiteness of Athenians, for instance, would be anachronistic because Athenians did not recognize themselves as white and did not base their democracy on whiteness—maleness and property ownership were the only requirements for public service in Athens, but not whiteness.

31. *But see* Jonathan Jenkins Ichikawa & Matthias Steup, *The Analysis of Knowledge*, STAN. ENCYCLOPEDIA PHIL., <https://plato.stanford.edu/entries/knowledge-analysis/> (last updated Mar. 7, 2017) (suggesting that real truth *is*, in fact, a matter of how things are, while this Article posits that legal truth is the opposite).

32. CHAD ENGELLAND, PHENOMENOLOGY 2 (2020).

33. *Id.* (emphasis in original).

phenomenology as used here is the study of experience, as it unfolds, which allows participants to sort out both *mere* appearances from true appearance of things, and legal truth from *mere* truth.

Unlike determinism whose view of technology places it on a pedestal, phenomenology encourages a relational approach to meaning-making.³⁴ Emphasizing the experiential interaction between humans, technology, and the world,³⁵ phenomenology would correct the intimidating view of reflective thinking and thus the wrongful embrace of technology. Through phenomenology, technology opens the ways to experience the world, which inevitably produces reflection upon that experience, which subsequently is incorporated in meaning-making.

Law relishes appearances (legal appearances³⁶) as much as reality. Legal truth is a construct, evidentiarily established, and incorporating technological results. A determinist approach to technology reduces the factfinder's role because it minimizes the role of reflective, investigative thinking. To the contrary, a phenomenological view of technology exposes legal meaning as connected not to the essence of things, but to human behavior. It exposes how technology interposes a layer of appearance, which might be exactly what the factfinder needs, but understanding the difference keeps the process open to improvements, which is inevitable.

The foremost phenomenological thinkers are Edmund Husserl and Martin Heidegger.³⁷ Their work is briefly discussed here to the

34. See generally DANA NEACȘU, *THE BOURGEOIS CHARM OF KARL MARX AND THE IDEOLOGICAL IRONY OF AMERICAN JURISPRUDENCE* (2020) (highlighting Professor Neacșu's view on meaning making).

35. There are many approaches to phenomenology, including G.W.F. HEGEL, *PHENOMENOLOGY OF SPIRIT* (A.V. Miller trans., Oxford Univ. Press 1952) (1807). Hegel's main purpose was to unfold human history as a process of human consciousness. *Id.* Heidegger and Husserl (discussed here) continue Hegel's transcendental approach to phenomenology, because both have an idealist subjectivist approach to the philosophy—as a reasonable investigation of the world—rather than a materialist approach, as I do. While a phenomenologist, because truth is revealed legally through experience, I believe, in Marx and Engels' words that “the first premise of all human existence and, therefore, of all history, the premise, namely, that men must be in a position to live in order to be able to ‘make history’.” KARL MARX & FRIEDRICH ENGELS, *THE GERMAN IDEOLOGY* 47 (Prometheus Books 1998) (1845). Furthermore, I doubt that only someone who had been exposed to music enjoys music as such and not as noise, but even more interestingly, for me, isn't all music noise, and therefore what creates music is the pleasure it produces in the listener?

36. See, e.g., Adam M. Samaha, *Regulation for the Sake of Appearance*, 125 HARV. L. REV. 1563, 1565 (2012) (appearance matters in law); see also Dana Neacșu, *Cazul Aparenței ca Normativitate Transformativă. Exemple din Dreptul American [The Case of Legal Appearance as a Transformative Norm. Examples from American Law]*, in 2 IN HONOREM FLAVIUS ANTONIU BAIAS – APARENTA ÎN DREPT 279 (Adriana Almasan et al. eds., Hamangiu ed. 2021).

37. Certainly, more knowledgeable scholars would add other philosophers, and for their views. See generally CHRISTOPHER MACANN, *FOUR PHENOMENOLOGICAL PHILOSOPHERS: HUSSERL, HEIDEGGER, SARTRE, MERLEAU-PONTY* (1993). This Article limits itself to Husserl and Heidegger because of their view of historical and experiential truth (particularly for

extent that their theories are helpful to this Article's call for a jurisprudential role of technology as intermediating legal truth to the semiotic agent, the factfinder.

1. *Husserl's Experiential View of Truth*³⁸

In 1929, Edmund Husserl's phenomenological theory became experiential and constitutive.³⁹ "[I]deal formations [are] essentially products of the correlative structures of productive cognitive life[.]"⁴⁰ Husserl's phenomenological–philosophical project on the problem of the constitution of meaning focused on exploring the processes through which “‘things’ (ranging from directly intuitable physical bodies to abstract mathematical objects) attain their meaning for the human mind.”⁴¹

According to Irish philosopher Dermot Moran, Chair in Catholic Philosophy at Boston College, Husserl apparently had his breakthrough phenomenological revelation in 1898 when he realized that meaning was the result of a “universal a priori of correlation between experienced object and manners of givenness.”⁴² Every object must be thus understood not solely as it is in itself, but in relation to the subjective acts which disclose it. For instance, the truth revealed through evidence is the result of multiple evidentiary correlations that made possible its realization, or using Husserl's vocabulary, its “givenness.”⁴³ Meaning, and thus truth, for Husserl, is the result of a process of consolidation, sedimentation, and

Husserl) and their anti-determinist view of technology. See LAMBERT ZUIDERVAART, TRUTH IN HUSSERL, HEIDEGGER, AND THE FRANKFURT SCHOOL: CRITICAL RETRIEVAL 19, 20 (2017).

38. ZUIDERVAART, *supra* note 37, at 20.

Husserl's explication of propositional truth makes possible “a deliberate [*schrittweise*] and critically testable [*kontrollierbare*] expansion” toward existential truth, toward truth as it is lived in true friendships and truthful conduct, for example, and not simply as it is asserted. Even though Husserl does not really account for the relationships among truth, history, and human practices (*Praxis*), “for the first time since German idealism” Husserl understands human life in its entirety as “oriented to truth,” and he regards philosophy as “the radicalization of this relation to truth [*Wahrheitsbezug*].”

Id.

39. This processual, meaning-making aspect is more interesting than Husserl's ahistorical view of human existence, and the transcendental, intuitive basis of thinking. For more on Husserl, see ZUIDERVAART, *supra* note 37.

40. EDMUND HUSSERL FORMAL AND TRANSCENDENTAL LOGIC 263 (Dorion Cairns trans., Springer Sci. & Bus. Media 1969) (1929).

41. Peter Woelert, *Husserl on Symbolic Technologies and Meaning-Constitution: A Critical Inquiry*, 50 *CONT'L PHIL. REV.* 289, 296–97 (2017). Husserl further developed his own phenomenological concept of intentionality. *Id.* at 297. According to it, ‘individual consciousness, in its various cognitive and affective manifestations, is and remains phenomenologically always and essentially “consciousness of something.”’ *Id.* (emphasis omitted).

42. DERMOT MORAN, HUSSERL'S CRISIS OF THE EUROPEAN SCIENCES AND TRANSCENDENTAL PHENOMENOLOGY: AN INTRODUCTION 21 (2012).

43. *Id.* at 15–21.

stratification. Moreover, the constitution of meaning relies on temporal experiences in consciousness; humans function as semiotic agents.⁴⁴

Furthermore, Husserl focuses on linguistically mediated processes of consolidation of meanings which are progressively superimposed upon by “persisting linguistic acquisitions.”⁴⁵ Specifically, a particular emphasis is placed on the form of sedimentation that occurs with and while using the medium of writing.

Husserl observes that writing is peculiar as a linguistic medium because it allows for the “sensible embodiment” of meanings through a generalized system of signs⁴⁶ [S]igns are “sensibly experienceable”⁴⁷ by one’s visual senses, and are importantly of such a disposition that they are potentially “intersubjectively experienceable in common.”⁴⁸

According to Husserl, there are several implications stemming from these features of writing. The manifest stabilization of meaning depends on the levels its carriers (i.e., the material, written signs) stimulate. This is an efficient process of stratification and consolidation of once actively constituted meanings, and accordingly, truth, viewed as a historical stratification of human practices.⁴⁹

From this perspective, the written text enables the process of sedimentation of meaning, not its intelligibility (as Plato’s Socrates warned us⁵⁰). And because writing relies on a system that can be experienced in common, it becomes a sensible embodiment of truth. Building on Husserl’s phenomenology, this Article suggests that truthfulness stems from open accessibility. It would correct the current situation, which ironically encourages a hierarchical approach to truth. Because the more sedimented through a particular technological mediation truth finds itself, the less open its meaning is to refutations. Incorporating Husserl’s revised phenomenology—absent its ahistorical transcendental aspect—the semiotic agent is

44. See generally *id.*

45. Woelert, *supra* note 41, at 299 (quoting Edmund Husserl, *The Origin of Geometry, in THE CRISIS OF EUROPEAN SCIENCES AND TRANSCENDENTAL PHENOMENOLOGY* 353, 362 (David Carr ed., 1970) (1939) [hereinafter *The Origin of Geometry*]).

46. *Id.* (quoting EDMUND HUSSERL, *THE CRISIS OF EUROPEAN SCIENCES AND TRANSCENDENTAL PHENOMENOLOGY* 26 (David Carr ed., 1970) (1954)).

47. *Id.* (quoting *The Origin of Geometry, supra* note 45, at 361).

48. *Id.*

49. ZUIDERVAART, *supra* note 37, at 20.

50. See *supra* note 20 and accompanying text.

free to inquire about the value of knowledge. Technological expertise is not a prerequisite to truth-establishing. It only frames the beginning of the thought process. Only reflective, inquisitive thinking can guide the factfinder searching for truth. In the legal realm, this inquisitiveness rests with the evidentiary rules of the legal process.

2. *Martin Heidegger's Assertive View of Truth*⁵¹

In 1954 German philosopher Martin Heidegger developed his own phenomenological quest for the meaning of technology. He questioned the essence of technology in the essay entitled: "The Question Concerning Technology."⁵² Heidegger essentially told his audience that "questioning builds a way [of being]."⁵³

The way is one of thinking. All the ways of thinking, more or less perceptibly, lead through language in a manner that is extraordinary. We shall be questioning concerning *technology*, and in so doing we should like to prepare a free relationship to it. The relationship would be free if it opens our human existence to the essence of technology. When we can respond to this essence, we should be able to experience the technological within its own bounds.⁵⁴

Heidegger rejected Husserl's phenomenology as the beginning of a thought.⁵⁵ Though, Heidegger embraces temporality of thought, and its historicity. Thus, in terms of the phenomenology of technology, Heidegger moves its role to that of intermediary, enabling "disclosedness" (*Erschlossenheit*) and "discoveredness" (*Entdecktheit*) of

51. The conception of truth proposed by Martin Heidegger's *Being and Time* is both provocative and problematic. On the one hand, in going beyond Husserl's phenomenological account, Heidegger provides a way to reconnect technical accounts of propositional truth within logic, epistemology, and philosophy of language with the cultural practices and social institutions from which such accounts take distance. He does so by developing an ontological alternative to a pervasive "logical prejudice" in Western philosophy, an alternative to the "propositionally inflected" character of many conceptions of truth. On the other hand, Heidegger takes such a dim view of "everydayness" and public communication that attaining truth becomes the inexplicable privilege of "authentic" existence. This privileging of authentic existence ensnares his conception in the self-referential incoherence of theorizing what, according to his own theory, cannot be theorized.

LAMBERT ZUIDERVAART, TRUTH IN HUSSERL, HEIDEGGER, AND THE FRANKFURT SCHOOL: CRITICAL RETRIEVAL 47 (2017).

52. MARTIN HEIDEGGER, THE QUESTION CONCERNING TECHNOLOGY AND OTHER ESSAYS (William Lovitt trans., 1977) (1954).

53. *Id.* at 3.

54. *Id.* at 3–4.

55. See generally *id.*

meaning.⁵⁶ French philosopher Bernard Stiegler discussed Heidegger's assessment of technology.⁵⁷ Similarly to Heidegger, Stiegler pointed out the intermediary role of technology between the contingent and the accidental.⁵⁸ Stiegler seems to have continued Heidegger's view of technology as the "unconceal[r]"⁵⁹ and revealer of the truth.⁶⁰ Whether it is through language or writing, technology intermediates thought⁶¹ and asserts truth.

Like Aristotle, Heidegger distinguished between knowledge and technology:

Techné reveals whatever does not bring itself forth and does not yet lie here before us Thus what is decisive in *techné* does not at all lie in making and manipulating nor in the using of means, but rather in the . . . revealing. It is as revealing, and not as manufacturing, that *techné* is a bringing-forth Technology is a mode of revealing. Technology comes to presence . . . in the realm where revealing and unconcealments take place, where *alétheia*, truth, happens.⁶²

Heidegger seems to promote the view about technology as enabling a way of thinking, "a mode of revealing."⁶³ Professor Paul Callister believes that, for Heidegger, technology enabled a non-reflective way of thinking.⁶⁴ I think, for Heidegger, technology enabled all thinking—reflective and computational—technology could reveal and conceal the truth. Heidegger noted that in light of the undeniable advances in science and technology, the possibility of abandoning reflective thinking in the name of computational technology was moving from a mere possibility enabled by technology to reality. But the result is not inevitable, because the "essence of technology is by no means anything technological"⁶⁵ *It is* in fact thinking. The essence of technology is the reflective thinking it

56. ZUIDERVAART, *supra* note 37, at 48 (meaning can be both discerned and understood).

57. See generally ROSS ABBINNETT, *THE THOUGHT OF BERNARD STIEGLER: CAPITALISM, TECHNOLOGY AND THE POLITICS OF SPIRIT* (2018).

58. *Id.* at 2–3.

59. MARK WRATHALL, *HEIDEGGER AND UNCONCEALMENT: TRUTH, LANGUAGE, AND HISTORY* 30 (2011).

60. Bernard Stiegler, *Philosophy and Technics, in* *PHILOSOPHISING BY ACCIDENT: INTERVIEWS WITH ELIE DURING*, 29, 42 (2017).

61. HEIDEGGER, *supra*, note 52.

62. *Id.* at 13 (emphasis in original).

63. *Id.* at xxv.

64. See Paul D. Callister, *Law and Heidegger's Question Concerning Technology: Prolegomenon to Future Law Librarianship*, 99 *L. LIBR. J.* 285, 285 (2007).

65. HEIDEGGER, *supra* note 52, at 4.

engenders (not endangers!) and then, asserts. In the legal realm, it cannot happen automatically, it requires us to abandon the determinist view of technology.⁶⁶

3. *A Jurisprudential Phenomenological View of Technology as Actuating Possibility*

This Article proposes a phenomenological view of technology as potentially revealing the truth. It incorporates both Husserl and Heidegger's experiential approach. Technology sets up the beginning of a thought, mediating its possibility into actuality, asserting its disclosedness.

For instance, consider the example of writing. A pen and paper induce a type of reflectiveness, even before the process of thinking starts. Given that it is harder to correct what is on the paper than what is simply enunciated, one is perhaps more careful to engage in the written text. Similarly, using a word processor sets up a particular cut-and-paste liberation which induces a particular thought-creation. Moreover, dictating software sets up an even more relaxed way of thinking. None of them can guarantee the quality of the written text. Without more, there is no certainty of knowledge, only its possibility, only the means to assert its actuation.

Technology is an intermediary prosthetic device of unlimited imaginative power. It threatens to replace decision-making reflective processes with automated, computing thinking, because of its versatility. Technology is behind both calculative and reflective thinking: it conditions both. Technology is one of the most inventive vessels of truth whose meaning and legal role has not yet been established.

The signs of confusion about the role of technology appeared from its Greek origins. As Plato reminds us, Socrates complained about writing, because immortalizing events was also a way of creating them.⁶⁷ Through Socrates, Plato worried that humans write, like God, to create. But unlike God, they also wrote to easily forget. Forget what? That creation is hard? Perhaps, because recording thoughts reproduces them. So, could it thus be that memorializing frees us from the burden of inquiring about any other version of the truth? Marshal McLuhan attempted to solve the problem with technology by deciding in favor of determinism: the medium was

66. It is beyond the scope of this Article to investigate the attraction determinism and computational thinking has over human nature.

67. PHAEDRUS, *supra* note 11.

the message.⁶⁸ But the challenge remains not to reduce technology from potentiality to some frozen determinism but to embrace its complexity while being aware of our interpretive limitations as semiotic agents. Technology can both reveal and obscure the truth, if abandoned to technicality. Legally, such uniformity of application, as writing or any recording device enables, would close all democratic avenues toward change. Technology advances through reflective thinking, which often has computational components. Its legal applications are equally dual-natured.

II. TECHNOLOGY AND LEGAL TRUTH-MAKING

Legally, evidentiary rules tell us that truth is what can be proven. Rules of Evidence (“the Rules”) have embraced the so-called “modern technologies” which are expected to avoid deception. The mere fact that we can talk about avoiding deception⁶⁹ is itself deterministic and deceptive. But the Rules also reflect something essential in their imperfection: they are not meant to solve anything alone. As the late Eastern District of New York Senior Judge Jack Weinstein said:

The problems of expert witnesses are subtle and difficult. They do not respond readily to simple solutions. I have only two related points to make. First, we should not be quick to abandon the principle of easy admissibility of expert and other testimony embodied in the Federal Rules of Evidence. The Rules were designed to depend primarily upon lawyer-adversaries and sensible triers of fact to evaluate conflicts.⁷⁰

Technology is not meant to legally solve anything without the trier of fact. Technology is more and more incorporated in the legal realm because all facets of human life are more and more technology-driven. But that is the opposite of ready-made technical solutions. For technology to exist, reflective thinking is a prerequisite both at the beginning and end process. Simplistic substitutes cannot but produce simplistic solutions.

68. See generally MARSHALL McLuhan, *UNDERSTANDING MEDIA: THE EXTENSIONS OF MAN* 7–21 (1964).

69. MCCORMICK ON EVIDENCE § 206.2 (8th ed. 2020).

70. Jack B. Weinstein, *Rule 702 of the Federal Rules of Evidence Is Sound; It Should Not Be Amended*, 138 F.R.D. 631, 631 (1991).

A. *Technology and Evidentiary Truth*

Under Rule 702 of the Federal Rules of Evidence, a trial judge must ensure that any scientific testimony or evidence admitted is not only relevant but reliable.⁷¹ The Federal Rules of Evidence also clarify the meaning of the term “scientific.”⁷² Moreover, Rule 702 also states that scientific testimony is appropriate when the judge determines that the trier of fact, the truth-finder, would benefit from an intermediary, because the matter requires specialized knowledge.⁷³ The term “knowledge” within the meaning of Rule 702 connotes more than subjective belief or unsupported speculation. In other words, technology is needed only as an intermediary to guide the meaning-making process of the trier of fact. This is not a rule about technology as truth-maker but as truth-enabler. Specialized knowledge is welcome if it mediates understanding for the factfinder.

Historically, federal trial courts’ analyses and determinations about the admissibility of scientific evidence were straightforward and simple. For most of the twentieth century, from 1923⁷⁴ until 1993,⁷⁵ the admissibility standard for scientific expert evidence at trial was the so-called *Frye test*. This test obtained its name from *Frye v. United States*.⁷⁶ The issue in *Frye* was whether truth could be viewed as spontaneous, coming without conscious effort, and thus, reflected in blood pressure.⁷⁷ The technique used to support that theory was the systolic blood pressure test. The technique was rejected (and therefore the admissibility test formulated), because the Court found that the proposed systolic technique *had not been generally accepted* in the relevant scientific fields.⁷⁸ The implication of that requirement for general acceptance in the relevant field was crucial because technology was viewed in a determinist manner, being applied and used uniformly in every situation. Consequently, the truthful value of the knowledge was conferred by the uniform manner of obtaining that knowledge, although its result could have been unintelligible to the factfinder.

But, as Judge Weinstein noted, technology is not the determinist savior as its proponents would like it to be. Its results are

71. *Daubert v. Merrell Dow Pharms.*, 509 U.S. 579, 589 (1993); see FED. R. EVID. 702(d).

72. See FED. R. EVID. 702(a)–(c).

73. FED. R. EVID. 702(a).

74. *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923).

75. *Daubert*, 509 U.S. at 585.

76. *Frye*, 293 F. at 1013.

77. *Id.* at 1014.

78. *Id.*

intimidating because they come from scientific experts and are difficult to evaluate by those without scientific expertise. Thus, Weinstein properly asked not for “uniform applicability” of tests, etc., but for supervised application, for intermediated use:

Expert evidence can be both powerful and quite misleading because of the difficulty in evaluating it. Because of this risk . . . [t]he judge may insist, for example, on strong guarantees that tests relied on by an expert were properly conducted since a careless laboratory is a terrible hazard to justice.⁷⁹

In 1993, another change occurred in the way federal courts determined legal truth. In the case *Daubert v. Merrell Dow Pharmaceuticals*,⁸⁰ the United States Supreme Court considered the technological role of epidemiological studies and whether those studies were adequately reliable to support expert opinion evidence under Federal Rule of Evidence 703.⁸¹ Unlike in *Frye*, in *Daubert*, the judiciary did not state that the admissibility standard depended on the generally accepted technology in the field. It replaced general acceptance in the field with the trial judge’s view. The *Daubert* test allows the trial judge to determine whether a witness’s testimony is based on scientifically valid reasoning.⁸² Accordingly, the trial judge became the ultimate arbiter of whether technology, in the form of scientific testimony, is admissible for consideration by a factfinder. When technology is admissible through the *Daubert* framework, it is admitted as a result of reflective thinking by the trial judge. This is a more nuanced view of technology, but still deterministic: if the judge accepted the scientific and technological evidence, its truth-worthiness benefited from the same aura as under the *Frye* test.

The *Daubert* Court represented welcome progress in fracturing the monolithic deterministic view of technology. The Court noted the critical concern under Rule 702 regarding whether or not a theory or method constituted the power bestowed on “scientific knowledge”⁸³ with “evidentiary reliability”⁸⁴ or “trustworthiness.”⁸⁵ Since 1993, trustworthiness has not depended on the “general

79. Weinstein, *supra* note 70, at 632.

80. *Daubert*, 509 U.S. at 579.

81. *Id.* at 584.

82. *Id.* at 592–93.

83. 509 U.S. at 590.

84. *Id.*

85. *Id.*

acceptance”⁸⁶ by the scientific community, a rarefied, inaccessible community, but on its relevance to the case, as explained to all by the trial judge.

This is welcome progress because technology, when used in the legal realm, has democratic ramifications. Whether openness and understanding are valued socially, or whether reflective thinking is abandoned in favor of a few technocrats matters. If a democratic rule of law requires a uniform applicability of all legal norms in force at that moment, it has no such requirement of how technology is used. Law applies uniformly to induce trust. A blind, mechanical approach to technology would produce, ironically, the opposite effect, especially if what is deemed scientific is not easily understandable by the factfinder. Technology is and needs to remain an artifact that mediates reflective thinking, which requires time and patience. This is the opposite of what laypeople and fact-finders are told and encouraged to expect from technology. Or, in the words of French poststructuralist Paul Virilio, what is expected from technology—immediate uniform results—is mere deception.⁸⁷ That expectation itself is mere pretense and deceit: so much thinking goes into every technical innovation, that to expect to master and understand its results without effort, is pure deception. Technology has the potential to engage humans both in truth-inducing or knowledge-provoking experiences, as well as in deceiving expediency. It is up to us how we want to use it.

B. Legal Truth. A Phenomenological Perspective

To the extent that meaning is as much recognition as it is experience and sense-giving or meaning bestowal, philosophers have been trapped in various schools of transcendentalism or ahistoricism.⁸⁸ In law, truth relies on evidence, which is already a phenomenological shortcut, a reduction of meaning. If technology were to replace the human element, its subjectivity, and the need for stratification, then what remains is an empty shell, a procedural requirement.

Husserl recognized this potential problem with technology, as technique enabling decontextualization. He was aware of schematic descriptions of a wide range of processes, in rigid abstraction from concrete referents and situations. For Husserl, such

86. *Id.* at 589–90 (quoting FED. R. EVID. 702).

87. PAUL VIRILIO, *WAR AND CINEMA: THE LOGISTICS OF PERCEPTION* (Patrick Camiller, trans., Verso 1989) (1984).

88. See discussion *supra* Part I, Section 3(i) (discussing Husserl).

formalization would change how one operated rationally thinking, producing “‘something in general’ which can be constructed in pure thought and in empty, formal generality.”

Husserl’s concept of technization designates a transformation of the practice of rational thinking as a result of which this thinking, along with the increasing reliance on formal methods, becomes more efficient and effortless. This, Husserl notes, is to the point that rational thought itself “becomes a sort of *technique*,” namely, a “calculating technique.” It is however precisely this cognitively alleviating process of technization that entails for Husserl that thought—technized rational thought—tends to become somewhat mechanical and forgetful, and thus ultimately . . . more “thoughtless.”⁸⁹

Legally, this layered approach to meaning intermediated by the artifact, writing, is very suggestive of the role of technology proposed here. Jurisprudentially speaking, writing is the embodiment of truth regarding contracts, for instance. If there is no written contract, then there is no contract. This is perhaps the most dramatic, and the most expedient example of reality-making technology.

As noted in *Williston on Contracts*,⁹⁰ originally, at common law, a contract in writing had the same evidentiary value as a parole contract: they both needed to be proven truthful in case of doubt. But then, with the advent of capitalism—and consequently the need for expediency—the well-known statute of frauds was enacted by the English Parliament in the second half of the seventeenth century. Under the guise that it provided defense against fraudulent testimony, the statute of frauds provided that a party producing a writing evidencing a contract was presumed to have proven the truth. There was no inquiry into the ability of the opposing party to know how to read or write. Moreover, as summarized in a 1991 Connecticut case—*C.R. Klewin, Inc. v. Flagship Properties, Inc.*⁹¹—the Statute of Frauds as an evidentiary provision denied jurors the ability to participate as factfinders in the process of truth-finding. Indeed, it seems that jurors tended to avoid the evidence in favor of their own knowledge, which again, explains the attraction of the

89. See Woelert, *supra* note 41, at 301 (emphasis in original).

90. 9 WILLISTON ON CONTRACTS § 21:1, Purpose and History of the Statute of Frauds (4th ed. 2021).

91. *C.R. Klewin, Inc. v. Flagship Props., Inc.*, 600 A.2d 772, 775 (Conn. 1991).

determinist view of technology—as producing irrefutable truth, the parties’ contractual will, in this instance.

The Connecticut statute of frauds has its origins in a 1677 English statute entitled “An Act for the Prevention of Fraud and Perjuries.” The statute appears to have been enacted in response to developments in the common law [when] perjury and the subornation of perjury became a widespread and serious problem. Furthermore, *because juries at that time decided cases on their own personal knowledge of the facts*, rather than on the evidence introduced at trial, a requirement, in specified transactions, of “some memorandum or note . . . *in writing, and signed by the party to be charged*” placed a limitation on the uncontrolled discretion of the jury.⁹²

It is hard to refute the evidentiary value of such a rule, in light of the problems it faced and solved. By the same token, it is difficult not to worry about its future legal impact, especially if by chance, technology is given another truth-making role hard to contest.

Today, when artificial intelligence (“AI”) defines the parameters of scientific thinking, calculative-technological thinking produces symbolism, measurable and calculative signs to decipher the mystery of life. It is taxing to engage in reflective thinking challenging such advanced products. Heidegger was among the first to deplore the potential loss of meditative contemplative thinking that the advent of technology encouraged. Heidegger’s worry came when AI had not made its presence center stage.⁹³ “Each human transforms into a cyborg-type being that becomes one with a digital smart

92. *Id.* (emphasis added) (citations omitted) (“Although the British Parliament repealed most provisions of the statute, including the one-year provision, in 1954 . . . the statute nonetheless remains the law virtually everywhere in the United States.”).

93. Rauno Huttunen & Leena Kakkori, *Heidegger’s Critique of the Technology and the Educational Ecological Imperative*, EDUC. PHIL. & THEORY, Mar. 2021, at 4, <https://doi.org/10.1080/00131857.2021.1903436>. Huttunen and Kakkori explained:

When Heidegger writes about technology, modern technology, and machine technology, he mainly refers to the technology of the Second Industrial Revolution. When he addresses the dangers of nuclear power and gene technology, these phenomena belong to the era that we could call the Third Industrial Revolution. The Third Industrial Revolution began in the late 20th century, with the rise of microelectronics and microcomputers. It continues nowadays with globalisation, robotisation, digitalisation, the Internet, gene technology, hybrid warfare, immaterialisation of the production process, nanotechnology, quantum computers, and cognitive capitalism. Following the lead of Klaus Schwab, we could call this newly emerging era the Fourth Industrial Revolution. Within the Fourth Industrial Revolution, human behaviour integrates with digital equipment and becomes part of the global Internet of things.

Id. (citations omitted).

device. These devices are already integrated with human thinking and action.”⁹⁴

But, as Judge Weinstein noted, reflective thinking is the only way to ensure that legal truth is more than the evidence meeting the standards of various evidentiary rules. It reflects the facts in dispute in each particular case. This is a very hard precept to follow, especially when technology has created an expectation of expedience and an uncritical subordination to its results.

C. *DNA Sample Collection as Irrefutable Evidence Fingerprinting for the 21st Century*

Technological determinism has been and remains a problem in the legal realm. More than a transcendental desire to find meaning, it reflects a transcendental desire to believe in easy ways out. Reality does not necessarily support this trust, and Daubert has chipped away at technological determinism with clear empowerment of the trial judge. Still, technological determinism continues its sway in many areas of the legal realm to nefarious democratic consequences for the rule of law and the trust it demands in its reign. Ironically, too often, the more recent the technology, and thus the less tested, the more trusted its application is, as shown here.

For instance, twenty-five years ago, DNA technology was the most advanced technology helping to exonerate individuals wrongfully convicted of rape and homicide to prove their innocence.⁹⁵ Janet Reno, then the United States Attorney General, requested that the National Institute of Justice establish a national commission to examine the future of DNA evidence.⁹⁶ Perhaps excited by its potential, the Commission examined issues that reached beyond the Attorney General’s original questions about its exonerator role. It examined postconviction DNA application to ensure a more effective integration of the technology into the criminal justice system.⁹⁷

In the following years, the criminal justice system quickly created vast DNA sample collections. At a news conference, the Attorney General for the George W. Bush administration, John Ashcroft, said:

94. *Id.*

95. See generally EDWARD CONNORS ET AL., CONVICTED BY JURIES, EXONERATED BY SCIENCE: CASE STUDIES IN THE USE OF DNA EVIDENCE TO ESTABLISH INNOCENCE AFTER TRIAL (U.S. Dep’t Just. ed., 1996).

96. *Id.* at iii–iv.

97. Christopher H. Asplen, Integrating DNA Technology into the Criminal Justice System, 83 JUDICATURE 144, 144–46 (1999).

The murder conviction of Alvin Braziel is a powerful example of how one technology—forensic DNA analysis—has revolutionized law enforcement. Over the short span of 10 years, DNA technology has proven itself to be the truth machine of law enforcement, ensuring justice by identifying the guilty and exonerating the innocent.

With the strong support of Congress, the Department of Justice has served as a leader in the national effort to maximize the benefits of DNA evidence, and the past five years have seen a national explosion in forensic DNA collection. All fifty states and the federal government now have laws on the books that require DNA to be collected from convicted offenders for the purpose of criminal DNA databasing.⁹⁸

The reason for the trend toward broad DNA sample collection, however, was surprisingly not based in science. As Ashcroft boasted, the reason was simply “experience”.⁹⁹ But not experience in terms of time lapsed innovating and applying science and technology. It was the experience of wishful thinking (ignorantly) transformed in proof, as the future tense Ashcroft used denotes:

[A]nd the reason is simple: *Experience* has taught law enforcement that the more offenders that are included in the database, the more crimes *will be solved*.¹⁰⁰

Technological determinism won the day, though the hawkish, “pro-war,” and “law and order” political ideology of the Bush Administration might have helped this trend, too.¹⁰¹ The result was expansive legislative efforts that violated individual human rights. Indeed, the Combined DNA Index System, 34 U.S.C. § 40702, and numerous state statutes enabled the collection of DNA samples. It built on collections methods already approved by the U.S. Supreme Court as minimal bodily invasion, and thus constitutional.¹⁰² However, the human rights violation was two-fold, the invasion to collect the sample and then its unlimited preservation. Taking a blood

98. John Ashcroft, U.S. Att’y Gen., News Conference, DNA Initiative (Mar. 4, 2002) (transcript available at <http://www.justice.gov/archive/ag/speeches/2002/030402newsconferencednainitiative.htm> (last visited Nov. 1, 2021)).

99. *Id.*

100. Ashcroft, *supra* note 98 (emphasis added).

101. See generally Andrew Newman, *Arms Control, Proliferation and Terrorism: The Bush Administration’s Post-September 11 Security Strategy*, J. STRATEGIC STUD. 59 (2004) (highlighting the ideology that propped the Bush Presidency and its hawkish administration).

102. *Skinner v. Ry. Lab. Execs’ Ass’n*, 489 U.S. 602, 625 (1989).

sample was viewed as minimal and its potential benefit immense: exculpating the wrongly convicted.¹⁰³

Again, the results proved the opposite of what common sense thinking would expect from novel uses of advanced technology. The adoption of so many invasive statutes for unproven results, is democratically troublesome. The judiciary and legislative bodies chose to endorse computational thinking at the expense of reflective thinking. But, reflective thinking needs to support the automatic decisions about the data collected indefinitely, even when that collection happens only in a relatively non-invasive manner. Violating privacy for wishful thinking seems unwarranted in a liberal democracy.

Even worse, taking DNA from a lot of arrestees slows the testing in active criminal investigations. After all, *12 million* or more people are arrested *each year*. (According to one study, by age 23, nearly one-third of Americans have been arrested for an offense, not including minor traffic violations.) Backlogs created by arrestee DNA sampling means that rape kits and samples from convicted offenders sit in storage or go untested. This hurts innocent suspects . . . because of a delay in testing evidence that later cleared [them].¹⁰⁴

Mindless use of technology does not exculpate anyone. This use of technology has the disadvantage of minimizing the role of technology as instrumental in reflective thinking, which is the mark of truth-finding. There is no societal value in increasing the role of

103. The constitutional discussion about the legality of taking and persevering blood and DNA samples continues. For a concise explanation, see, e.g., Theodore F. Claypoole, *Why We Are Losing Our DNA Privacy Rights and What Legislators Can Do to Save Them*, NAT'L L. REV. (Jan. 30, 2020), <https://www.natlawreview.com/article/why-we-are-losing-our-dna-privacy-rights-and-what-legislators-can-do-to-save-them>.

104. Brandon L. Garrett & Erin Murphy, *Supreme Court 2013: Why Collecting DNA from People Who are Arrested Won't Help Solve More Crimes*, SLATE, http://www.slate.com/articles/news_and_politics/jurisprudence/2013/02/dna_collection_at_the_supreme_court_maryland_v_king.html (last visited Nov. 1, 2021) (emphasis in original).

Research shows that bigger is only better if DNA databases grow in the right way: by entering more samples from crime scenes, not samples from arrestees. DNA databases already include 10 million-plus known offender profiles. But a database with every offender in the nation cannot solve a crime if no physical evidence was collected or tested. And police collect far too few such samples. [As of 2013, nationwide,] [p]olice do routinely collect physical evidence in cases of homicide and in most cases of rape. But evidence is not collected from eight out of 10 crime scenes for other serious offenses, like burglary, robbery, and aggravated assault. Forget what you see on the proliferation of CSI spinoffs. Many jurisdictions do not even have dedicated and trained crime scene investigators.

Id.; WAYNE R. LAFAVE, 3 SEARCH & SEIZURE § 5.4(c) (6th ed. 2020).

technology as truth-making, by eliminating any other path to truth-finding. Technology as truth-making rather than truth-finding is dangerous in a democratic society. Abandoning doubt, technology reigns in violation of fundamental individual rights. For instance, given the legislator's analogy to fingerprinting, once DNA is identified, no individual can reclaim their undeniable identity. In 2005, United States Senator Jon Kyl endorsed the DNA Fingerprint Act, noting that no such expungement procedure exists for an arrestee's fingerprints—an arrestee who is ultimately not convicted has no way to affirmatively seek the destruction of her fingerprint records.¹⁰⁵ That procedure is equally missing in the case of DNA identification.

A decade after its implementation, in 2009, the National Research Council ("NRC") of the National Academies of Science released its report, *Strengthening Forensic Science in the United States: A Path Forward*.¹⁰⁶ That report included harsh critiques of many traditional forensic science techniques, including microscopic hair analysis, forensic odontology, and questioned document examination.¹⁰⁷

In evaluating the accuracy of a forensic analysis, it is crucial to clarify the type of question the analysis is called on to address For example, *microscopic hair analysis* may provide reliable evidence on some characteristics of the individual from which the specimen was taken, but it may not be able to reliably match the specimen with a specific individual.¹⁰⁸

As in the case of all analyses leading to classification conclusions (e.g., diagnostic tests in medicine), the *microscopic hair analysis* process must be subjected to performance and validation studies in which appropriate error rates can be defined and estimated.¹⁰⁹

In sharp contrast, the report found that some techniques have been thoroughly validated. For example, the report singled out nuclear DNA testing as the one forensic identification technique

105. See generally 151 CONG. REC. S13,756 (daily ed. Dec. 16, 2005) (statement of Sen. Kyl); see also Anselm Franke & Eyal Weizman, FORENSIS: THE ARCHITECTURE OF PUBLIC TRUTH (Forensics Architecture ed., Sternberg Press 2014); Garrett & Murphy, *supra* note 104.

106. See NAT'L RSCH. COUNCIL OF THE NAT'L ACADS., STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD (2009).

107. *Id.* at 127, 160, 166.

108. *Id.* at 8 (emphasis added).

109. *Id.* at 118 (emphasis added).

demonstrated to consistently achieve accurate results with a high degree of confidence.¹¹⁰

Perhaps the most appropriate words of warning are those of the late Supreme Court Justice Antonin Scalia, in his dissent in *Maryland v. King*.¹¹¹ He raised concerns about the use of DNA samples to create a ready-to-use database. Every time a crime occurs, society may choose to solve it relying on technology rather than on other evidentiary means of proving the facts. But then, society might also choose to prevent crime through public and private technological surveillance, at the expense of its citizens' privacy. Is it worth it? "The Court's assertion that DNA is being taken, not to solve crimes, but to *identify* those in the State's custody, taxes the credulity of the credulous."¹¹²

Paraphrasing Justice Scalia, using technology and science to avoid thinking is oppositional to the very essence of science and technology. Their progress requires reflective, time-consuming thinking. Furthermore, our democracy demands an open, transparent approach to what is considered truth in the legal realm.

CONCLUSION – FOR A PHENOMENOLOGICAL USE OF TECHNOLOGY IN THE LEGAL REALM

This Article argues in favor of technology as *poiésis*,¹¹³ as a challenge that frames and reveals the truth, or even the appearance of truth mediated by evidentiary rules. It exposes the problems of relying on technology in its computational rather than its prosthetic, supportive role of encouraging reflection over what constitutes truth.

When technology is hailed as a mythical truth-provider, the participants to the legal process need to remember that the process by which legal facts are constructed is significantly different than the process of belief formation within an individual mind. Most notably, as James R. Steiner-Dillon noted recently, the factfinder relies on the adversarial model of adjudication, which gives substantial autonomy to the parties' counsel to control what is presented as (truth) evidence.¹¹⁴

110. *Id.* at 128.

111. *Maryland v. King*, 569 U.S. 435, 466 (2013) (Scalia, J. dissenting).

112. *Id.* (emphasis in original).

113. See generally HEIDEGGER, *supra* note 52; see also Blitz, *supra* note 3, at 76 (defining *poiésis* as art, revealing beauty)

114. James R. Steiner-Dillon, *Is Truth Truth?*, 109 KY. L.J. 477, 481–82 (2020).

At the same time, the Rules of Evidence and other exclusionary rules prevent the parties from presenting certain kinds of relevant evidence to the factfinder, and sometimes prescribe the specific inferences that the factfinder may or may not draw from the information it does receive. In addition, facts determined by a court, unlike those of an individual mind, are held to an explicit, *ex ante* standard of proof—a standard that shifts to reflect policy priorities external to the epistemic task. These distinctions, and others, are generally overlooked when we speak casually of legally constructed facts as “true” or “false.”¹¹⁵

This Article advocates for technology to remain only a welcome device in negotiating the appearance of truth as decided by the trial judge on a case-by-case basis. In the legal realm, where truth is as much as factual as evidentiary, the myth of finding it should remain as important as other legal values of our democratic system, not the least of which is one’s human right to preserve privacy while living in a democratic society whose rules are uniformly applied to all in a manner open to a common understanding.

115. *Id.*

Considering “Machine Testimony”: The Impact of Facial Recognition Software on Eyewitness Identifications

Valena Beety*

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INTRODUCTION

Andrea Roth’s seminal work in *Machine Testimony* and *Trial by Machine* presented a problem that is now upon us: addressing biased algorithms and the rampant reliance on technology by prosecutors and law enforcement.¹ That reliance, however, is no longer unquestioning. Roth’s work came at a crucial moment in time, when other articles were embracing the apparent impartiality of technology and algorithms for use in the criminal legal system. Her scholarship steered us away from that blind acceptance and dove deep, not only questioning technology itself, but also *how to frame* those questions of technology in the courtroom.

Machine Testimony combined the acumen of a far-seeing scholar with a practitioner’s on-the-ground practicality. The piece looked deeply at how the rules of evidence, pre-trial disclosure, and corroboration should apply to developing forms of technology.

* Professor of Law, Arizona State University Sandra Day O’Connor College of Law; Deputy Director, Academy for Justice. I cannot thank Professor Jane Moriarty enough for organizing this valuable symposium and bringing us all together as scholars and colleagues. Thank you also to the 2021 ABA Criminal Justice Section Academics Committee Work-In-Progress Roundtable, and for elucidating feedback from Professors Shirin Bakhshay, Deborah Denno, and Margareth Etienne. Finally, thank you to editor Nakib Kabir who brought out the best in this piece.

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

Roth importantly identifies some machine findings as testimonial evidence.² She writes: “Both physical and testimony evidence can lead to decisional inaccuracy[,]” but “[t]estimonial evidence presents different challenges for decisional accuracy.³ Even if the factfinder’s powers of observation and inference are working well, she might draw an improper inference if the source is not worthy of belief.”⁴

One case in point is machine modes of identification. Research has widely demonstrated the decisional inaccuracy that results from unreliable identifications, either by human eyewitnesses, or facial recognition software.⁵ Wrongful convictions can occur when police use either of these identification methods without precautions. Contextual information is vital to whether a factfinder correctly interprets either type of evidence.

This Article uses a wrongful conviction lens to compare identifications by machines, notably facial recognition software, with identifications by humans. The Article advocates for greater reliability checks on both before use against a criminal defendant. The Article examines the cascading influence of facial recognition software on eyewitness identifications themselves and the related potential for greater errors. As a solution, the Article advocates the inclusion of eyewitness identification in the Organization of Scientific Area Committees’ (“OSAC”) review of facial recognition software for a more robust examination and consideration of software and its usage. The Article also encourages police departments to adopt double-blind procedures for eyewitness identifications, including when “matching” photos from facial recognition software are included. Finally, the Article concludes with a prediction of where these two fields will be ten years from now, in 2032.

I. UNRELIABILITY OF EYEWITNESS IDENTIFICATION

Courts would rarely admit eyewitness identifications if based on their scientific reliability. Few types of evidence are as unreliable as human identifications, yet they are routinely admitted in court.⁶

2. *Id.* at 1984.

3. *Id.*

4. *Id.*

5. *See generally*, Aliza B. Kaplan & Janis C. Puracal, *Who Could It Be Now? Challenging the Reliability of First Time In-Court Identifications After State v. Henderson and State v. Lawson*, 105 J. CRIM. L. & CRIMINOLOGY 947 (2015); Andrew Guthrie Ferguson, *Facial Recognition and the Fourth Amendment*, 105 MINN. L. REV. 1105, 1210 (2021).

6. *See generally* Kaplan & Puracal, *supra* note 5, at 947.

Prosecutions frequently depend on an eyewitness to secure a conviction.

The decreased reliability of eyewitness identifications is partially due to a lack of effective standards. In 2011, the New Jersey Supreme Court crucially and influentially adopted robust protections to heighten the likelihood of a valid identification.⁷ In *State v. Henderson*, the New Jersey Supreme Court relied on decades of scientific research to reform and strengthen its test for admissibility of eyewitness identification evidence, addressing influential factors that were “within the control of the criminal justice system,” namely human factors.⁸

But a year following the *Henderson* decision, the United States Supreme Court in *Perry v. New Hampshire*⁹ reified its outdated standard previously put in place by the Court’s opinion in *Manson v. Brathwaite*.¹⁰ In *Manson v. Brathwaite*, the Supreme Court created a test for whether eyewitness identifications were admissible in court.¹¹ The *Manson* Court held that “reliability is the linchpin in determining the admissibility of identification testimony.”¹² Since 1977, when the Court decided *Manson*, decades of research have unfortunately shown how the Court’s test misses the mark in enhancing – or securing – reliability of eyewitness identifications. The *Manson* test relies on “the good sense and judgment of American juries.”¹³ But scholar Elizabeth Loftus’ research demonstrates that “[e]yewitness testimony is likely to be believed by jurors,

7. The *Henderson* test established the following steps: (1) the defendant must present evidence of “suggestiveness” to obtain a pretrial hearing; (2) the State then must establish that the identification reliably accounts for both estimator and system variables; (3) the defendant still has the overall burden to show a “substantial likelihood of irreparable misidentification” through either cross-examining eyewitnesses, presenting expert testimony, or by introducing evidence linked with both types of variables; and (4) the court should suppress the identification if it determines, after weighing the evidence, that the defendant demonstrated an irreparable misidentification. See *State v. Henderson*, 27 A.3d 872, 881–82, 920 (N.J. 2011). If the trial court then admits the identification, the court will provide the jury with specific jury instructions at the conclusion of the trial. *Id.* at 924–26; see also Amy D. Trenary, *State v. Henderson: A Model for Admitting Eyewitness Identification Testimony*, 84 U. COLO. L. REV. 1257, 1295–96 (2013).

8. *Henderson*, 27 A.3d at 878; see also Valena Elizabeth Beety, *Identifying the Culprit in Wrongful Convictions*, 82 TENN. L. REV. 975, 996 (2015) (“The court appointed a Special Master who interviewed seven experts, evaluated the current scientific evidence on eyewitnesses, and then presented the supreme court with 2000 transcript pages and reports on hundreds of scientific studies.”).

9. *Perry v. New Hampshire*, 565 U.S. 228, 248 (2012) (“[T]he Due Process Clause does not require a preliminary judicial inquiry into the reliability of eyewitness identification when the identification was not procured under unnecessarily suggestive circumstances arranged by law enforcement.”).

10. 432 U.S. 98, 114 (1977).

11. *Id.*

12. *Id.*

13. *Id.* at 116.

especially when it is offered with a high level of confidence, *even though the accuracy of an eyewitness and the confidence of that witness may not be related to one another at all.*"¹⁴ The *Manson* factors, that is the reliability test created by the Supreme Court, provide little guidance to jurors and are poor indicators of a witness's reliability.¹⁵

Fast forward to 2012, when the Supreme Court ruled in *Perry v. New Hampshire* that courts did not have to query the reliability of an eyewitness identification before admitting the testimony, unless police held a suggestive pre-trial identification.¹⁶ Justice Sotomayor dissented, quoting *State v. Henderson* that "[t]he empirical evidence demonstrates that eyewitness misidentification is 'the single greatest cause of wrongful convictions in this country.'"¹⁷

Eyewitness identification is indeed a leading cause of wrongful convictions in DNA exonerations and exonerations more broadly.¹⁸ The concerns about the unreliability of eyewitness identifications led the National Academy of Sciences ("NAS") to investigate. In *Identifying the Culprit: Assessing Eyewitness Identification*, the NAS looked to thirty years of scientific studies and heard presentations from scientists and law enforcement.¹⁹ The National Academy of Sciences recommended that courts (1) conduct pretrial judicial inquiries into eyewitness identifications; (2) admit and present to juries any prior identifications and the confidence levels at the time of the identifications; (3) allow experts to testify on eyewitness memory and identifications; and (4) utilize jury instructions to inform the jury about eyewitness identifications.²⁰

Identifying the Culprit criticized the practices for gathering and using eyewitness testimony in a criminal case.²¹ The report

14. *Watkins v. Sowders*, 449 U.S. 341, 352 (1981) (Brennan, J., dissenting) (alteration in original) (emphasis added) (quoting ELIZABETH F. LOFTUS, EYEWITNESS TESTIMONY 19 (1979)).

15. *See* Beety, *supra* note 8, at 978. ("The *Manson* test's five factors—the witness's opportunity to view the criminal during the crime, degree of attention, accuracy of prior description, level of certainty, and the length of time between incident and identification—are poor indicators of a witness's reliability.")

16. *Perry v. New Hampshire*, 565 U.S. 228 (2012).

17. *See id.* at 263 (Sotomayor, J., dissenting) (quoting *State v. Henderson*, 27 A.3d 872, 885 (N.J. 2011)).

18. % Exonerations by Contributing Factor, NAT'L REGISTRY OF EXONERATIONS (Mar. 17, 2022), <https://www.law.umich.edu/special/exoneration/Pages/ExonerationsContribFactorsByCrime.aspx>.

19. NATIONAL RSCH. COUNCIL OF THE NAT'L ACADS., IDENTIFYING THE CULPRIT: ASSESSING EYEWITNESS IDENTIFICATION 71–102 (2014) [hereinafter IDENTIFYING THE CULPRIT].

20. *Id.* at 109–12.

21. *Id.* at 1–2.

recommends an overhaul of eyewitness identification procedures by police and prosecutors.²²

Notably, *Identifying the Culprit* was released in 2014, just as police routinely began using facial recognition software.²³ Facial recognition software analyzing stills from surveillance videos allows a third witness to be present, a machine witness – but is that witness reliable?

Recognizing the questionable reliability of eyewitness identifications, facial recognition software may be seen as a good thing, increasing the reliability of identifications in a crime scenario. Yet, just as there are fundamental flaws with eyewitness identification, the same currently holds true for facial recognition software.

II. FACIAL RECOGNITION SOFTWARE

Facial recognition software compares two images and determines whether the same person is present in each image.²⁴ A probe photo—a still from a surveillance video, for example—can be uploaded to a police database, which includes civilian photos from the Department of Motor Vehicles.²⁵ The software then compares the probe photo with its database of photos. The software, however, cannot actually “match” two photos. It has fundamental accuracy problems, undermining its reliability.²⁶ The software provides several possible matches, and a human police officer uses those possible matches as investigative leads.²⁷

The use of facial recognition software is not always disclosed to the person ultimately charged with the offense.²⁸ This failure to disclose can be problematic, given the known inaccuracy of facial recognition software when used to identify people of color.²⁹

22. *Id.* at 5–7 (such recommendations include, for example, training law enforcement officers in eyewitness identification, implementing double-blind lineups and photo array procedures, standardized witness instructions, and related procedures).

23. *The History of Face Recognition*, FACEFIRST, <https://www.facefirst.com/blog/brief-history-of-face-recognition-software/> (last visited Mar. 17, 2022) (“Beginning in 2014, The Automated Regional Justice Information System (ARJIS), began supplying partner agencies with FaceFirst’s mobile platform supporting face recognition for law enforcement.”).

24. Kaitlin Jackson, *Challenging Facial Recognition Software in Criminal Court*, THE CHAMPION, July 2019, at 14, <https://www.nacdl.org/Article/July2019-ChallengingFacialRecognitionSoftwareinCri>.

25. *Id.*

26. *Id.*

27. *Id.*

28. *Id.*

29. *Id.* at 15.

III. RACIAL BIAS

Wrongful convictions can be caused by human error, as well as machine error, and both can be influenced by racial bias. Racial bias has been identified as both a cause of faulty human eyewitness identification,³⁰ as well as faulty facial recognition through software.³¹

Eyewitnesses struggle to identify members of a different racial group, a phenomenon known as “cross-racial misidentification.”³² This phenomenon is particularly harmful against people of color because white people have greater difficulty identifying people of color than vice versa.³³ All people, however, in a famous study where witnesses look at a photograph of a Black man and a white man fighting, were more likely to misremember the Black man as holding the knife.³⁴ If both men in the photo were white, the witnesses could remember correctly which man was armed. These memory studies show what other research has confirmed: consciously and subconsciously, Americans associated Blackness with crime.³⁵ This bias can infiltrate itself into technology, which is coded and programmed by humans. As Roth notes in *Machine Testimony*, “a machine’s programming, whether the result of human coding or machine learning, could cause it to utter a falsehood by design.”³⁶

Police use of facial recognition software disproportionately affects Black Americans, Asian Americans, and Native Americans.³⁷ While advocates of technology may claim these systems “do not see

30. See, e.g., Radha Natarajan, *Racialized Memory and Reliability: Due Process Applied to Cross-Racial Eyewitness Identifications*, 78 N.Y.U. L. REV. 1821 (2003).

31. See generally Ferguson, *supra* note 5, at 1173.

32. Valena Elizabeth Beety, *What the Brain Saw: The Case of Trayvon Martin and the Need for Eyewitness Identification Reform*, 90 DENV. U. L. REV. 331, 341 (2012).

33. John P. Rutledge, *They All Look Alike: The Inaccuracy of Cross-Racial Identifications*, 28 AM. J. CRIM. L. 207, 211 (2001); Christian A. Meissner & John C. Brigham, *Eyewitness Identification: Thirty Years of Investigating the Own-Race Bias in Memory for Faces: A Meta-Analytic Review*, 7 PSYCHOL. PUB. POL’Y & L. 3, 3, 15 (2001).

34. See Jennifer L. Eberhardt et al., *Seeing Black: Race, Crime, and Visual Processing*, 87 J. PERSONALITY & SOC. PSYCHOL. 876, 876 (2004) (detailing the 1947 Allport and Postman study).

35. *Id.*

36. Roth, *supra* note 1, at 1977–78. She continues that “[a] machine’s output could be imprecise or ambiguous because of human error at the programming, input, or operation stage, or because of machine error due to degradation and environmental forces. And human and machine errors at any of these stages could also lead a machine to misanalyze an event.” *Id.* at 1978.

37. Claire Garvie et al., *The Perpetual Line-Up: Unregulated Police Face Recognition in America*, CTR. ON PRIV. & TECH. AT GEO. L. (Oct. 18, 2016), <https://www.perpetuallineup.org/>; see also SAFIYA UMOJA NOBLE, ALGORITHMS OF OPPRESSION: HOW SEARCH ENGINES REINFORCE RACISM (2018); RUHA BENJAMIN, RACE AFTER TECHNOLOGY: ABOLITIONIST TOOLS FOR THE NEW JIM CODE (2019).

race,” research now shows the incorrect identifications of people of color by these programs. Indeed, facial recognition is the least accurate of Black women, even misidentifying their gender.³⁸

IV. INFLUENCE OF FACIAL RECOGNITION SOFTWARE ON EYEWITNESS IDENTIFICATION

I wonder, however, about the cascading influence of facial recognition software on eyewitnesses. Police pervasively use facial recognition software and databases.³⁹ These databases are no longer limited to mug shots; now, nearly half of American adults are in a law enforcement agency’s facial recognition network.⁴⁰ The Federal Bureau of Investigation routinely runs face recognition searches through their agency’s system, and many states allow law enforcement to run searches in driver’s license databases or ID photos.⁴¹ These databases include law-abiding citizens.⁴² If we combine their wide usage with the lack of accuracy of facial recognition of people of color, and false positives of people of color, we can see how this software can influence eyewitnesses, but also contribute to wrongful convictions if not checked.

Imagine camera footage exists of a crime. Facial recognition software identifies the perpetrator as either Jonathan Jefferson or Clint Alamo, both civilians in the driver’s license database. The photos of Jefferson and Alamo are shown to the eyewitness, in a similar manner to a show-up identification. The eyewitness is not instructed that neither may be the culprit, only that the facial recognition software determined one of these was the likely culprit. The influence of this potentially incorrect identification of an individual may be more harmful than a photo show-up, or a photo lineup, because of the added weight given to scientific evidence. Thus, a mistaken facial recognition by software could taint an eyewitness identification, leading to the impression of double confirmation that Jefferson or Alamo is the perpetrator, rather than recognizing how the software finding may have influenced the eyewitness.

Alternatively, if the facial recognition photos are placed in a traditional photo lineup, the safeguards on eyewitness identification –

38. *NIST Study Evaluates Effects of Race, Age, Sex on Face Recognition Software*, NAT’L INST. OF STANDARDS & TECH (Dec. 19, 2019), <https://www.nist.gov/news-events/news/2019/12/nist-study-evaluates-effects-race-age-sex-face-recognition-software> [hereinafter *NIST Study*].

39. Garvie et al., *supra* note 37.

40. *Id.*

41. *Id.*

42. *Id.*

instructions that the culprit may not be present, that it is just as important to exculpate as inculpate people, use of the folder shuffle method to double-blind the use of images – are equally important. Use of a suspect’s photo identified by unreliable facial recognition software can also “unreasonably increase[] the chance of eyewitness misidentification.”⁴³

Yet this is not only a hypothetical. In Spring 2019, police investigating a robbery in Detroit sent a shop surveillance camera image to the Michigan State Police, to match the image to the database of driver’s licenses.⁴⁴ Facial recognition software identified Robert Williams as the suspect – but Mr. Williams was not the culprit.⁴⁵ Still, his driver’s license photo was put in a photo lineup and showed to a security consultant for the store who did not witness the robbery itself.⁴⁶ Based on the surveillance image and now the driver’s license, the consultant incorrectly identified Mr. Williams as the culprit.⁴⁷

Police went to Mr. Williams’s home with an arrest warrant and put him in handcuffs in front of his children.⁴⁸ They took him to the police station and began interrogating him. Finally, they revealed to Mr. Williams the surveillance photo.⁴⁹ A stunned Williams held the photo up to his face and asked the police, “I hope you guys don’t think that all Black men look alike.”⁵⁰ The photo was not Mr. Williams. One police officer sheepishly admitted, “the computer must have gotten it wrong[.]”⁵¹ Unfortunately, the police detained Mr. Williams nearly thirty more hours following this admission.⁵²

The potential influence of facial recognition software on eyewitness identification is due to the malleability of human memory. A witness perceives an event, commits that information to memory, and then recalls the memory.⁵³ But in the final stage of recalling

43. See Jackson, *supra* note 24, at 17.

44. Man Wrongfully Arrested Because Face Recognition Can’t Tell Black People Apart, ACLU (June 24, 2020), <https://www.aclu.org/press-releases/man-wrongfully-arrested-because-face-recognition-cant-tell-black-people-apart?msclkid=ec3ffb03bdc411ec85a7795ac4583fd5>.

45. *Id.*

46. *Id.*

47. *Id.*

48. *Id.*

49. *Id.*

50. Robert Williams, Opinion, *I Was Wrongfully Arrested Because of Facial Recognition. Why Are Police Allowed to Use It?*, WASH. POST (June 24, 2020), <https://www.washingtonpost.com/opinions/2020/06/24/i-was-wrongfully-arrested-because-facial-recognition-why-are-police-allowed-use-this-technology/>.

51. *Id.*

52. *Id.*

53. See LOFTUS, *supra* note 14, at 21.

and reconstructing the event, the memory can be influenced by police protocols, instructions, or feedback. For example, if a witness receives no instructions when shown a lineup of suspects, the witness often assumes the perpetrator of the crime must be in the lineup and is influenced to choose a person.⁵⁴ If a witness receives positive feedback from police after making an identification, the feedback increases the witness’s confidence in the identification.⁵⁵ The eyewitness may give more weight and deference to a software-determined “match” and resulting photo. Research shows that jurors view scientific evidence as particularly reliable and believe that it holds persuasive power.⁵⁶ Jurors are inclined to give forensic evidence more weight and value, particularly if an expert witness testifies to it.⁵⁷

V. SOLUTIONS

The solutions that Professor Roth provides in her scholarship are applicable to facial recognition software, and to challenging identifications in court. We can also go upstream to find solutions for an eyewitness influenced by facial recognition software findings.

One upstream solution would be that just as police departments are encouraged to adopt neutralizing procedures for eyewitness identifications, they should implement these procedures for show-ups or line-ups, including facial recognition software findings. The National Academy of Sciences in *Identifying the Culprit* recommended that law enforcement agencies implement protocols such as using double-blind lineup and photo array procedures, developing and using standardized witness instructions, documenting witness statements, and recording the witness identification.⁵⁸ The International Association of Chiefs of Police and some state

54. See Gary L. Wells et al., *Eyewitness Identification Procedures: Recommendations for Lineups and Photospreads*, 22 LAW & HUM. BEHAV. 603, 625 (1998) (“[E]mpirical data show[s] that eyewitnesses are less likely to identify an innocent suspect when they are warned that the actual culprit might not be present than when they are not so warned.”).

55. Amy Bradfield Douglass & Nancy Steblay, *Memory Distortion in Eyewitnesses: A Meta-Analysis of the Post-Identification Feedback Effect*, 20 APP. COGNITIVE PSYCHOL. 859, 865 (2006); Gary L. Wells & Amy L. Bradfield, “Good, You Identified the Suspect:” *Feedback to Eyewitnesses Distorts Their Reports of the Witnessing Experience*, 83 J. APP. PSYCHOL. 360, 361–62 (1998).

56. See Valena E. Beety & Jennifer D. Oliva, *Evidence on Fire*, 97 N.C. L. REV. 483, 507 (2019) (citing Valerie P. Hans, *Judges, Juries, and Scientific Evidence*, 16 J.L. & POL’Y 19, 23–24 (2007) (explaining that “jurors themselves have identified the task of interpreting scientific and technical evidence and expert testimony as particularly challenging” and “[c]ase studies examining juror comprehension of scientific testimony, and some experimental research, point out the types of expert evidence that can present problems for juries”).

57. See Beety & Oliva, *supra* note 56, at 516–17.

58. See IDENTIFYING THE CULPRIT, *supra* note 19, at 5.

legislatures adopted the specific police protocols proposed in *Identifying the Culprit*.⁵⁹

The double-blind lineup encouraged for all eyewitness identifications could be particularly effective for identifications reliant on facial recognition software. Creating a double-blind lineup is simple through the Folder Shuffle method.⁶⁰ The officer conducting the photo lineup uses manila folders and places a single image in each folder. The officer then randomly shuffles the folders, so the officer does not know which photo is in which folder. Finally, the officer places two empty manila folders at the bottom of the stack, so that the eyewitness does not feel added pressure to pick the last image they see.⁶¹ This process could neutralize any influence that may be present if the eyewitness knew the individual suspect's image came from facial recognition software. The individual so-identified is placed in a photo lineup similar to every other photo in the double blind process. Thus the witness is protected from their own bias, as is the police officer.

Another upstream solution is to apply a more scientific lens to all eyewitness identification evidence.

The National Institute of Standards and Technology ("NIST") has considered creating regular tests for algorithmic bias, and ensuring datasets reflect diversity to diminish racially biased error rates.⁶² This follows on a NIST study that evaluated the effects of race, age, and sex on facial recognition software.⁶³

NIST also oversees forensic science discipline-specific guidance groups, organized to enhance and ensure quality assurance and quality control.⁶⁴ These guidance groups are called Scientific Area

59. *National Academy of Sciences Releases Landmark Report on Memory and Eyewitness Identification, Urges Reform of Police Identification Procedures*, INNOCENCE PROJECT (Oct. 2, 2014), <http://www.innocenceproject.org/news-events-exonerations/national-academy-of-sciences-releases-landmark-report-on-memory-and-eyewitness-identification-urges-reform-of-police-identification-procedures>. See also *Eyewitness Identification Reform*, INNOCENCE PROJECT, <https://innocenceproject.org/eyewitness-identification-reform/> (last visited Feb. 5, 2022).

60. See *Groundbreaking Study Finds Double-Blind Sequential Lineups More Accurate in Eyewitness Identifications*, JOHN JAY COLL. CRIM. J. (Sept. 19, 2011), <http://johnjay.jjay.cuny.edu/newsroom/4898.php> (observing that study participants demonstrated greater errors in simultaneous lineups rather than in sequential lineups, the former of which influence eyewitnesses in identification by providing them a basis for comparison amongst the members of the lineup).

61. For example, Chapter 62 of the West Virginia Code has a detailed description of the folder shuffle method. See W.VA. CODE § 62-1E-2.

62. See Garvie et al., *supra* note 37.

63. See *NIST Study*, *supra* note 38.

64. See ORGANIZATION OF SCIENTIFIC AREA COMMITTEES FOR FORENSIC SCIENCE (OSAC), TERMS OF REFERENCE FOR THE SCIENTIFIC AREA COMMITTEES (2021) (available at

Committees, part of the Organization of Scientific Area Committees. They create standard operating procedures for specified forensic disciplines, while also evaluating research in the field.⁶⁵ One Scientific Area Committee (“SAC”) is on Digital/Multimedia, including facial recognition and video/imaging technology and analysis.

The use of machines as eyewitnesses will soon necessitate that the Scientific Area Committee that evaluates Facial Identification and Video/Imaging Technology & Analysis also understand and consider the research on eyewitness identification. Within the Digital/Multimedia SAC, I suggest that the subcommittee for Facial Identification consider eyewitness identification, and thus contemplate the impact of facial recognition software on eyewitness identification. Eyewitness identification can be included in the Digital/Multimedia SAC meetings more broadly to focus on quality control and best practices, in line with the extensive research in the field.

This scientific background could further validate experts to testify on eyewitness identification in court, alongside testimony about facial recognition software. By treating eyewitness identification as more scientific, the current divide between human and machine identification can collapse. Parties could present robust data and research in court about the similarities and differences, and the potential influences of one form of identification on the other. Eyewitness identification continues to be used in many courtrooms with no scientifically established standards, and is not understood as related to scientific findings.⁶⁶ This could change, for the better.

CONCLUSION AND LOOKING AHEAD

The cascading impact of a faulty machine identification can be seen in Roth’s work. This Article has connected the problems of human and machine eyewitness identification, with proposed solutions.

Perhaps in 2032, the biases and problems currently inherent in facial recognition software will be resolved. Perhaps police, prosecutors, and juries will rely more on machine identification rather than human identification. Arguably, that tech will meet the demand in the future. And perhaps this will be a positive move,

https://www.nist.gov/system/files/documents/2021/09/13/FSSB_OSAC_ToR%20SAC_v2.2.pdf). See also Beety, *supra* note 8, at 985.

65. OSAC Subcommittees, NAT’L INST. OF STANDARDS & TECH. (Nov. 5, 2021), <https://www.nist.gov/osac/osac-subcommittees>.

66. See Beety, *supra* note 8, at 990–91.

though it is questionable how much we as a society wish to rely on surveillance for evidentiary needs.

But just as we currently have technology deserts and rural communities without broadband – indeed, states where nearly fifty percent of the population does not have internet access – I anticipate machine identification will still not be a reliable resource in rural and underserved areas. We will still be relying on eyewitness identifications. And to that end, it is important to have an OSAC that considers eyewitness identification as scientific evidence, and that courts seek greater reliability in this field.

By recognizing the connections between machine and human identifications, we can work to enhance the reliability of both. We have structures in place to heighten the scientific reliability of machine identifications, and proposals for law enforcement to increase the accuracy of human identifications. Working together, we can increase accuracy in the courtroom, and prevent wrongful convictions due to misidentifications.

Biometrics and an AI Bill of Rights

Margaret Hu*

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ABSTRACT

This Article contends that an informed discussion on an AI Bill of Rights requires grappling with biometric data collection and its integration into emerging AI systems. Biometric AI systems serve a wide range of governmental purposes, including policing, border security and immigration enforcement, and biometric cyberintelligence and biometric-enabled warfare. These systems are increasingly categorized as “high-risk” when deployed in ways that may impact fundamental constitutional rights and human rights. There is growing recognition that high-risk biometric AI systems, such as facial recognition identification, can pose unprecedented challenges to criminal procedure rights. This Article concludes that a failure to recognize these challenges will lead to an underappreciation of

* Professor of Law and International Affairs, Penn State Law and School of International Affairs; Institute for Computational and Data Sciences; The Pennsylvania State University – University Park. The author is grateful for this opportunity to participate in the Duquesne Law Review 2022 Symposium, *The Death of Eyewitness Testimony & the Rise of Machine Evidence*. Many thanks to Davi Liang and Ashleigh Herrin for their editorial assistance, and to Robert Diehl and Alexis Thurston of the Duquesne Law Review for their editorial leadership.

the constitutional threats posed by emerging biometric AI systems and the need for an AI Bill of Rights.

INTRODUCTION

On October 8, 2021, the White House Office of Science and Technology Policy (“OSTP”) invited the public to discuss *Public and Private Sector Uses of Biometric Technologies* through a Notice of Request for Information (“RFI”), published in the Federal Register.¹ Shortly thereafter, OSTP Director Eric Lander and OSTP Deputy Director for Science and Society Alondra Nelson, issued several media and White House releases, including an opinion piece titled, *Americans Need a Bill of Rights for an AI-Powered World*,² and a Press Release titled, *Join the Effort to Create a Bill of Rights for an Automated Society*.³ This Article addresses both: concerns attached to biometric technologies and the need for an AI Bill of Rights.⁴

Rather than treat these topics as separate and distinct, this Article attempts to integrate the two. It argues that biometric AI systems must be seen as a constitutive force behind conceptualizing an AI Bill of Rights. To ground potential AI-driven harms concretely, this Article focuses on facial recognition technology, a biometric technology that utilizes AI. The increasing reliance on facial recognition technology by the government poses unique challenges to

1. Notice of Request for Information (RFI) on Public and Private Sector Uses of Biometric Technologies, 86 Fed. Reg. 56,300 (Oct. 8, 2021).

2. Eric Lander & Alondra Nelson, *Americans Need a Bill of Rights for an AI-Powered World*, WIRED (Oct. 8, 2021), <https://www.wired.com/story/opinion-bill-of-rights-artificial-intelligence/> (citing, e.g., Drew Harwell, *The Accent Gap*, WASH. POST (July 19, 2018) <https://www.washingtonpost.com/graphics/2018/business/alexa-does-not-understand-your-accent/>; Kashmir Hill, *Another Arrest, and Jail Time, Due to a Bad Facial Recognition Match*, N.Y. TIMES (Jan. 6, 2021), <https://www.nytimes.com/2020/12/29/technology/facial-recognition-misidentify-jail.html>; Paul Mozur, *One Month, 500,000 Face Scans: How China Is Using A.I. to Profile a Minority*, N.Y. TIMES (Apr. 14, 2019), <https://www.nytimes.com/2019/04/14/technology/china-surveillance-artificial-intelligence-racial-profiling.html>; Tom Simonite, *How an Algorithm Blocked Kidney Transplants to Black Patients*, WIRED (Oct. 26, 2020), <https://www.wired.com/story/how-algorithm-blocked-kidney-transplants-black-patients/>).

3. Press Release, White House, *Join the Effort to Create a Bill of Rights for an Automated Society* (Nov. 10, 2021), <https://www.whitehouse.gov/ostp/news-updates/2021/11/10/join-the-effort-to-create-a-bill-of-rights-for-an-automated-society/>.

4. Multiple scholars have offered careful analysis of data-driven and algorithmic harms of big data and AI technologies. See generally, e.g., CATHY O'NEIL, WEAPONS OF MATH DESTRUCTION: HOW BIG DATA INCREASES INEQUALITY AND THREATENS DEMOCRACY (2016); VIRGINIA EUBANKS, AUTOMATING INEQUALITY: HOW HIGH-TECH TOOLS PROFILE, POLICE, AND PUNISH THE POOR (2018); SAFIYA NOBLE, ALGORITHMS OF OPPRESSION: HOW SEARCH ENGINES REINFORCE RACISM (2018); FRANK PASQUALE, THE BLACK BOX SOCIETY: THE SECRET ALGORITHMS THAT CONTROL MONEY AND INFORMATION (2015); Solon Barocas & Andrew D. Selbst, *Big Data's Disparate Impact*, 104 CAL. L. REV. 671 (2016); Anupam Chander, *The Racist Algorithm?*, 115 MICH. L. REV. 1023 (2017) (book review); Danielle Keats Citron & Frank Pasquale, *The Scored Society: Due Process for Automated Predictions*, 89 WASH. L. REV. 1 (2014); Jessica M. Eaglin, *Constructing Recidivism Risk*, 67 EMORY L.J. 59 (2017).

criminal procedure protections under the Bill of Rights. These challenges include potential stressors placed on the Fourth Amendment's protections against unreasonable searches and seizures, the Fifth Amendment's protection of the right against self-incrimination, and the Sixth Amendment's protection to confront witnesses under the Confrontation Clause.⁵ Under the Sixth Amendment, for example, a criminal defendant is owed the opportunity to confront witnesses and prosecutorial evidence. However, as this Article explores, confronting AI technologies, such as facial recognition technology that may be presented in a criminal case to establish the defendant's identity or to support evidentiary claims of criminal wrongdoing, may be difficult.⁶

Part I provides an overview of biometric data, including how it is currently defined by the U.S. Department of Homeland Security ("DHS"). It focuses on capture of biometric data by DHS for purposes of border security and homeland security. As a case study, this Article contends that biometric collection by the DHS is indicative of both the government's exponentially increasing appetite for biometric data and the expansion of biometric AI systems. Part II explains why biometric data is increasingly integrated into AI technologies, especially for law enforcement, and intelligence and national security purposes. Part III discusses why an informed effort to create an AI Bill of Rights requires grappling with biometric data and its integration into emerging AI systems, especially for predictive policing and biometric cybersurveillance purposes.

Biometric AI systems are increasingly categorized as "high-risk AI systems" by other governing bodies, such as the European Commission⁷ ("EU Commission") and human rights organizations within the European Union ("EU").⁸ The EU has recognized that

5. U.S. CONST. amends. IV–VI. See *infra* Part II.B. See also, e.g., Andrew Guthrie Ferguson, *Facial Recognition and the Fourth Amendment*, 105 MINN. L. REV. 1105, 1126 (2021); Eldar Haber, *Racial Recognition*, 43 CARDOZO L. REV. 71, 101 n.165 (2021) (citing *State v. Loomis*, 881 N.W.2d 749 (Wis. 2016)); Adam Liptak, *Sent to Prison by a Software Program's Secret Algorithms*, N.Y. TIMES (May 1, 2017), <https://www.nytimes.com/2017/05/01/us/politics/sent-to-prison-by-a-software-programs-secret-algorithms.html>; Andrea Roth, *Machine Testimony*, 126 YALE L. J. 1972, 1983 (2017); Joseph Clarke Celentino, Note, *Face-to-Face with Facial Recognition Evidence: Admissibility Under the Post-Crawford Confrontation Clause*, 114 MICH. L. REV. 1317, 1318 (2016).

6. See *infra* Part II.B (citing, *inter alia*, Roth, *supra* note 5).

7. European Commission, *Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts*, COM (2021) 206 final (Apr. 21, 2021) [hereinafter EU 2021 Artificial Intelligence Act Proposal].

8. European Digital Rights et al., *A Civil Society Statement: An EU Artificial Intelligence Act for Fundamental Rights*, ALGORITHM WATCH (Nov. 30, 2021), <https://algorithmwatch.org/en/eu-artificial-intelligence-act-for-fundamental-rights/>.

certain biometric AI systems should be understood as high-risk when impacting fundamental constitutional rights and human rights. In a recent proposal for greater AI regulation, the EU Commission recognized that biometric AI systems require additional oversight and recognition of their potential impact on fundamental rights.⁹ This Article concludes that a conversation on an AI Bill of Rights should be paired with a comparative approach to biometric data and biometric AI system regulation that is occurring in the EU. By monitoring the EU's approach to high-risk AI systems generally, and high-risk biometric AI systems specifically, the dialogue on an AI Bill of Rights and AI regulation will be more informed in the United States.

I. FEDERAL GOVERNMENT USE OF BIOMETRIC DATA

A. *Biometric Data: Public Collection and Use*

Biometric identification involves the measurement of physiological characteristics. Biometric data used in biometric identification technologies can include a range of biometric identifiers.¹⁰ In addition to digital photos and video feeds utilized for facial feature analysis through facial recognition technology, other biometric data may include digitally scanned fingerprints and iris scans, keystroke analysis, voice and gait analysis, and other identifiers.¹¹ DNA is included as a biometric identifier in some contexts and excluded in others.¹² The DHS deemphasizes the genome as a biometric to enable the use of de-identified health data for research purposes, while the DHS includes DNA within a proposed definition of

9. See *infra* Part II.A (citing EU 2021 Artificial Intelligence Act Proposal, *supra* note 7).

10. See, e.g., Margaret Hu, *Biometric ID Cybersurveillance*, 88 IND. L.J. 1475, 1477 n.3 (2013) (citing, e.g., BIOMETRIC RECOGNITION: CHALLENGES AND OPPORTUNITIES (Joseph N. Pato & Lynette I. Millett eds., 2010); A. MICHAEL FROMKIN & JONATHAN WEINBERG, CHIEF JUSTICE EARL WARREN INST. ON LAW & SOC. POL'Y, *HARD TO BELIEVE: THE HIGH COST OF A BIOMETRIC IDENTITY CARD* (2012), http://www.law.berkeley.edu/files/Believe_Report_Final.pdf; KELLY A. GATES, *OUR BIOMETRIC FUTURE: FACIAL RECOGNITION TECHNOLOGY AND THE CULTURE OF SURVEILLANCE* (2011); ANIL K. JAIN ET AL., *INTRODUCTION TO BIOMETRICS* (2011); JENNIFER LYNCH, *FROM FINGERPRINTS TO DNA: BIOMETRIC DATA COLLECTION IN U.S. IMMIGRANT COMMUNITIES AND BEYOND* (2012); SHOSHANA AMIELLE MAGNET, *WHEN BIOMETRICS FAIL: GENDER, RACE, AND THE TECHNOLOGY OF IDENTITY* (2011); Laura K. Donohue, *Technological Leap, Statutory Gap, and Constitutional Abyss: Remote Biometric Identification Comes of Age*, 97 MINN. L. REV. 407 (2012)).

11. See, e.g., Margaret Hu, *Biometric Surveillance and Big Data Governance*, in *THE CAMBRIDGE HANDBOOK OF SURVEILLANCE LAW* 121, 126 (David Gray & Stephen E. Henderson eds., 2017).

12. Jennifer K. Wagner et al., Comment Letter on Notice of Request for Information (RFI) on Public and Private Sector Uses of Biometric Technologies 7 (Jan. 5, 2022) (copy on file with author).

biometrics in order to enable a broad definition for border security and other security rationales.¹³ From a governmental standpoint, DNA collection for databasing and database screening by various federal agencies is not clearly defined as biometric *per se*.¹⁴

The United States federal government is at the earliest stages of regulating how the government should collect and use biometric data. Congress has not clearly defined biometric data or when it is appropriately collected.¹⁵ Federal agencies have commenced the process of attempting to define biometric data under a regulatory regime.¹⁶ As of yet, there is not a unified federal approach to imposing limitations on biometric data collection and use.¹⁷ Experts have noted that there is a need to expressly recognize tensions in how best to define and apply biometric data. Unresolved questions include who is responsible for oversight of biometric standards and the deployment of emerging biometric technologies; how biometric data can be used, by whom, and under what circumstances; and, when biometric systems may be appropriately used for identification purposes or other policy objectives.

Similarly, AI is also at the earliest stages of regulation in the United States. What is not clearly understood by many policymakers in the United States is how certain AI systems are increasingly reliant on biometric data, including the failure to recognize the precise relationships between biometric technology and the AI systems utilized by that technology.¹⁸ Consequently, this Article focuses on how biometric-based AI systems challenge the current data governance frameworks in unprecedented ways¹⁹ that underscore the

13. *Id.*

14. *See* Wagner et al., *supra* note 12.

15. *See id.* at 7.

16. *See id.*; *see generally* Dan Berger et al., *Biometric Data and Midnight Regulations*, REGULATORY REV. (Mar. 11, 2021), <https://www.theregreview.org/2021/03/11/berger-hukatsanis-wagner-biometric-data-midnight-regulations/>.

17. *See* Wagner et al., *supra* note 12, at 7; *see generally* Berger et al., *supra* note 16. *See also infra* Part III.B.

18. *See, e.g.*, Jan Czarnocki, *Will New Definitions of Emotion Recognition and Biometric Data Hamper the Objectives of the Proposed AI Act?*, in 2021 INTERNATIONAL CONFERENCE OF THE BIOMETRICS SPECIAL INTEREST GROUP (BIOSIG) (Arslan Brömme et al., eds., Inst. of Elec'l. & Elec's. Eng'rs 2021); Mia Hoffmann & Mario Mariniello, *Biometric Technologies at Work: A Proposed Use-Based Taxonomy*, POLY CONTRIBUTION no. 23, Nov. 2021 (defining "biometric technologies as AI technologies that rely on biometric data to derive inferences about the individual whose data is collected").

19. This Article is a continuation of the author's past research on the legal challenges attached to biometric cybersurveillance. *See* Margaret Hu, *Algorithmic Jim Crow*, 86 FORDHAM L. REV. 633 (2017); Margaret Hu, *Biometric ID Cybersurveillance*, *supra* note 10; Margaret Hu, *Crimmigration-Counterterrorism*, 2017 WIS. L. REV. 955 (2017); Margaret Hu, *Horizontal Cybersurveillance Through Sentiment Analysis*, 26 WM. & MARY BILL RTS. J. 361 (2017); Wagner et al., *supra* note 12.

urgent need for an AI Bill of Rights. The underdevelopment of AI regulation is especially pronounced when examining the risks to criminal defendants and the criminal procedure protections that may be compromised under the Fourth, Fifth, and Sixth Amendments.²⁰

B. *DHS Expansion of Biometric Collection*

To better understand biometric-based AI systems, this Article uses as a case study a DHS-issued Notice of Proposed Rulemaking (“NPRM”), titled *Collection and Use of Biometrics by U.S. Citizenship and Immigration Services (USCIS)*.²¹ At the end of the Trump administration, on September 11, 2020, a proposed rulemaking illustrated the rapid expansion of proposed biometric data collection, purportedly for the purposes of homeland security and immigration enforcement. Specifically, the NPRM stated that: “Biometrics means the measurable biological (anatomical and physiological) or behavioral characteristics of an individual, including an individual’s fingerprints, palm prints, photograph (facial image), signature, iris (iris image), voice (voice print), and/or DNA (partial DNA profile) (subject to the limitations in 8 CFR 103.16(d)(2)).”²² DHS further stated that its biometrics can include “voluntary DNA testing to verify a claimed genetic relationship.”²³ The proposed regulation did not rely upon congressional authority. The expansion of both how biometric data was defined as well as how biometric data could be used was dramatic. The NPRM expanded the definition and collection of biometric data to authorize vetting and tracking individuals throughout the “immigration lifecycle.” Although the status of the NPRM and biometric collection policy under the Biden administration is unclear, a recent DHS Privacy Impact Assessment (“PIA”)²⁴ appears to adopt DNA verification screening by DHS without clear statutory authority.²⁵

20. See *infra* Part II.B.

21. *Collection and Use of Biometrics by U.S. Citizenship and Immigration Services*, 85 Fed. Reg. 56,338 (proposed Sept. 11, 2020).

22. *Id.* at 56,414 (emphasis removed).

23. *Id.* at 56,350.

24. DEP’T OF HOMELAND SEC., DHS REFERENCE NO. DHS/CBP/PIA-071, PRIVACY IMPACT ASSESSMENT FOR THE OPERATIONAL USE OF FAMILIAL DNA (2021), <https://www.dhs.gov/sites/default/files/publications/privacy-pia-cbp071-operationaluseoffamilialdna-september2021.pdf>.

25. *Id.* at 1 (citing *Ms. L. v. U.S. Immigr. & Customs Enf’t*, 415 F. Supp. 3d 980, 990 (S.D. Cal. 2020) (requiring U.S. Immigration and Customs Enforcement to conduct DNA testing to verify parentage before separating migrant adult from child)); see also Tally Kritzman-Amir, *Swab Before You Enter: DNA Collection and Immigration Control*, 56 HARV. C.R.-C.L. L. REV. 77, 78 (2021).

This NPRM illustrates how biometric data forms the cornerstone datapoint for a wide range of AI-driven immigration-related vetting and database screening protocols.²⁶ DHS often commences screening protocols with biometric data as a form of identity verification. Beyond identity verification, biometric AI tools and systems can assist DHS and other governmental entities with profiling individuals to form the basis of risk assessments and predictive analytics.²⁷

The data architecture necessary for biometric AI systems has expanded dramatically in the past two decades since the terrorist attacks of September 11, 2001. There have been proposals for biometric electronic identity cards such as a biometric ePassport,²⁸ for example, which, if implemented, would dramatically expand biometric data collection through mass collection and universal databasing. Further, the Trump administration's Executive Order 13780, commonly referred to as the Muslim Ban or Travel Ban, mandated the "Expedited Completion of the Biometric Entry-Exit Tracking System" by DHS.²⁹ The extreme vetting protocols proposed by the Trump administration also expanded social media surveillance as a part of screening procedures.³⁰ Through biometric AI systems promulgated under predictive policing and national security objectives, biometric cybersurveillance tools fuse biometric and biographic data with social media profiling to assess risk.³¹

II. BIOMETRICS AND AI

A. *High-Risk AI Biometric Systems*

In April 2021, the EU Commission proposed for public comment a comprehensive AI regulation.³² It explained that the goals of the proposed law were multifold: to safeguard fundamental rights, to ensure a harmonization of EU rules relating to AI, and to promote excellence and trustworthiness in AI and AI regulation.³³ Referred to as the AI Act, the proposal is officially titled: "Laying Down Harmonized Rules on Artificial Intelligence (Artificial Intelligence Act)

26. Hu, *Algorithmic Jim Crow*, *supra* note 19, at 639–40 (internal citations omitted).

27. *See, e.g., id.*

28. *Id.*

29. *Id.* at 640 n.45 (citing Exec. Order No. 13,780, 82 Fed. Reg. 13,209 (Mar. 6, 2017)).

30. *See id.* at 640–41.

31. *See, e.g.,* Margaret Hu, *The Ironic Privacy Act*, 96 WASH. U. L. REV. 1267, 1288–90 (2019).

32. EU 2021 Artificial Intelligence Act Proposal, *supra* note 7.

33. *Id.* *See also, e.g.,* Mauritz Kop, *EU Artificial Intelligence Act: The European Approach to AI*, TRANSATL. ANTITRUST & IPR DEVS. (Oct. 1, 2021), <https://law.stanford.edu/publications/eu-artificial-intelligence-act-the-european-approach-to-ai/>.

and Amending Certain Union Legislative Acts.”³⁴ The AI Act proposes to adopt a risk-based approach to AI regulation. Article 13, for instance, emphasizes the need for AI transparency: “High-risk AI systems shall be designed and developed in such a way to ensure that their operation is sufficiently transparent to enable users to interpret the system’s output and use it appropriately.”³⁵

Importantly for the purposes of this Article, the AI Act recognizes the link between AI technologies and biometric identification, and the risk to fundamental rights. The AI Act identifies certain “high-risk AI” technologies that integrate biometric data in contexts that might impose harm in public safety and surveillance.³⁶ These “high-risk AI systems” are contained in Annex III of the AI Act.³⁷ Other AI systems are characterized as posing “unacceptable risk.”³⁸ Except for certain law enforcement and national security justifications, the AI Act classifies AI systems that are deployed for real-time biometric identification as falling within the unacceptable risk category.³⁹

The AI Act proposes that specific fundamental rights warrant protection from AI harms, such as anti-discrimination values and expressive freedoms. The AI Act identifies that social scoring systems, in particular, “may lead to discriminatory outcomes and the exclusion of certain groups.”⁴⁰ Specifically, such scoring systems “may violate the right to dignity and non-discrimination and the values of equality and justice.”⁴¹ Regarding biometric identification systems, the proposed EU law identifies the intrusive nature of biometric surveillance as infringing upon fundamental freedoms, impacting privacy rights that could lead to “a feeling of constant surveillance and indirectly dissuade the exercise of the freedom of assembly and other fundamental rights.”⁴² The proposed AI Act further identifies that criminal procedure protections might be vulnerable to remote biometric identification technologies. The harms associated with biometric AI systems could encompass, for example, databasing, inadequate safeguards, lack of proportionality, probabilistic and predictive consequences, and negative inferences.⁴³

34. *Id.*

35. EU 2021 Artificial Intelligence Act Proposal, *supra* note 7, at art.13.

36. Khari Johnson, *The Fight to Define When AI is ‘High Risk’*, WIRED (Sept. 1, 2021, 8:00 AM), <https://www.wired.com/story/fight-to-define-when-ai-is-high-risk/>.

37. EU 2021 Artificial Intelligence Act Proposal, *supra* note 7, at art. 6(2).

38. *Id.* at art. 5, mem. § 5.2.2.

39. *Id.* at art. 5.

40. *Id.* at recital (17).

41. *Id.*

42. *Id.* at recital (18).

43. *Id.* at recitals (19)–(20).

Standalone AI systems identified in Chapter 1 of Title III of the AI Act “with mainly fundamental rights implications that are explicitly listed in Annex III” are AI systems “whose risks have already materialised or are likely to materialise in the near future.”⁴⁴ For the Annex III high-risk AI systems, the AI Act proposes newly developed AI compliance and oversight mechanisms, including impact assessment procedures.⁴⁵ The proposal recognizes the special risks posed by “remote biometric identification systems.”⁴⁶ The AI Act suggests that internal controls can be implemented by AI providers; however, remote biometric identification systems “would be subject to third-party conformity assessment[,]” and would also be subject to “comprehensive ex-ante conformity assessment through internal checks, combined with a strong ex-post enforcement[.]”⁴⁷ Title IV of the law focuses on the manipulative risks of AI systems that involve human interactions and “are used to detect emotions or determine association with (social) categories based on biometric data” or “generate or manipulate content” (such as with deep fakes).⁴⁸

B. *Biometric AI Systems and Criminal Procedure Risks*

In the United States, biometric AI systems place unique stress points on criminal procedure protections, demonstrating why they are fairly characterized as “high-risk.”⁴⁹ AI is increasingly integrated into criminal investigation and used as evidence.⁵⁰ There are several points in a criminal investigation and proceeding where biometric AI and cybersurveillance are vulnerable to failing to

44. *Id.* at mem. § 5.2.3.

45. *Id.* at tit. III, chs. 2, 3.

46. *Id.* at recital (18).

47. *Id.* at mem. § 5.2.3.

48. *Id.* at mem. § 5.2.4.

49. See generally, e.g., ANDREW GUTHRIE FERGUSON, *THE RISE OF BIG DATA POLICING* (2017); Jennifer Daskal, *Pre-Crime Restraints: The Explosion of Targeted, Non-Custodial Prevention*, 99 CORNELL L. REV. 327 (2014); Kelly Hannah-Moffat, *Algorithmic Risk Governance: Big Data Analytics, Race and Information Activism in Criminal Justice Debates*, 23 THEORETICAL CRIMINOLOGY 453 (2019); Margaret Hu, *Algorithmic Jim Crow*, *supra* note 19; Aziz Z. Huq, *Racial Equity in Algorithmic Criminal Justice*, 68 DUKE L.J. 1043 (2019); Rashida Richardson et al., *Dirty Data, Bad Predictions: How Civil Rights Violations Impact Police Data, Predictive Policing Systems, and Justice*, 94 N.Y.U. L. REV. 192 (2019); Sahil Chinoy, Opinion, *The Racist History Behind Facial Recognition*, N.Y. TIMES (July 10, 2019), <https://www.nytimes.com/2019/07/10/opinion/facial-recognition-race.html>; Woodrow Hartzog & Evan Selinger, *Facial Recognition Is the Perfect Tool for Oppression*, MEDIUM (Aug. 2, 2018), <https://medium.com/s/story/facial-recognition-is-the-perfect-tool-for-oppression-bc2a08f0fe66/>.

50. Christopher Rigano, *Using Artificial Intelligence to Address Criminal Justice Needs*, NAT'L INST. JUST. (Oct. 8, 2018), <https://nij.ojp.gov/topics/articles/using-artificial-intelligence-address-criminal-justice-needs>.

conform to the protections historically afforded under the Fourth, Fifth, and Sixth Amendments.

Under the Fourth Amendment, biometric AI concerns encompass the collection, use, and storage of biometric data. The presentation of biometric data—for example, the public view of one’s face, either physically or digitally—can be captured in a digital image and then processed by facial recognition technology. If the government undertakes the collection of facial images, it could be argued that this falls outside the scope of a search and seizure. This is especially true if the biometric data collection was collected administratively and not in the service of a specific law enforcement investigation. Therefore, broad surveillance captures may fall outside of the warrant requirement of the Fourth Amendment.⁵¹

In AI systems, biometric data collection and use often does not stop with a simple data point, such as a digital image of a face for a single facial recognition technology use. The aggregation of biometric identification data with other sources of data supports new AI innovations in criminal enforcement⁵² and national security contexts, such as biometric cyberintelligence and biometric-enabled warfare.⁵³ The type of AI-enabled evidence that can be derived from biometric AI include correlative evidence and predictive findings, for example, facial recognition technology that purports to serve as a form of identity verification as well as predictive of criminal or terrorist intent. Additionally, database screening can also deploy algorithms that are a part of a biometric AI architecture.⁵⁴ Cyber searches and data seizures can result in Fourth Amendment harms through the surveillance and AI analytics. Analysis of biometrics data fed into other AI-driven risk assessment can lead to AI-driven surveillance tools that erode or infringe upon reasonable

51. See, e.g., Margaret Hu, *Orwell’s 1984 and a Fourth Amendment Cybersurveillance Nonintrusion Test*, 92 WASH. L. REV. 1819, 1824 (2018).

52. See, e.g., CLARE GARVIE ET AL., GEO. L. CTR. ON PRIVACY & TECH., *THE PERPETUAL LINE-UP: UNREGULATED POLICE FACE RECOGNITION IN AMERICA* 1 (2016), <https://www.perpetuallineup.org>; Ferguson, *Facial Recognition*, *supra* note 5; Mariko Hirose, *Privacy in Public Spaces: The Reasonable Expectation of Privacy Against the Dagnet Use of Facial Recognition Technology*, 49 CONN. L. REV. 1591, 1594 (2017); Brenda Leong, *Facial Recognition and the Future of Privacy: I Always Feel Like . . . Somebody’s Watching Me*, 75 BULLETIN ATOMIC SCIENTISTS 109, 109 (2019); Katelyn Ringrose, Comment, *Law Enforcement’s Pairing of Facial Recognition Technology with Body-Worn Cameras Escalates Privacy Concerns*, 105 VA. L. REV. ONLINE 57, 59–61 (2019).

53. See generally, e.g., ANNIE JACOBSEN, *FIRST PLATOON: A STORY OF MODERN WAR IN THE AGE OF IDENTITY DOMINANCE* (2021); Margaret Hu, *Biometric Cyberintelligence and the Posse Comitatus Act*, 66 EMORY L.J. 697 (2017).

54. See, e.g., Elazar Zadok, *Legislative and Ethical Questions Regarding DNA and Other Forensic “Biometric” Databases*, in *ETHICS AND POLICY OF BIOMETRICS* 37 (Ajay Kumar & David Zhang eds., 2010); see also citations *supra* notes 5, 10–12, 16–19, 53, 54.

expectation of privacy protections, such as those asserting privacy to facial recognition technologies and geolocation privacy under the Fourth Amendment.⁵⁵

Under the Fifth Amendment, many experts have focused on AI and the risk of procedural due process deprivations.⁵⁶ However, increasingly biometric AI also raises self-incrimination concerns. Returning to the example of facial recognition technology, in one case, a magistrate judge denied an application for a search warrant that would have compelled unlocking digital devices through biometric identification such as facial recognition and digitally stored fingerprints.⁵⁷ The court denied the application on the grounds that compelling the production of biometric data would violate the Fifth Amendment privilege against self-incrimination.⁵⁸ The reasoning of the order denying the application analogized the forced compulsion of participation in biometric AI, such as the type of biometric AI used in the security features of digital devices, to forced production of passwords.⁵⁹

Andrea Roth contends that machine testimony poses particular concerns under the Sixth Amendment and, in particular, challenges the protections of the Confrontation Clause.⁶⁰ The Confrontation Clause allows for a criminal defendant to confront witnesses and evidence used against them.⁶¹ “[I]n criminal cases, machine sources of accusation—particularly proprietary software created for litigation—might be ‘witnesses against’ a defendant under the Confrontation Clause.”⁶² AI-driven determinations introduced as evidence

55. See generally, e.g., Michael L. Rich, *Machine Learning, Automated Suspicion Algorithms, and the Fourth Amendment*, 164 U. PA. L. REV. 871 (2016).

56. See, e.g., Danielle Keats Citron, *Technological Due Process*, 85 WASH. U. L. REV. 1249, 1253 (2008); Margot E. Kaminski & Jennifer M. Urban, *The Right to Contest AI*, 121 COLUM. L. REV. 1957, 1989 (2021).

57. *Matter of Residence in Oakland, California*, 354 F. Supp. 3d 1010, 1014 (N.D. Cal. 2019).

58. *Id.* at 1016.

59. *Id.* at 1015. Several publications have discussed the potential impact of the case *Matter of Residence in Oakland, California*, and the issues of forcing compulsion of biometrics to bypass biometric authentication. See, e.g., Ariel N. Redfern, Comment, *Face It—The Convenience of A Biometric Password May Mean Forfeiting Your Fifth Amendment Rights*, 125 PENN ST. L. REV. 597, 626 (2021); Adam Herrera, Comment, *Biometric Passwords and the Fifth Amendment: How Technology Has Outgrown the Right to Be Free from Self-Incrimination*, 66 UCLA L. REV. 778 (2019); see also Orin S. Kerr, *Compelled Decryption and the Privilege Against Self-Incrimination*, 97 TEX. L. REV. 767, 778–82 (2019); contra Bryan H. Choi, *The Privilege Against Cellphone Incrimination*, 97 TEX. L. REV. ONLINE 73, 73–75 (2019).

60. Roth, *supra* note 5.

61. U.S. CONST. amend. VI.

62. Roth, *supra* note 5, at 1983 (citing contra Brian Sites, *Rise of the Machines: Machine-Generated Data and the Confrontation Clause*, 16 COLUM. SCI. & TECH. L. REV. 36, 99–100 (2014)).

in criminal law processes raise so-called “black box” concerns.⁶³ For example, the inscrutability of predictive analytics and correlative determinations through big data assessments has led to concerns of whether AI harms in a criminal proceeding can be adequately protected by the Sixth Amendment with an appropriate “confrontation” when the AI itself has little explanatory power.⁶⁴

AI tools that use biometrics to identify individuals are known to be fallible, and are not guaranteed methods of identification.⁶⁵ Inaccurate facial recognition matches have led to wrongful arrests and jail time, while poor handling of DNA evidence have led to the same.⁶⁶ For instance, Amazon’s facial recognition tool “Rekognition,” when used on members of the U.S. Congress, falsely matched twenty-eight sitting legislators with mugshots.⁶⁷ The same issues of innate fallibility combine with issues of overconfidence in AI tools and inadequate understanding of the results by juries, judges, and even prosecutors.⁶⁸

Further, facial recognition tools have been shown to lead to racially biased results, with people of color being disproportionately matched incorrectly more frequently than others.⁶⁹ This is just one example of algorithmic bias present in AI tools trained from a

63. Roth, *supra* note 5, at 1978.

64. *Id.* at 2048–50.

65. See Bess Stiffelman, *No Longer the Gold Standard: Probabilistic Genotyping Is Changing the Nature of DNA Evidence in Criminal Trials*, 24 BERKELEY J. CRIM. L. 110, 131 (2019); Drew Harwell, *Amazon Facial-Identification Software Used by Police Falls Short on Tests for Accuracy and Bias, New Research Finds*, WASH. POST (Jan. 25, 2019), <http://www.washingtonpost.com/technology/2019/01/25/amazon-facial-identification-software-used-by-police-falls-short-tests-accuracy-bias-new-research-finds/>.

66. Kashmir Hill, *Another Arrest, and Jail Time, Due to a Bad Facial Recognition Match*, N.Y. TIMES (Jan. 26, 2021), <https://www.nytimes.com/2020/12/29/technology/facial-recognition-misidentify-jail.html>; Katie Worth, *Framed for Murder By His Own DNA*, THE MARSHALL PROJECT (Apr. 19, 2018, 7:00 AM), <https://www.themarshallproject.org/2018/04/19/framed-for-murder-by-his-own-dna>.

67. Jacob Snow, *Amazon’s Face Recognition Falsely Matched 28 Members of Congress with Mugshots*, ACLU (2018), <https://www.aclu.org/blog/privacy-technology/surveillance-technologies/amazons-face-recognition-falsely-matched-28>.

68. See, e.g., Victor Nicholas A. Metallo, *The Impact of Artificial Intelligence on Forensic Accounting and Testimony—Congress Should Amend “The Daubert Rule” to Include a New Standard*, 69 EMORY L.J. ONLINE 2039 (2020). Important research has considered how technology such as innovations in forensic evidence can influence criminal justice procedures and impact outcomes. See, e.g., Brandon L. Garrett & Peter J. Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions*, 95 VA. L. REV. 1, 5 (2009); Tamara F. Lawson, *Before the Verdict and Beyond the Verdict: The CSI Infection Within Modern Criminal Jury Trials*, 41 LOY. U. CHI. L.J. 119 (2009); Andrea Roth, *Safety in Numbers? When DNA Alone is Enough to Convict*, 85 NYU L. REV. 1130 (2010); Laurie Meyers, *The Problem with DNA*, APA MONITOR, June 2007, at 52.

69. Snow, *supra* note 67.

homogenous sample set.⁷⁰ More extensive audits found that there were facial recognition tools that “reduced accuracy disparities” relating to race and gender, but such disparities were still present.⁷¹

Another way that racial disparities in biometric analysis by AI tools leads to actual disparities in justice outcomes is through the application of predictive policing systems.⁷² Predictive policing aims to distribute police resources more efficiently to areas at times where crime is more likely to happen based on patterns discerned by AI through historical records. But, like other fallible AI tools, datasets used to generate predictive policing AI suffer from historical biases that leads to greater policing in neighborhoods with greater minority populations.⁷³ Predictive policing systems now target specific individuals that have been ascertained to be “at risk” of causing violent crimes.⁷⁴ The greater the power of these predictive policing systems become, the greater the drive will be to collect more data to further their application and power, including the collection of biometric data to integrate facial recognition and DNA in surveillance and prediction systems without proper transparency and security.⁷⁵

It is also critical to observe the inherent limitations and challenges of AI tools when deployed as criminal evidence. AI evidence, once introduced, involves an explanation obstacle: the inability of the prosecution or its witnesses to explain how results are acquired by AI tools. This creates difficulties in interrogating the results of the tools to decide innocence or guilt. Source code of biometric analysis tools like DNA forensic software has been withheld by forensic software companies under IP protections of trade secret status.⁷⁶ Other times, the biometric analysis tools are based on an underlying AI that is a black box, typical of neural network machine-learning, whose decision making cannot be interrogated.⁷⁷ As a result,

70. See, e.g., Steve Lohr, *Facial Recognition Is Accurate, if You're a White Guy*, N.Y. TIMES (Feb. 9, 2018), <https://www.nytimes.com/2018/02/09/technology/facial-recognition-race-artificial-intelligence.html>.

71. See, e.g., Inioluwa Deborah Raji & Joy Buolamwini, *Actionable Auditing: Investigating the Impact of Publicly Naming Biased Performance Results of Commercial AI Products* in PROCEEDINGS OF THE 2019 AAAI/ACM CONFERENCE ON AI, ETHICS, AND SOCIETY 429 (2019).

72. See generally Andrew Guthrie Ferguson, *Policing Predictive Policing*, 94 WASH. U. L. REV. 1109 (2017).

73. See, e.g., Richardson et al., *supra* note 49.

74. See, e.g., Ferguson, *Policing Predictive Policing*, *supra* note 72, at 1137–42.

75. *Id.* at 1167–68, 1186–87.

76. See, e.g., Rebecca Wexler, *Life, Liberty, and Trade Secrets: Intellectual Property in the Criminal Justice System*, 70 STAN. L. REV. 1343, 1358–62 (2018).

77. See, e.g., Katherine Kwong, *The Algorithm Says You Did It: The Use of Black Box Algorithms to Analyze Complex DNA Evidence*, 31 HARV. J.L. & TECH. 275 (2017); Roth,

issues in discovery can arise where the AI “witness” cannot be readily “deposed” to explain the veracity of the results and outcomes.⁷⁸

III. AI BILL OF RIGHTS

A. *Bill of Rights and Anticipating Biometric AI Harms*

The United States Bill of Rights was modeled on the English Bill of Rights of 1689,⁷⁹ the Declaration of Independence,⁸⁰ and various state constitutions to safeguard fundamental liberties,⁸¹ limit government power, and to sustain a democratic form of governance.⁸² Some of the rights enshrined in the Bill of the Rights were intended to be the rights of the people, or “collective and popular” rights.⁸³ Other rights were intended to be restraints on governmental power, for example, the first two amendments of the Bill of Rights safeguarded “the rights of popular majorities . . . against a possible unrepresentative and self-interested Congress.”⁸⁴ The Bill of Rights served “as [a] beacon-light[] to guide and control the action of [state] legislatures, as well as that of Congress.”⁸⁵

Under any project undertaken to envision an AI Bill of Rights, it is appropriate to consider the protection of fundamental rights from biometric cybersurveillance harms. Recent empirical findings assessing United States public perspectives on biometric data collection and use across various contexts indicates that the United States citizenry is increasingly aware of potential privacy harms that can attach to biometric systems.⁸⁶ Just as the Bill of Rights was intended to constrain Congress and the states from unlawful

Safety in Numbers?, *supra* note 68; Jim Shook et al., *Transparency and Fairness in Machine Learning Applications*, 4 TEX. A&M J. PROP. L. 443, 448–449 (2018); Matthew Shaer, *The False Promise of DNA Testing*, ATLANTIC (June 2016), <https://www.theatlantic.com/magazine/archive/2016/06/a-reasonable-doubt/480747/>.

78. See Roth, *supra* note 5, at 2044–48.

79. See, e.g., AKHIL REED AMAR, THE BILL OF RIGHTS: CREATION AND RECONSTRUCTION, 25 N.25 at 24, 31–32, 60 (1998).

80. See, e.g., *id.* at 106–09.

81. See, e.g., *id.* at 30 (“In the Continental Congress’s 1774 Declaration of Rights and in all six of the Revolutionary-era state constitutions affirming a right of the people to assemble, the right was explicitly yoked to the right of petition.”) (citation omitted).

82. See, e.g., *id.* at xii; see also CHRISTOPHER L EISGRUBER, CONSTITUTIONAL SELF-GOVERNMENT 2–3 (2001).

83. AMAR, *supra* note 79, at 30.

84. *Id.* at 21.

85. *Id.* at 154 (quoting *Nunn v. Georgia*, 1 Ga. 243, 251 (1846)).

86. Sara H. Katsanis et al., *U.S. Adult Perspectives on Facial Images, DNA, and Other Biometrics*, 3 IEEE TRANSACTIONS ON TECH. & SOC’Y 9 (2022), <https://doi.org/10.1109/TTS.2021.3120317>; Sara H. Katsanis et al., *A Survey of U.S. Public Perspectives on Facial Recognition Technology and Facial Imaging Data Practices in Health and Research Contexts*, PLOS ONE (2021), <https://doi.org/10.1371/journal.pone.0257923>.

infringements and encroachments, an AI Bill of Rights must function similarly to preserve individual rights and government restraint.

Biometric AI that is often deployed in criminal and terrorist screening is structured to serve both identification and risk assessment purposes.⁸⁷ Predictive analytics operationalize biometric-enabled AI systems that are structured to preempt crime and terrorism before they occur. Because these AI systems aim to identify data-driven suspects or suspicious data from an ocean of data, law enforcement and the intelligence community perceive biometric data as an anchor point, critically important for identity verification. Consequently, biometric cybersurveillance in the context of predictive policing and national security is critical to the project of envisioning how biometric AI stresses criminal procedure rights and other constitutional protections.⁸⁸

B. *Looking Ahead*

As discussed above, the AI Act proposed by the EU explicitly links AI technologies, biometric identification, and the risk to fundamental rights.⁸⁹ Some question whether the AI Act will accomplish the regulatory goals set forth by the draft to provide a sufficiently robust framework to prevent AI harms to fundamental rights.⁹⁰ Whether the AI Act may or may not be crafted in a way that can achieve its goals, the proposed law's recognition of the extent of potential harms that biometric AI systems may inflict is instructive in envisioning the need for an AI Bill of Rights.

Similarly, the EU's General Data Protection Regulation ("GDPR") could also be useful in informing how best to shape new Bill of Rights protections.⁹¹ First, the GDPR considers the need to

87. Hu, *Crimmigration-Counterterrorism*, *supra* note 19, at 991–93.

88. See, e.g., Hu, *Algorithmic Jim Crow*, *supra* note 19; Hu, *Crimmigration-Counterterrorism*, *supra* note 19; Michael Rich, *Machine Learning, Automated Suspicion Algorithms, and the Fourth Amendment*, 164 U. PENN. L. REV. 871 (2016); Andrew Guthrie Ferguson, *Big Data and Predictive Reasonable Suspicion*, 163 U. PA. L. REV. 327 (2015); Sohayla M. Roudsari, *Fourth Amendment Jurisprudence in the Age of Big Data: A Fresh Look at the "Penumbra" Through the Lens of Justice Sotomayor's Concurrence in United States v. Jones*, 9 FED. CTS. L. REV. 139, 140 (2016).

89. Khari Johnson, *The Fight to Define When AI is 'High Risk'*, WIRED (Sept. 1, 2021, 8:00 AM), <https://www.wired.com/story/fight-to-define-when-ai-is-high-risk/>; see discussion *supra* Part II.A.

90. See, e.g., Natasha Lomas, *Europe's AI Act Falls Far Short on Protecting Fundamental Rights, Civil Society Groups Warn*, TECHCRUNCH (Nov. 30, 2021, 10:55 AM), <https://techcrunch.com/2021/11/30/eu-ai-act-civil-society-recommendations/>.

91. 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

frame data rights as a form of individual rights. For instance, GDPR's Articles 13–15 focus on a data subject's right to access data,⁹² and Articles 21 and 22 address a data subject's right to object to and opt out of automated decision-making.⁹³ Next, facial recognition technology falls within the GDPR's regulation of both personal data and biometric data. Personal data is defined as: "any information relating to an identified or identifiable natural person ('data subject') and encompasses both direct and indirect forms of identification."⁹⁴ Biometric data is defined as: "personal data resulting from specific technical processing relating to the physical . . . characteristics of a natural person, which allow or confirm the unique identification of that natural person, such as facial images"⁹⁵ Finally, the processing of personal data under the GDPR requires that it be undertaken in a "lawful, fairly, and . . . transparent manner[.]"⁹⁶ The GDPR, as a precursor to the proposed AI Act, demonstrates one model of how to restrain biometric AI system harms by embedding data rights within an AI Bill of Rights.

The EU's model of AI regulation, emphasizing transparency and greater accountability, is instructive in framing how best to protect criminal procedure protections afforded under the Sixth Amendment. The Sixth Amendment mandates that a defendant be "informed of the nature and cause of the accusation" and the Confrontation Clause guarantees a right to know one's accusers.⁹⁷ Under an AI Bill of Rights, those accused could be guaranteed the right to know the source of the data collected and used, the nature of the algorithm, and the interpreter of the AI-enabled outcome—to be "informed of the nature and cause of the accusation."⁹⁸ Guaranteeing the right to confront the AI forms the foundation of the tools of defense of the accused in cases where the prosecution relies upon AI evidence.

In short, the project of imagining an AI Bill of Rights benefits from a comparative approach to biometric data and biometric AI system regulation in the EU. The GDPR greatly expands the potential for better regulating biometric AI systems, already categorized as "high-risk" systems and "unacceptable risk" systems by the

and on the Free Movement of Such Data, 2016 O.J. (L119), <https://eur-lex.europa.eu/eli/reg/2016/679/oj>.

92. *Id.* at arts. 13–15.

93. *Id.* at arts. 21, 22.

94. *Id.* at art. 4(1).

95. *Id.* at art. 4(14).

96. *Id.* at art. 5(1)(a).

97. U.S. CONST. amend. VI.

98. *Id.*

EU's proposed AI Act.⁹⁹ In recognizing the strain biometric AI systems are placing on criminal procedure protections under the Fourth, Fifth, and Sixth Amendments—as well as better understanding that biometric AI systems require additional oversight due to an expanding impact on fundamental rights—it is critical to look to the EU for greater guidance in how to construct AI Bill of Rights protections.

Already in the United States, reform efforts are underway that recognize the need for greater regulation of AI and high-risk biometric systems such as facial recognition systems used in law enforcement contexts.¹⁰⁰ During the 116th Congress, several bills were introduced to address federal uses of facial recognition technology. For example, a Senate bill proposed to create a moratorium on facial recognition technology pending a Commission study to assess its impact,¹⁰¹ and also to impose warrant requirements upon federal law enforcement for searches utilizing facial recognition technology.¹⁰² However, to date, federal legislation does not provide additional oversight for facial recognition technology uses by law enforcement.¹⁰³ States and local jurisdictions are increasingly considering bans on facial recognition technology. Portland, Maine, for example, banned city government officials from “using or authorizing the use of any facial surveillance software on any groups or members of the public”¹⁰⁴ States such as Illinois, Texas, and Washington have passed laws restricting biometric use and protecting biometric privacy.¹⁰⁵ Other states are proposing efforts to

99. EU 2021 Artificial Intelligence Act Proposal, *supra* note 7.

100. See, e.g., JAMES A. LEWIS & WILLIAM CRUMPLER, CTR. STRATEGIC & INT'L STUDS., FACIAL RECOGNITION TECHNOLOGY: RESPONSIBLE USE PRINCIPLES AND THE LEGISLATIVE LANDSCAPE 5–6 (2021), <https://www.csis.org/analysis/facial-recognition-technology-responsible-use-principles-and-legislative-landscape>.

101. Ethical Use of Facial Recognition Act, S. 3284, 116th Cong. (2020) (introduced by Sen. Jeff Merkley (D-Ore.) and Sen. Cory Booker (D-NJ)) (not passed).

102. LEWIS & CRUMPLER, *supra* note 100 (citing Facial, Analysis, Comparison, and Evaluation Protection Act, H.R. 4021, 116th Cong. (2019) (introduced by Rep. Eliot Engel (D-NY-16), Rep. Eleanor Holmes Norton (D-DC), Rep. Nydia Velázquez (D-NY-7), Rep. Debra A. Haaland (D-NM-1), and Rep. José Serrano (D-NY-16) (not passed))).

103. *Id.* app. at 17.

104. Brian Heater, *Portland, Maine Passes Referendum Banning Facial Surveillance*, TECHCRUNCH (Nov. 4, 2020, 12:05 PM), <https://techcrunch.com/2020/11/04/portland-maine-passes-referendum-banning-facial-surveillance/>.

105. See Biometric Information Privacy Act, 740 ILL. COMP. STAT. 14/1–99; TEX. BUS. & COM. CODE ANN. § 503.001 (regulating “Capture or Use of Biometric Identifier”); WASH. REV. CODE §§ 19.375.010–900 (regulating “Enrollment, Disclosure, and Retention of Biometric Identifiers”); see also, e.g., LEWIS & CRUMPLER, *supra* note 100; *The Evolution of Biometric Data Privacy Laws*, BLOOMBERG L. (Nov. 4, 2021), <https://pro.bloomberglaw.com/brief/biometric-data-privacy-laws-and-lawsuits/>. Other state laws such as the California Consumer Privacy Act, CAL. CIV. CODE §§ 1798.100–199.95, and the California Privacy Rights Act, A.B. 1490, 2021–2022 Leg., Reg. Sess. (Cal. 2021), are not solely biometric privacy laws, however,

specifically study facial recognition and AI technologies, and its impact. The Virginia General Assembly, for instance, proposed House Joint Resolution No. 59, calling for the formation of a Joint Commission on Technology and Science to study and report on “the proliferation and implementation of facial recognition and artificial technology within the Commonwealth.”¹⁰⁶ The resolution reasoned that “facial recognition implicates constitutional concerns related to unreasonable searches and seizures [under the Fourth Amendment] as well as individual privacy[.]”¹⁰⁷ To date, the resolution has not passed.¹⁰⁸ The lack of a unified legislative approach at the federal level, combined with the increasing disunity of state and local approaches, to the regulation of biometric data and biometric AI systems, underscores the need for an AI Bill of Rights, a framework of rights that is capable of complementing and buttressing statutory developments or administrative oversight through other laws and regulations.

CONCLUSION

Biometric AI systems are increasingly being developed for a wide range of governmental purposes, including policing, border security and immigration enforcement, and biometric cyberintelligence and biometric-enabled warfare. Collection of biometric data in the criminal procedure context can exacerbate preexisting harms, such as historic over-policing of minority communities. AI analysis of biometric data has been known to be flawed in several cases, potentially aiding law enforcement, investigators, and prosecutors in their work, but also introducing sources of bias, and commonly understood AI fallibilities.

Better understanding the impact of biometric AI systems will be critical to the project of developing an AI Bill of Rights.¹⁰⁹ As signaled by the EU Commission’s proposed AI Act, public and private uses of biometric identification systems carry increasing risks: the more comprehensive and ambitious biometric AI technologies are

also encompass biometric data protections. *The Evolution of Biometric Data Privacy Laws*, *supra* note 105.

106. H.J.R. 59, 2020 Gen. Assemb., Reg. Sess. (Va. 2020) (introduced by Del. Lashrecse D. Aird (D-Petersburg)).

107. *Id.*

108. *Legislation Related to Artificial Intelligence*, NAT’L CONF. STATE LEGISLATURES (Jan. 5, 2022), <https://www.ncsl.org/research/telecommunications-and-information-technology/20-legislation-related-to-artificial-intelligence.aspx>.

109. See Eric Lander & Alondra Nelson, *Americans Need a Bill of Rights for an AI-Powered World*, WIRED (Oct. 8, 2021), <https://www.wired.com/story/opinion-bill-of-rights-artificial-intelligence/>.

in scope, the greater the risks are to the protection of fundamental rights. Both the proposed AI Act and the GDPR combined offer important ways to construct the types of rights and values necessary for an effective AI Bill of Rights, including the need to conceptualize data rights as fundamental rights and how biometric AI systems can infringe upon criminal procedure rights.

By closely examining the sweeping biometric collection proposed in the September 2020 NPRM in the final weeks of the Trump administration,¹¹⁰ this Article suggests that the rapid expansion of biometric collection by DHS is also a case study for the expansive ambition of AI by the government generally. Without explicit acknowledgment of biometric AI system risks, the potential harms of attempts to broaden biometric data definitions and increase the collection of biometric data, and the potential ability to embed biometric data into emerging AI systems for multiple domestic and national security programs may be misunderstood. DHS is not only one of the primary drivers of expansion of biometric data collection, but also a driver of AI-enabled biometric cybersurveillance: biometric AI systems that rely upon biometric identifiers to anchor predictive policing and risk assessment profiling under purported border security and national security justifications. Beyond identity verification purposes, biometric AI systems are deployed to aggregate and analyze individuals and groups to conduct social scoring and project risk, to serve evidentiary and prosecutorial purposes, and to inform actionable intelligence.

AI-enabled biometric cybersurveillance carries the risk of substituting new technologies in place of traditional criminal evidence that criminal procedure protections under the Bill of Rights might not be able to sufficiently address. This Article concludes that a failure to recognize these challenges will lead to an underappreciation of the constitutional threats posed by emerging biometric AI systems. The growing recognition that high-risk biometric AI systems can pose unprecedented challenges to criminal procedure rights is core to the project of conceptualizing the need for an AI Bill of Rights.

110. Collection and Use of Biometrics by U.S. Citizenship and Immigration Services, 85 Fed. Reg. 56338 (proposed Sept. 11, 2020).

Ending Manner-of-Death Testimony and Other Opinion Determinations of Crime

*Keith A. Findley**

*Dean A. Strang***

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INTRODUCTION

In January 2011, Ellen Greenberg's fiancé and her apartment building manager broke down her apartment door after she failed repeatedly to respond to attempts to contact her.¹ They found her

* Professor of Law, University of Wisconsin Law School; Co-Founder and President, Center on Integrity in Forensic Sciences; Co-Founder, Wisconsin Innocence Project. We are grateful to Dan Simon, Kathy Pakes, and Christopher Lau for helpful comments on a draft of this article.

** Distinguished Professor in Residence, Loyola University Chicago School of Law; Of Counsel, Strang Bradley, LLC; Co-Founder, Center on Integrity in Forensic Sciences.

1. The facts in this case narrative are drawn from Jessica Lipscomb, *A Woman with 20 Stab Wounds Died of Suicide, an Autopsy Found. Her Parents Are Unconvinced: It Makes No*

dead in a pool of blood on the kitchen floor, the victim of twenty stab wounds to her chest, torso, head, and neck, including stab wounds to the back of her head and to her body through her clothes. They found a half-eaten fruit salad on the kitchen counter along with an overturned knife block. By all appearances, Greenberg was the victim of a grisly murder, and the medical examiner (“ME”) initially ruled homicide the manner of death.

Eventually, however, the ME changed the manner finding to suicide. It was a curious determination, especially given the nearly two-dozen stab wounds—including wounds atypical of suicide, such as through the clothing and to the back of the head—along with the absence of a suicide note, the appearance that her death had interrupted her dining on the fruit salad, the fact that she had expressed no thoughts to anyone of harming herself and appeared happy to family. Moreover, she had behaved normally earlier that day by, for example, filling up the gas tank in her car before returning home that morning. So why did the ME change the manner-of-death determination to suicide?

The answer lies not in any medical evidence or in anything the ME was specially trained to consider, but in ordinary circumstantial evidence—the fact that Greenberg’s apartment was locked from the inside with a swing bar, and the only other entrance, an exterior balcony on the sixth-floor apartment, was covered with fresh, undisturbed snow. Moreover, Greenberg had no defensive wounds, nothing was stolen from her apartment, and she had been on anxiety medication and a sleep aid, both of which listed suicidal ideations as possible side effects. These were the kinds of circumstances that juries are called upon to consider every day, and that juries are fully capable of assessing without expert interpretation from a physician. Yet they were also the kinds of non-expert evidence that routinely underlie medical opinion testimony about manner of death or injury.

In courtrooms across America, MEs and other medical doctors routinely testify to their opinions about both cause and manner of death and about whether injuries were produced by criminal activity or something else.² “Cause”—meaning specifically physiological

Sense., WASH. POST (Oct. 27, 2021), <https://www.washingtonpost.com/nation/2021/10/27/ellen-greenberg-suicide-stabbing/>.

2. NAT’L RSCH. COUNCIL OF THE NAT’L ACADS., STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 243 (2009) [hereinafter NAS REPORT], <http://www.nap.edu/catalog/12589.html>. Cause and manner of death determinations are routinely made by coroners and MEs. Medical experts also often make determinations about cause and manner of injury in non-death cases, as in, for example, child abuse cases, although that terminology is not routinely used in that context. See *id.* The legal issues related to

cause³—generally refers to findings such as heart attack, infection, gunshot wound to the head, or strangulation. These are findings that medical experts, drawing on medical expertise, rightly make.

“Manner” determinations, by contrast, generally refer to interpreting external factors, beyond medical findings about disease or injury to the body, to reach conclusions about whether the “cause” was homicidal, suicidal, accidental, natural, or undetermined.⁴ While medical expertise often contributes to understanding manner of death, that determination almost always demands consideration also of ordinary evidence that neither requires nor is improved by a physician’s assessment. Because jurors (or judges) typically are assigned responsibility for assessing such ordinary evidence, a question arises: why are medical experts routinely called upon and allowed to testify expansively about “manner?”

There is another, perhaps more subtle, problem with “manner” determinations by medical experts: those opinions conceal an epistemological problem. How does the ME or other medical expert know the veracity or accuracy of the ordinary evidence that provides the contextual support for the “manner” opinion in the end? That is, the “manner” determination both shifts the responsibility for assessing ordinary evidence away from the constitutionally proper factfinder, who is as capable of considering ordinary evidence as the doctor, and rests in part on the merely assumed provenance of that ordinary evidence. Worse, the medical expert does not have the tools that jurors and judges have for assessing the truth and accuracy of that ordinary evidence: an oath taken by the evidence-giver; cross-examination; rules of evidence designed to exclude the grossly unreliable; and the opportunity of an adversary to offer contrary evidence. Instead, the medical expert has professional incentives, which may bleed into personal incentives and cognitive biases, to accept this ordinary, contextual evidence from the police without challenge, regardless of its possible weaknesses.

In Part I of this Article, we examine the historical accident that created the practice of calling on medical experts to testify not only

such cause-and-manner determinations are the same in both death and non-death cases, so in this paper references to “cause and manner” are meant to apply to both death and non-death cases.

3. *Id.* at 257; see also THE AUTOPSY COMM. AND THE FORENSIC PATHOLOGY COMM. OF THE COLL. OF AM. PATHOLOGISTS IN CONJUNCTION WITH THE NAT’L ASS’N OF MED. EXAMINERS, CAUSE-OF-DEATH STATEMENTS AND CERTIFICATION OF NATURAL AND UNNATURAL DEATHS 3 (Randy L. Hanzlick ed., 1997) (defining “cause of death” as “the disease (condition)” that led to death).

4. RANDY HANZLICK ET AL., NAT’L ASS’N OF MED. EXAMINERS, A GUIDE FOR MANNER OF DEATH CLASSIFICATION 3 (2002); NAS REPORT, *supra* note 2, at 248, 257.

about cause, but also manner of death or injury. In Part II, we consider three approaches that U.S. courts use when considering the admissibility of cause- and manner-of-death opinions. We then examine the nature of manner determinations in Part III, looking at the kinds of facts that inform those decisions, and we consider whether such opinion testimony is appropriately admitted under the Federal Rules of Evidence. Finally, in Part IV, we extend this analysis to other “manner” determinations made by physicians, such as child-abuse determinations in shaken baby syndrome or abusive head trauma cases.

In the end, we conclude that manner-of-death or injury opinion testimony is almost always improper under *existing* evidentiary rules. First, to the extent it relies upon *non-medical* facts, the manner determination produces opinions that exceed the scope of a physician’s *medical* expertise.⁵ Second, because this type of testimony ventures into questions of etiology rather than diagnosis, it fails to meet the standards demanded by Federal Rule of Evidence 702 and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*⁶ In typical diagnostic scenarios, the accepted process of differential diagnosis generally provides adequate reliability for admissibility under Rule 702 and *Daubert*—cause determinations often present no evidentiary problem, then. By contrast, manner determinations entail not a differential diagnosis, but a differential etiology,⁷ with fewer assurances of reliability. Third, because manner determinations almost always depend on ordinary factual evidence—the stuff juries can assess on their own—manner determinations are not “helpful” to the factfinder, as required by Rule 702.⁸ Fourth, in a criminal case, a manner determination often imports a tacit opinion on the mental state of an actor—the very type of opinion that the Federal Rules of Evidence explicitly forbid in Rule 704(b).⁹ Moreover, to the extent manner determinations depend on ordinary facts that juries will hear about and consider, embedding them in medical opinion evidence runs the risk of unwitting double-counting of those facts—once by the expert, and then a second time, independently, by the jury or

5. See discussion *infra* Part III.A.

6. 509 U.S. 579, 597 (1993); see discussion *infra* Part III.B.

7. In this Article we equate manner determinations with etiology in this sense. Manner calls for a determination of whether a death was a homicide, accident, natural event, suicide, or undetermined. To make that determination, the physician must by necessity, at least to some extent, determine etiology—what happened that made this a homicide, accident, natural event, or suicide? Etiology thus can be understood as a specific determination of what events produced the manner of death (or injury).

8. See discussion *infra* Part III.C.

9. See discussion *infra* Part III.D.

judge. At a minimum, it heightens the risk that the jury will defer inappropriately to a purported expert: that the lab coat, not the evidence, will decide the case.¹⁰

I. THE ME'S OR CORONER'S ORIGINAL WARRANT TO DETERMINE "CAUSE AND MANNER" OF DEATH OR INJURY

Under the Rules of Evidence, experts enjoy a privileged place in U.S. courtrooms. And among experts, medical experts and coroners¹¹ often enjoy even greater privileges than most. The greater leeway extended to such experts is evident in several respects. First, ordinary witnesses usually are allowed to testify only to observed facts, not to their opinions about what they have observed.¹² Second, all other witnesses are usually limited to testifying about matters they have personally perceived and are prohibited from testifying about what others have said or what they have read or learned from other sources.¹³ Finally, while witnesses may testify about "ultimate issues" in a case,¹⁴ they may not testify about "whether the defendant did or did not have a mental state or condition that constitutes an element of the crime charged or of a defense[.]"¹⁵ and courts generally prevent witnesses from occupying the entire decisional field—that is, they prevent them from usurping the function of the jury and rendering opinions about guilt or liability on the basis of all evidence in the case.¹⁶ But medical

10. See Keith A. Findley, *The Absence or Misuse of Statistics in Forensic Science as a Contributor to Wrongful Convictions: From Pattern Matching to Medical Opinions About Child Abuse*, 125 DICK. L. REV. 615, 650–51 (2021) [hereinafter Findley, *Misuse of Statistics*].

11. Note initially the distinction between medical examiners and coroners. The more modern, statutory office of medical examiner always is filled by a physician, almost always one trained in pathology. As we explain below, see *infra* notes 21–25 and accompanying text, the ancient office of coroner, which persists in many parts of the United States (especially rural areas) is an elective office, typically, that may be filled by anyone. Coroners may be nurses or even people with no medical training. When a coroner happens to be a medical doctor, he or she may be a medical doctor with a specialty other than pathology. For our purposes, though, the distinction between ME's and coroners really does not matter: as to manner of death, both MEs and coroners are venturing into non-medical, ordinary evidence as to which neither is any better qualified than a representative juror in interpreting. We therefore consider MEs and coroners together, unless expressly noted otherwise.

12. See FED. R. EVID. 602 (requiring personal knowledge), 701 (permitting lay witnesses to offer opinions only under limited circumstances), 702 (permitting experts to render opinions).

13. See FED. R. EVID. 602 (requiring personal knowledge), 802 (banning most hearsay).

14. FED. R. EVID. 704(a).

15. FED. R. EVID. 704(b).

16. See, e.g., *United States v. Wright*, 48 M.J. 896, 901–02 (A.F. Ct. Crim. App. 1998) ("Expert testimony may not be used to determine the credibility of the victim nor may an expert offer an opinion as to the guilt or innocence of the accused."); *United States v. Thanh Quoc Hoang*, 891 F. Supp. 2d 1355, 1362 (M.D. Ga. 2012) (quoting *Montgomery v. Aetna Cas. & Sur. Co.*, 898 F.2d 1537, 1541 (11th Cir. 1990)) ("Although Rule 704(a) abolished the

experts often are permitted to exceed these limitations, and they do indeed render opinions that at times purport to decide the entire case.¹⁷

The ME's or coroner's warrant for rendering such opinions starts with the duties they are assigned by statute. Medical examiners and coroners are charged by law in most states with the responsibility to determine cause and manner of death.¹⁸ Typically, that responsibility includes signing a death certificate "describing the manner or circumstances under which death occurred (natural, accident, suicide, homicide, or undetermined)."¹⁹ The death certificate serves multiple purposes: it "informs families about specific conditions that led to death; provides local, state and national mortality statistics by cataloging morbidity and mortality; indicates priorities for funding programs and policy making for public health and safety issues; and, serves as the legal and administrative documentation of the death."²⁰

While such statutes thus make cause and manner determinations part of the ME's statistics-generating and administrative duties, does that legislative and administrative charge mean they also are entitled to offer opinion testimony in court on both issues? Courts often assume as much, but, as explained below, the Rules of Evidence—to say nothing of objective reason—say otherwise. Why then do courts almost reflexively permit such expansive opinion testimony? It may be little more than a historical accident with

ultimate issue rule, an expert 'may not, however, merely tell the jury what result to reach. A witness also may not testify to the legal implications of conduct.'" (citations and alterations to original omitted); *Stephens v. State*, 774 P.2d 60, 66 (Wy. 1989) (quoting 3 CHARLES E. TORCIA, *WHARTON'S CRIMINAL EVIDENCE* § 566 (14th ed. 1987) ("[A] witness may not state his opinion as to . . . whether the defendant was guilty or innocent of the crime charged[.]")).

17. See Keith A. Findley et al., *Feigned Consensus: Usurping the Law in Shaken Baby Syndrome/Abusive Head Trauma Prosecutions*, 2019 WIS. L. REV. 1211, 1251–52 (2019) [hereinafter Findley et al., *Feigned Consensus*]; Deborah Tuerkheimer, *Science-Dependent Prosecution and the Problem of Epistemic Contingency: A Study of Shaken Baby Syndrome*, 3 ALA. L. REV. 513, 515–16 (2011); Deborah Tuerkheimer, *The Next Innocence Project: Shaken Baby Syndrome and the Criminal Courts*, 87 WASH. U. L. REV. 1, 5 (2009).

18. NAS REPORT, *supra* note 2, at 256; see, e.g., IOWA CODE § 331.802(2) (requiring county medical examiners to "conduct a preliminary investigation of the cause and manner of death [and] prepare a written report of the findings" when "a person's death affects the public interest"); MICH. COMP. LAWS § 52.202(1) ("A county medical examiner . . . shall investigate the cause and manner of death . . ."); *id.* § 52.205(3) ("The county medical examiner . . . shall carefully reduce or cause to be reduced to writing every fact and circumstance tending to show the condition of the body and the cause and manner of death[.]").

19. NAS REPORT, *supra* note 2, at 257; see also Evan W. Matshes & Sam W. Andrews, *The Autopsy as a 'Dying' Art*, 42 CHAMPION, March 2018, at 34, 35 ("[A] manner of death determination is . . . an *opinion* offered by the Coroner or Medical Examiner, with no legal bearing. This opinion is offered primarily for statistical purposes, as part of a statutory obligation to produce a death certificate describing how and why a person died.").

20. Amy Hawes & Darinka Mileusnic-Polchan, *Medical Examiners and 'Manner of Death': How Is a Suicide Determination Made?*, 55 TENN. B.J. 20, 21 (2019).

resulting inertia, or a simple misunderstanding of the purpose and nature of manner determinations, more than principle and law.

The coroner system initially emerged in the ninth or tenth century as an office whose purpose was to safeguard the financial interests of the crown in criminal cases.²¹ “On behalf of the crown, the crowner was responsible for inquests to confirm the identity of the deceased, *determine the cause and manner of death*, confiscate property, collect death duties, and investigate treasure troves.”²² For nearly one hundred years, the National Academy of Sciences and other scientific bodies have pushed for abolishing the coroner system and moving toward MEs²³ because the coroner traditionally, and frequently today, is an elected (occasionally appointed) position that requires no medical training at all.²⁴ Today, in many jurisdictions, coroners have been supplanted by MEs, but the coroner remains statutorily intact in many states, either alone or in tandem with an ME.²⁵

II. JUDICIAL APPROACHES TO ADMISSIBILITY OF CAUSE AND MANNER DETERMINATIONS

As MEs began to assume responsibility for determining cause and manner of death and signing death certificates, courts turned to them to testify as experts on those matters.²⁶ Courts also often admit the ME’s autopsy report itself with its cause-and-manner determinations, sometimes over hearsay and Confrontation Clause objections.²⁷

21. NAS REPORT, *supra* note 2, at 241 (citing Randy Hanzlick, *Overview of the Medicolegal Death Investigation System in the United States*, in MEDICOLEGAL DEATH INVESTIGATION SYSTEM: WORKSHOP SUMMARY 7, 8 (Inst. Med. ed., 2003)).

22. NAS REPORT, *supra* note 2, at 241 (emphasis added).

23. *See, e.g., id.* at 242, 247, 267; BULLETIN OF THE NATIONAL RESEARCH COUNCIL, NO. 64, NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMY OF SCIENCES, THE CORONER AND THE MEDICAL EXAMINER (1928).

24. NAS REPORT, *supra* note 2, at 247.

25. “As of 2004, administratively, 16 states had a centralized statewide medical examiner system, 14 had a county coroner system, 7 had a county medical examiner system, and 13 had a mixed county ME/C system.” *Id.* at 245 (citing J.C.U. Downs, Board Member & Chair, Governmental Affs. Comm., Nat’l Ass’n Med. Exam’r; Vice Chair, Consortium of Forensic Sci. Orgs.; Coastal Reg’l Med. Exam’r, Ga. Bureau Investigation, Presentation to the Committee (June 5, 2007)).

26. *See* Michael Panella, *Problematic Legal Causations of Death*, 44 TENN. B.J. 21, 24 (2008) (“Given that the medical examiner determines the cause and manner of death, the medical examiner’s findings may be critical in the legal proceedings involving problematic death causation”; “the courts may rely on the medical examiner for the cause and manner of death when faced with problematic causation issues.”).

27. Andrew Higley, Note, *Tales of the Dead: Why Autopsy Reports Should Be Classified as Testimonial Statements under the Confrontation Clause*, 48 N. ENG. L. REV. 171, 176 (2013).

In the United States today, courts are inconsistent as to whether MEs may testify about both cause and manner of death, but some general principles and approaches are discernible. First, courts almost always permit MEs to testify about cause of death, because that determination almost always depends upon medical expertise to determine if the death was caused by, for example, disease, blunt force trauma, poisoning, heart attack, strangulation, or the like.²⁸ Even then, a few courts have limited some cause-of-death testimony in those somewhat rare occasions when the determination was based primarily on ordinary non-medical evidence rather than on physical examination of the body at autopsy.²⁹ Second, some courts admit ME testimony on both cause and manner in almost every case. Illustrative of this group of states is Kentucky, where the state's Supreme Court has held that both are generally admissible because "it is axiomatic that a determination of the cause and manner which led to a person's death is generally scientific in origin and outside the common knowledge of layperson jurors."³⁰ Third, some courts take a more nuanced approach, particularly with regard to manner-of-death: they generally admit both cause and manner opinions but exclude such evidence, especially manner determinations, on a case-by-case basis, depending on whether the opinion was based on medical evidence from the autopsy or instead almost entirely on non-medical evidence.³¹ As the Arizona Court of Appeals put it, after surveying nationwide caselaw: "To the extent that there is a common thread amongst these cases, it is that the admissibility in a criminal case of a medical examiner's opinion regarding the manner of death depends on the particular facts and circumstances of each case."³²

28. See, e.g., *Baraka v. Commonwealth*, 194 S.W.3d 313, 315 (Ky. 2006). Admissibility of medical opinion on that issue has been widely accepted for decades. See J. Thomas Sullivan, *When Death is the Issue: Uses of Pathological Testimony and Autopsy Reports at Trial*, 19 WILLAMETTE L. REV. 579 (1983).

29. See, e.g., *State v. Tyler*, 867 N.W.2d 136, 162 (Iowa 2015).

30. *Baraka*, 194 S.W.3d at 315; see also *Medlock v. State*, 430 S.E.2d 754, 756–57 (Ga. 1993); *State v. Byles*, 652 So.2d 59, 61–62 (La. Ct. App. 1995) ("A physician testifying as an expert may properly give an opinion as to the probable manner in which a wound or other traumatic injury was inflicted where such testimony is based on facts within the expert's knowledge."); *Commonwealth v. Pikul*, 511 N.E.2d 336, 339 (Mass. 1987); *State v. Commander*, 721 S.E.2d 413, 419–20 (S.C. 2011) (finding manner-of-death opinion evidence admissible because the "anecdotal history" provided by police and relied on by the medical examiner was the type of information routinely relied on by medical professionals in conducting autopsies); *State v. Jones*, 801 P.2d 263, 267 (Wash. Ct. App. 1990) ("[U]nder the facts and circumstances presented, the doctors were better qualified than jurors to adjudge the cause of death and whether the fatal blow was accidental or inflicted."); *State v. Smith*, 358 S.E.2d 188, 191 n.1 (W. Va. 1987).

31. See, e.g., *Tyler*, 867 N.W.2d at 156–57 (collecting cases).

32. *State v. Sosnowicz*, 270 P.3d 917, 923 (Ariz. Ct. App. 2012).

The Iowa Supreme Court's decision in *State v. Tyler* is illuminating, because it thoroughly canvasses the case law from around the country, and because it recognizes some of the problems with admitting some ME cause and manner opinion evidence. The *Tyler* court held that it was error to admit both cause- and manner-of-death testimony under the unique circumstances of that case because the ME admitted that both opinions were dependent on ordinary, non-medical evidence.³³ The issue at trial was whether the defendant's baby was still-born or born alive and then drowned in a bathtub.³⁴ The ME conceded that the medical evidence was indeterminate on that question, and that the only thing that caused him to revise his initial findings from undetermined to drowning (cause) and homicide (manner) was that police informed him that, after initially claiming the baby was born still,³⁵ the defendant eventually told police that the baby had moved and cried after birth and she had filled the bathtub to drown him.³⁶ Because both the cause and manner conclusions therefore were wholly dependent on ordinary, non-medical evidence, both determinations were beyond the proper scope of expert testimony. The court concluded that the trial court "abused its discretion in allowing the medical examiner to testify to the cause and manner of Baby Tyler's death because the medical examiner based his opinions primarily, if not exclusively, on Tyler's inconsistent and uncorroborated statements to the police as opposed to objective, scientific, or medical evidence."³⁷

But the *Tyler* court did not hold that all cause- or manner-of-death opinion evidence is inadmissible. Rather, the court observed:

[W]hen a medical examiner over-relies on witness statements or information obtained through police investigation in forming his or her opinions on cause or manner of death, such opinions may not assist the trier of fact. Numerous jurisdictions have held that when a medical examiner bases his or her opinions on cause or manner of death largely on statements of lay witnesses or information obtained through police investigation, such opinions are

33. *Tyler*, 867 N.W.2d at 156.

34. *Id.* at 150.

35. *Id.* at 146.

36. *Id.* at 147.

37. *Id.* at 144. For other cases adopting a similar approach and conclusion, see, for example, *Sosnowicz*, 270 P.3d at 922-23; *Maxwell v. State*, 414 S.E.2d 470, 473-74 (Ga. 1992), *overruled on other grounds by Wall v. State*, 500 S.E.2d 904, 907 (Ga. 1998); *People v. Perry*, 593 N.E.2d 712, 716 (Ill. App. Ct. 1992); *State v. Vining*, 645 A.2d 20, 20-21 (Me. 1994); *State v. Jamerson*, 708 A.2d 1183, 1189, 1195 (N.J. 1998); *People v. Eberle*, 697 N.Y.S.2d 218, 219 (N.Y. App. Div. 1999); *Bond v. Commonwealth*, 311 S.E.2d 769, 772 (Va. 1984).

inadmissible under rules similar to our [Iowa corollary to FED. R. EVID. 702].³⁸

The court also held that such opinions are not admissible because they “are not sufficiently based on scientific, technical, or specialized knowledge”³⁹

Consistent with those rationales, *Tyler* announced a case-by-case approach to admissibility:

Having surveyed the authority on the issue, we conclude there are circumstances when a medical examiner’s opinions on cause or manner of death may assist the jury, even when such opinions are based in part on witness statements or information obtained through police investigation. However, our review of the caselaw confirms there is no bright-line rule for determining whether a medical examiner may opine on cause or manner of death when his or her opinions are based, in whole or in part, on such information. Instead, whether a medical examiner’s opinion on cause or manner of death is admissible depends on the particular circumstances of each case. For example, when a medical examiner bases his or her opinion of cause or manner of death largely on witness statements or information obtained through police investigation, such opinions would ordinarily be inadmissible under [Iowa corollary to FED. R. EVID. 702] because they would not assist the trier of fact.⁴⁰

While several courts have followed the *Tyler* approach, to our knowledge no court has adopted a *per se* rule excluding all manner-of-death (or injury) testimony. The time has come for just such a rule.

III. TOWARD A *PER SE* RULE OF EXCLUSION FOR OPINION EVIDENCE ON “MANNER” (AND A CASE-BY-CASE RULE ON “CAUSE”)

Considering whether manner evidence (and in some cases, even cause evidence) should be admissible requires consideration of the divergent purposes MEs serve as investigators, administrators, and data-collectors on one hand, and expert witnesses in court on the

38. *Tyler*, 867 N.W.2d at 156.

39. *Id.* at 157.

40. *Id.* at 162.

other, as well as the fundamental structure of the trial process that the Rules of Evidence protect. Forensic pathologists have strenuously argued that, to fulfill their statutory duties as MEs to determine cause and manner of death, they must be able to base their opinions on unlimited case information—both scientific or medical evidence and ordinary lay evidence.⁴¹ When MEs are performing their statutory duties to complete death certificates or to classify deaths for epidemiological records or statistical purposes, there is usually no reason to contest the consideration of contextual information in that process. Prohibiting them from considering all relevant evidence would undermine their statutory and administrative roles, just as barring juries from hearing anything but scientific or medical evidence would compromise juries' ability to find facts at trials. But note that the governmental-function rationale applies to MEs, like juries, only in those circumstances where they are the ultimate factfinders. When performing bureaucratic and public health data-collection duties, the ME is indeed the factfinder, just as the jury is in the courtroom. As a death investigator, the ME should have access to all available relevant and helpful information, or at least there is no sound policy reason to deny the ME access to that information—although, as noted below, even then the ME still should grapple with the challenges posed by cognitive biases introduced by context information.⁴²

When the ME ventures into the courtroom, however, the standard of proof, the allocation of fact-finding authority, and the public interest change significantly. In the courtroom, the ME no longer is the factfinder. As an expert witness, her license in the courtroom is much more limited: to provide *specialized* knowledge drawn from her unique expertise that the jury cannot access or comprehend, without the help of an expert.⁴³ In that context, where a person's liberty is at risk of state deprivation, the Constitution has designated the jury as the factfinder. The jury is charged with considering all relevant (and otherwise admissible) evidence, deciding ultimate questions of fact, and concluding whether the prosecution's theory on manner of death is right.⁴⁴

Accordingly, a tension arises whenever a medical expert analyzes and opines about both cause and manner of death or injury, and in

41. See William R. Oliver et al., *Cognitive Bias in Medicolegal Death Investigation*, 5 ACAD. FORENSIC PATHOL. 548, 549 (2015); William R. Oliver, *Manner Determination in Forensic Pathology*, 4 ACAD. FORENSIC PATHOL. 480, 483 (2014).

42. See *infra* notes 46, 49 and accompanying text.

43. See FED. R. EVID. 702.

44. See generally U.S. CONST. amend. VI; *Apprendi v. New Jersey*, 530 U.S. 466, 476–77, 490 (2000).

doing so relies upon contextual (non-medical) evidence to support a manner conclusion. It is a tension that raises concerns for the legal system on several fronts. First, exposure to such context information exacerbates the risk of error from innate cognitive biases. Second, because assessment of such ordinary—and often vigorously contested—context evidence is not scientific but subjective, untested, untestable, and often inaccurate, it fails the reliability standards demanded by *Daubert* and Rule 702.⁴⁵ Third, allowing the ME to testify to manner of death is not “helpful” to the jury as required by Rule 702, and even worse, constitutes vouching for the prosecution’s preferred theory of the facts and inferences and the credibility of witnesses. Fourth, it creates a risk that it will improperly allow smuggled opinions on a human actor’s mental state, in violation of Rule 704(b). Finally, it permits unlawful usurpation of the role of the jury alone to determine the guilt of the accused. We take up each of these considerations in turn and demonstrate how each is best addressed by a *per se* ban on manner opinion evidence, and a case-by-case approach to cause evidence.

A. *Working Around the Cognitive Bias Conundrum*

Cognitive bias, and in particular context bias, now is widely recognized as a serious threat to the accuracy and reliability of forensic sciences across many disciplines (just as it is recognized as a potential source of significant error in all academic scientific research and laboratory testing).⁴⁶ The NAS put it bluntly: “The findings of forensic science experts are vulnerable to cognitive and contextual bias.”⁴⁷ These biases, the NAS explained, “are not the result of character flaws; instead, they are common features of decision making, and they cannot be willed away.”⁴⁸

Cognitive bias refers to the wide range of cognitive shortcuts or inclinations that can serve us well in most contexts but can lead us astray in disastrous ways in others. The cognitive biases that are widely addressed in the forensic science and criminal justice literature include confirmation bias, hindsight bias, outcome bias, motivated reasoning, group-think, role effects, cognitive dissonance,

45. See discussion *infra* Part III.B.

46. See Saul M. Kassin et al., *The Forensic Confirmation Bias: Problems, Perspectives, and Proposed Solutions*, 2 J. APPLIED RSCH. MEMORY & COGNIT. 42 (2013); D. Michael Risinger et al., *The Daubert/Kumho Implications of Observer Effects in Forensic Science: Hidden Problems of Expectation and Suggestion*, 90 CALIF. L. REV. 1, 8 (2002).

47. NAS REPORT, *supra* note 2, at 8 n.8.

48. *Id.* at 122.

anchoring effects, availability bias (or heuristic)—and more.⁴⁹ All of these can affect ME offices, both because education in one field does nothing to eliminate human cognitive biases, and because ME offices are closely allied with police agencies and prosecutors.

Additionally, another cognitive bias has particular relevance to the forensic science disciplines, including forensic pathology and other medical specialties: context bias.⁵⁰ Context bias refers to the risk that an analyst's exposure to task-irrelevant information can bias the way the analyst interprets case data, especially when those data are ambiguous.⁵¹ If, for example, a fingerprint examiner learns that the suspect was seen in the area of the crime, or that the suspect made incriminating statements, that knowledge might lead the examiner, even unwittingly, to see similarities between the crime scene latent prints and the suspect's rolled print and to declare a "match" when the analyst might not have otherwise. The psychological research on this is extensive, rendering it beyond legitimate dispute that such cognitive biases are ubiquitous and dangerous, and apply to all humans, including experts operating in their fields of expertise.⁵² That includes medicine.⁵³

When it comes to medical opinions related to cause and manner of death or injury, context bias presents a unique challenge. For many of the pattern-matching forensic disciplines (*e.g.*, fingerprints, firearms & toolmarks, bitemarks, handwriting comparison, fiber and hair comparison, shoe and tire impressions, drug spectra, and the like), discerning what evidence is task-relevant and what is task-irrelevant is often straightforward and non-controversial.⁵⁴ For example, when pattern analysts compare evidence from the crime scene to evidence from the defendant, they usually need to

49. See Keith A. Findley & Michael A. Scott, *The Multiple Dimensions of Tunnel Vision in Criminal Cases*, 2006 WIS. L. REV. 291, 307–22 (2006); Silvia Mamede et al., *Effect of Availability Bias and Reflective Reasoning on Diagnostic Accuracy Among Internal Medicine Residents*, 304 [J]AMA 1198, 1198 (2010); Risinger et al., *supra* note 46, at 12–21.

50. See Itiel Dror et al., *Cognitive Bias in Forensic Pathology Decisions*, 66 J. FORENSIC SCIS. 1751, 1751–52 (2021); NAS REPORT, *supra* note 2, at 8 n.8.

51. See Risinger et al., *supra* note 46, at 26.

52. See DAN SIMON, IN DOUBT: THE PSYCHOLOGY OF THE CRIMINAL JUSTICE PROCESS 21 (2012) [hereinafter SIMON, IN DOUBT]; Itiel E. Dror, *Cognitive and Human Factors in Expert Decision Making: Six Fallacies and the Eight Sources of Bias*, 92 ANALYTICAL CHEMISTRY 7998, 7999 (2020); Jeff Kukucka et al., *Cognitive Bias and Blindness: A Global Survey of Forensic Science Examiners*, 6 J. APPLIED RSCH. MEMORY & COGNIT. 452, 452 (2017).

53. NAT'L ACADS. SCIS., ENG'G, & MED., IMPROVING DIAGNOSIS IN HEALTH CARE 56–58 (Erin P. Balogh et al. eds., 2015); Joseph J. Lockhart & Saty Satya-Murti, *Diagnosing Crime and Diagnosing Disease: Bias Reduction Strategies in the Forensic and Clinical Services*, 62 J. FORENSIC SCIS. 1534, 1537 (2017) (noting that in clinical medicine, "[d]iagnostic errors can, and do, occur in response to extraneous contextual information").

54. See Dan Simon, *Minimizing Error and Bias in Death Investigations*, 49 SETON HALL L. REV. 255, 276–77 (2019).

know little or nothing more than what they can see in the disputed evidence itself and in the known sample used for comparison—the fingerprint patterns, the shoe or tire marks, etc. There is no need for them to know about the prosecution’s theory of the case, or about evidence of purported confessions, witness statements, or any of the other ordinary evidence the jury will be called upon to consider. Knowledge of that information does not help them determine, from a scientific or expertise-related perspective, whether the patterns match. Indeed, it can lead them to see patterns that might not be there.

Forensic pathology and other medical specialties are different. For them, the exposure to background information creates a true “conundrum,” to use Professor Dan Simon’s term.⁵⁵ On the one hand, non-medical evidence of unknown reliability can skew an ME’s interpretation of medical information, rendering the ultimate opinion vulnerable to error, just as contextual information can taint interpretations made by other forensic analysts. On the other hand, as forensic pathologists correctly remind us,⁵⁶ background information⁵⁷ is at the same time essential to an informed death investigation, particularly one charged with determining manner of death.⁵⁸ First, the medical profession rightly considers contextual information in general: medical history, family history, diet, habits, and so on. Second, forensic pathology specifically seeks background information such as the victim’s or suspect’s behavior leading up to the incident, the presence of non-medical physical evidence, the physical setting in which the body was found, the statements of witnesses, etc. This information may be important to determining manner of death in the ME’s administrative and data-collecting roles. Without it, for example, it might be impossible for an ME to decide for those purposes whether a fatal dose of poison was ingested voluntarily (suicide), mistakenly (accident), or through coercion or intervention of a third party (homicide). Moreover, as Dan Simon has observed, “background information also plays an important facilitative role in death examinations by way of enabling

55. *Id.* at 256.

56. Oliver et al., *supra* note 41, at 549.

57. In death investigations, “background information” is often understood as “any information that is not derived directly from the postmortem medical testing or autopsy.” Simon, *supra* note 54, at 267–68.

58. See Lockhart & Satya-Murti, *supra* note 53, at 1537 (“Complex medical decisions are, at once, both dependent and also vulnerable to raw contextual information.”); Simon, *supra* note 54, at 293 (“[A]llowing an unfettered flow of background information is likely to skew some investigations away from reaching accurate conclusions, but blocking access to that information is bound to stifle and skew other investigations.”).

the generation of investigative hypotheses without which the process is unlikely to succeed.”⁵⁹

Debate rages about how to address this conundrum. Some scholars call for implementation of case management systems, such as those being adopted in other forensic disciplines, to blind MEs from non-medical or background information that might taint their analyses.⁶⁰ In particular, for many disciplines, linear sequential unmasking is often proposed to address context bias,⁶¹ and is indeed being implemented in some prestigious forensic laboratories.⁶² Linear sequential unmasking employs a case manager to screen information before it is released to the analyst; the manager sequentially releases background information only as needed to complete the analysis, so that early steps in the process can be analyzed without risk of bias from that information.⁶³

Death investigators, however, have pushed back strenuously, arguing that such limitations are unworkable in a field as “complex, sprawling, iterative, and open-ended” as death investigations.⁶⁴ They contend that, in order to determine cause and manner of death, all *case*-relevant information is *task*-relevant for the ME; that to deprive MEs of any such information would create more errors than it would prevent; and, that to deny physicians such information is tantamount to limiting their ability to practice medicine.⁶⁵ Indeed, in death investigations, because investigators explicitly and intentionally factor non-medical background information into their conclusions, exposure to background information is often not so much a matter of cognitive bias as it is a feature of the “legal and normative aspects of death examination.”⁶⁶

59. Simon, *supra* note 54, at 256.

60. See, e.g., Itiel E. Dror & Jeff Kukucka, *Linear Sequential Unmasking—Expanded (LSU-E): A General Approach for Improving Decision Making as Well as Minimizing Noise and Bias*, 3 FORENSIC SCI. INT’L: SYNERGY, 100161, 2021, at 4, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8385162/pdf/main.pdf>.

61. *Id.* at 1; see also Dan E. Krane et al., Letter to the Editor, *Sequential Unmasking: A Means of Minimizing Observer Effects in Forensic DNA Interpretation*, 53 J. FORENSIC SCIS. 1006, 1006 (2008); Itiel E. Dror et al., Letter to the Editor, *Context Management Toolbox: A Linear Sequential Unmasking (LSU) Approach for Minimizing Cognitive Bias in Forensic Decision Making*, 60 J. FORENSIC SCIS. 1111, 1111 (2015).

62. See Simon, *supra* note 54, at 260.

63. See Dror & Kukucka, *supra* note 60, at 2.

64. Simon, *supra* note 54, at 255; see also *id.* at 261 (summarizing the opposition by death investigators to any context management).

65. William R. Oliver, *Commentary on: Lockhart JJ, Satya-Murti S. Diagnosing Crime and Diagnosing Disease: Bias Reduction Strategies in the Forensic and Clinical Sciences*, 63 J. FORENSIC SCIS. 651, 651 (2017); Oliver et al., *supra* note 41, at 549. See generally Lockhart & Satya-Murti, *supra* note 53, at 1537.

66. Simon, *supra* note 54, at 275.

In a thoughtful response to those objections, Dan Simon has proposed a compromise. Simon suggests a system in which death investigators have unfettered access to general background information in most cases, but utilize a structured context management system to minimize context biases in a very small number of what he calls “acute cases”—those in which the case is “headed for criminal proceedings, in which the costs of investigative errors are particularly high and the prospect of incomplete or inconclusive investigations is more tolerated, and in which the investigative task is non-obvious.”⁶⁷ Even for those rare cases, he would only blind the MEs to some background information: “death examiners shall continue to be exposed to the medical history and death scene findings, but not to the less reliable types of information.”⁶⁸

There is much to be said for Simon’s proposal, at least as a starting point for taking seriously the challenges posed by context biases. At the very least, Simon’s work reminds us of the potential for error from unreliable context information even in the death investigator’s bureaucratic role in recording cause and manner of death—a risk that the death investigation community has not yet been willing to acknowledge or address in a serious way.

But our purpose here is not to weigh in on the best process for generating cause and manner determinations for data collection, statistical, and public policy purposes. Our purpose instead is to highlight an obvious pathway forward for resolving this conundrum *in the courtroom*. It is a pathway, in fact, offered both by Simon and the chorus of forensic pathologists who object to any context management systems, but that gets lost in the more heated debates about whether context bias is a serious problem and about how context bias might be managed. The solution: regardless of what MEs and coroners do in their own domain pursuant to their statutory duties, their testimony in the courtroom should be limited uniformly to offering medical-evidence-based expertise, which in every case would exclude opinions about manner of death (or other injury). Those opinions always entail heavy reliance on non-medical, or background, information.

Simon makes the point this way:

It must not be overlooked that manner of death determinations have no rightful place in criminal proceedings. As stated above, in their public health capacity, forensic pathologists serve as the effective final decision maker and

67. *Id.* at 264.

68. *Id.*

are free to use low standards of proof in reaching their decisions, whereas in the criminal domain the final decision making authority is vested in the jury and should be made using the high threshold of beyond a reasonable doubt.⁶⁹

Simon also notes: “Recall that the critical manner of death determination—classifying a death as a homicide—is strictly for the jury to make.”⁷⁰

On this point, the mainstream forensic pathology community appears to *agree* with Simon (and us). Dr. William Oliver and his colleagues, for example, argue that it is a mistake to “ignore what manner determination is, and why it is done. Manner determination is not a legal determination. It is a public health classification for statistical analysis. It is absurd to pretend that manner determination has inherent legal meaning, and it is a misuse of manner to act as if it does.”⁷¹ Oliver elaborates: “[I]t is inappropriate to ignore the actual purpose of manner and claim that manner determination should be changed so that it can be misused more egregiously.”⁷² Similarly, in 2021, eighty-six prominent forensic pathologists and death investigators signed a letter to the editor of the *Journal of Forensic Science* in which, among other things, they addressed what they called the “misuse” of manner determinations as evidence in court. They wrote: “The fact that this tool for aggregate statistics often does not fit well in court is not a criticism of manner determination by forensic pathologists. It is instead a criticism of misuse of manner determination by the courts.”⁷³

We think this criticism is well-founded and urge courts to listen to what forensic pathologists are saying about their own manner determinations. Hence, as Simon put it, “lawmakers and judges . . . are strongly encouraged to alter this legal situation and purge the criminal process of all references to manner of death determinations.”⁷⁴ In the following sections, we explain why this approach indeed follows unavoidably from existing evidentiary rules and principles.

69. *Id.* at 294.

70. *Id.*

71. Oliver et al., *supra* note 41, at 552.

72. *Id.* at 553.

73. Brian Peterson et al., Letter to the Editor, *Commentary on: Dror IE, Melinek J, Arden JL, Kukucka J, Hawkins S, Carter J, et al. Cognitive Bias in Forensic Pathology Decisions*, 66 J. FORENSIC SCIS. 2541, 2542 (2021).

74. Simon, *supra* note 54, at 296.

B. The Unreliability and Non-Scientific Nature of Manner Determinations

Admissibility of expert opinion evidence is governed in federal and most state courts in the U.S. by Federal Rule of Evidence 702 or its state corollaries, as interpreted in the *Daubert* trilogy of Supreme Court cases.⁷⁵ At bottom, the rules demand that trial judges play a rigorous gatekeeping role to screen out purported scientific and technical opinion evidence if it lacks sufficient reliability or is not helpful to the trier of fact. In a nutshell, *Daubert* and Rule 702 require that courts ensure that expert opinion evidence meet the following requirements:⁷⁶

1. The expert must have expertise, as demonstrated “by knowledge, skill, experience, training, or education[.]”⁷⁷
2. The opinion must be based on principles or methods that are sufficiently reliable to constitute good science,⁷⁸ or, if not science, areas of expertise that bear sufficient indicia of reliability to demonstrate (a) a reliable process, (b) “sufficient facts or data,” and (c) reliable application of the process to those facts and data.⁷⁹
3. The expert’s opinion must “help the trier of fact to understand the evidence or to determine a fact in issue[.]”⁸⁰

Expert testimony on manner runs afoul of all three requirements in virtually every instance (and occasionally but less frequently in cause determinations as well, as exemplified by the *Tyler* case⁸¹). Looking at the first two requirements—qualified expertise, and reliable processes and application of those processes—it is clear that,

75. *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 141–42 (1999); *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 138–39 (1997); *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993).

76. Rule 702 provides in full:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

(a) the expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;

(b) the testimony is based on sufficient facts or data;

(c) the testimony is the product of reliable principles and methods; and

(d) the expert has reliably applied the principles and methods to the facts of the case.

FED. R. EVID. 702.

77. FED. R. EVID. 702(a).

78. *See Daubert*, 509 U.S. at 589–95 (discussing the components required to qualify as good science).

79. FED. R. EVID. 702(b), (c), (d).

80. FED. R. EVID. 702(a).

81. 867 N.W.2d 136, 177 (Iowa 2015); *see discussion supra* Part II.

as a group, MEs are qualified as medical experts and employ valid and reliable medical procedures, for many purposes.⁸² Their education, training, and experience clearly make them experts in medical matters. And no one doubts that modern medicine applies scientifically valid procedures and relies upon adequate data for many diagnostic purposes, despite sometimes alarming rates of error in virtually all types of diagnoses.⁸³ But that conclusion about expertise and reliability applies only to determinations that depend on the scientific and medical principles and training that physicians bring to the task.

Manner determinations *always* exceed these limits. Manner determinations, almost by definition, require consideration of non-medical or background information. Cause can often be determined largely, if not exclusively, by examination of the body and laboratory analysis of fluids and tissue obtained from the body. The autopsy and associated medical tests can identify blunt force trauma, or stab wounds, or illnesses, or the like. But *how* that blunt force trauma was inflicted requires much more—it requires ordinary background information and other direct or circumstantial evidence. A physician can know from examination of the body that a gunshot wound caused death. But the physician cannot know from examination of the body alone whether that gunshot wound was the result of an accident, suicide, or homicide. The Ellen Greenberg case, described at the outset of this Article, illustrates the point vividly. One might think that nearly two-dozen stab wounds, including through the clothing and in the back of the head, would alone be enough to permit a physician to determine this was a homicide. But it took context information—the fact that the door was locked from the inside and snow on the balcony was undisturbed—to lead the ME to change the manner determination (whether correctly or incorrectly) to suicide.

The problem is this: interpreting such background or context information is an ordinary task for fact-finders that does not require—and is not even advanced by—medical training. Hence, while an ME might be well qualified to render opinions based on medical evidence, she has no special training or qualifications that make her an expert on interpreting things like the meaning of a

82. The third requirement is our next point. See discussion *infra* Part III.C.

83. See, e.g., James Anderst et al., *Using Simulation to Identify Sources of Medical Diagnostic Error in Child Physical Abuse*, 52 CHILD ABUSE & NEGLECT 62, 66 (2016); Mark L. Graber, *The Incidence of Diagnostic Error in Medicine*, 22 BRIT. MED. J. ii21, ii25 (2013); Gordon D. Schiff et al., *Diagnostic Error in Medicine: Analysis of 583 Physician-Reported Errors*, 169 ARCHIVES INTERNAL MED. 1881, 1883 (2009).

locked door or undisturbed snow. Quite simply, analyzing such evidence exceeds the expertise of the ME.

Likewise, considering such evidence moves the determination outside the categories of good science or reliable processes demanded by Rule 702 and *Daubert*. There is simply no science behind figuring out what to make of the locked door or the undisturbed snow. And there is no medical data, nor any reliable medical process, to rely upon to aid in the interpretation of this information. It is for this reason that some courts on a case-by-case basis exclude some manner determinations that rely heavily on such information.⁸⁴ What is required is ordinary reasoning from evidence to a conclusion—just what juries are called upon to employ themselves.

Importantly, again, this observation about manner determinations—that they are unscientific and bear no special indicia of reliability—is one that forensic pathologists themselves embrace. Pathologist William Oliver surveyed MEs and found that “most medical examiners accept that their determinations of manner are made with uncertainty.”⁸⁵ He elaborates that, “[b]ecause [manner] is a matter of weighing information for which there may not be much certainty, virtually every serious discussion of manner accepts that in many cases there is no ‘right’ or ‘wrong’ answer.”⁸⁶ He explains that the reason MEs accept unreliability or uncertainty in their manner determinations is because the manner determination is not intended to resolve individual cases, but is “to allow the collection of aggregate statistics from death certificates for public health purposes.”⁸⁷ For that purpose, in most cases the cause and manner of death are obvious and non-controversial. Only the exceptional case is ambiguous. And of these, even smaller numbers are prosecuted as crimes, necessitating ME testimony. But, Oliver points out, for statistical purposes, even “if every single case where the manner is disputed had been incorrectly determined by the

84. See, e.g., *Tyler*, 867 N.W.2d at 177; cases cited *supra* note 37.

85. William R. Oliver, *Intent in Manner Determination*, 2 ACAD. FORENSIC PATHOL. 126, 133 (2012).

86. Oliver et al., *supra* note 41, at 552. Consider an example that Oliver does not use by recurring to our example of the gunshot wound assigned as cause of death. In fact, sometimes it will not be clear on medical principles and training alone whether a gunshot wound was ante-mortem, post-mortem, or peri-mortem. But if medical examination suggests no other cause of death, for statistical and administrative purposes, a medical examiner reasonably could conclude that it was ante-mortem and therefore caused death. Combined with other, non-medical context information, that same reasonable supposition might lead to a manner determination of homicide. Again, that would be fine for many routine purposes outside a courtroom. But within the courtroom, the manner determination would be two-fold separated from what medical science itself could determine in such a case.

87. Oliver et al., *supra* note 41, at 552.

medical examiner or coroner's pathologist, it would be statistically irrelevant. From the perspective of the purpose of manner determination, it simply *does not matter* whether or not some individual case in litigation is determined incorrectly."⁸⁸

This is true as a matter of statistics. But, of course, for the criminal justice system, getting the individual case right is *all* that matters. That is why Oliver calls manner-of-death testimony in litigated cases an "off-label use[]." ⁸⁹

Oliver is not at all alone in that view. An influential *Guide to Manner Determination* published by the National Association of Medical Examiners notes: "It must be realized that when differing opinions occur regarding manner-of-death classification, there is often no 'right' or 'wrong' answer or specific classification that is better than its alternatives."⁹⁰ As we noted above, in 2021, eighty-six prominent death investigators, primarily forensic pathologists, signed a published letter making the same points.⁹¹ They wrote:

Manner determination is not a "scientific" determination. It is a cultural determination that places a death in a social context for the purpose of public health statistics. Manner determination is by no means uniform in practice—for example, at least one large office deems death by drug overdose as "undetermined" with respect to manner, while many others by convention deem such cases "accidental." The criteria are guided by policy promulgated by the National Association of Medical Examiners (NAME) and the Centers for Disease Control and Prevention (CDC). This is why the NAME guidelines explicitly acknowledge that there is no "right" answer in many manner determinations, and that the goal is consistency rather than some nonexistent criteria for correctness. Manner determination is designed to assist public health agencies and the CDC, and it is they who determine what should and should not be considered relevant. The fact that this tool for aggregate statistics often does not fit well in court is not a criticism of manner determination by forensic

88. *Id.* at 553.

89. *Id.*

90. HANZLICK ET AL., *supra* note 4, at 2.

91. Peterson et al., *supra* note 73, at 2542–43.

pathologists. It is instead a criticism of misuse of manner determination by the courts.⁹²

Hence, it will not do to conclude that manner determinations are admissible, as many courts do reflexively, simply because MEs are assigned responsibility by statute to determine both cause and manner of death.⁹³ That rationale wholly ignores the critical question of *why* or *toward what end* MEs are charged with that responsibility. And the MEs themselves tell us, it is for bureaucratic statistic-keeping, the administrative necessity of death certificates (which then have several routine, collateral uses for funeral homes, insurance claims, probate, cessation of public benefits, and so on), and public health and policy reasons—not for generating testimony in contested court cases.

In those contested court cases, too, the epistemological problem hidden in the manner determination becomes easiest to see. All or most of the ordinary, contextual evidence that the ME folds into a manner determination comes from law enforcement officers or prosecutors. These are the natural allies of and frequent collaborators with medical examiners' offices. The ME, the police, and prosecution are local government employees (or a regularly consulted prosecution expert, in the case of some forensic pathologists). They work in harness frequently. For both professional and often personal reasons, then, the risk of a bandwagon or familiarity bias—or just uncritical acceptance of casual information—is very high when an ME receives ordinary, contextual evidence from others in the investigative and prosecutorial apparatus.

Moreover, even an objective ME, or one given to critical assessment, lacks the tools that juries and judges have at their disposal in considering this sort of ordinary evidence, which again they are

92. *Id.* at 2541–42; *see also* Hawes & Mileusnic-Polchan, *supra* note 20, at 22 (“A medicolegal suicide is a classification of professional opinion based on forensic investigative information after a complete investigation. It is never possible to ‘second-guess’ what was in a decedent’s mind; we must rely on explicit or implicit evidence of intent, while acknowledging that there may potentially be more than one interpretation of some evidence.”); Panella, *supra* note 26, at 25 (“For some manners of death, there exists nonuniformity within the medical examiner community with different opinions predicated upon various philosophical views, training or office policy.”).

93. *See, e.g.*, *People v. Yost*, 749 N.W.2d 753, 786 (Mich. Ct. App. 2008) (per curiam) (finding it significant that medical examiners are required by statute to investigate both the cause and manner of death, and thus, “medical examiners must routinely investigate and determine whether the manner of death for a particular person was suicide”); *People v. Unger*, 749 N.W.2d 272, 301 (Mich. Ct. App. 2008) (noting that MEs are required by statute to investigate both cause and manner of death, and concluding that therefore “it is not beyond a forensic pathologist’s area of expertise to offer testimony in the courts of this state concerning both the cause of death and the manner of death”).

as equipped as the medical expert to assess. All of the time-honored safeguards of the trial process—the jurors' oath, the witnesses' oath, confrontation through cross-examination, the rules of evidence, and the adversary's opportunity to introduce competing or contrary evidence—are afforded the fact-finder in a courtroom. None of them are available to the ME, even if she would be inclined to use them. The ME either accepts on faith information from law-enforcement colleagues or, at best, has not the means that jurors and judges have to test that information.

Yet, because that ordinary, contextual evidence often is barely acknowledged or buried in the final opinions of the ME or other medical expert on manner, the implicit determination that this information is true, accurate, or at least highly reliable is invisible. The ME rarely is called upon to answer or explain how she knows what she claims to "know." Provenance is presumed, rather than tested or even addressed honestly.

That epistemological problem finds no justification in the evidentiary rule that experts may rely on information that other qualified experts in the same field reasonably use as a basis of their opinions.⁹⁴ That relaxed rule of information-gathering and reliance for experts is about admissibility, not about epistemology. Not all the information that the expert "has been made aware of" beyond what he personally observed need be admissible, or true.⁹⁵ But nowhere does the rule suggest that its reliability or veracity is unimportant or may be presumed or overlooked. To the contrary, "facts or data" that otherwise would be inadmissible may be disclosed to the jury only if their probative value in helping to evaluate the opinion substantially outweighs their prejudicial effect.⁹⁶

There is the rub. As an epistemological matter, the ME cannot meet the first requirement that this contextual information really consists of "facts." Even if a jury could find that the information is factual, it has little or no probative value when embedded in the very opinion that the jurors must evaluate, for they would be the superior assessors of that contextual information in the first place. The ME has no better training in that role than the jurors or judge, and the latter has the better tools. They also may not labor with the same cognitive biases that familiarity and professional alliance breed.

It is time, then, that legal rule makers and courts take forensic pathologists at their word: manner determinations do not fit the

94. See FED. R. EVID. 703.

95. *Id.*

96. *Id.*

expertise and reliability paradigms established by Rule 702 and *Daubert*. And that applies across the board, in all litigated cases in which manner is at issue. For such manner determinations are not just sometimes dependent on context evidence of unknown reliability, or divergent policies, cultural norms, and standards, but in every case, at least in every disputed case that goes to litigation.

To understand why, consider again what the pathologists themselves have said: “Manner determination is not a ‘scientific’ determination. It is a cultural determination that places a death in a social *context*”⁹⁷ Where does that context come from? Either from non-scientific context information, or from cultural norms—the very stuff juries, not experts, are supposed to consider and apply in the courtroom.⁹⁸ Without context evidence, except perhaps in the rarest of circumstances, no medical expertise can tell anyone, MEs included, whether any death was inflicted by some other person (*i.e.*, a homicide).

An analogy to the pattern-matching forensic disciplines can help make this point. Pattern-matching (fingerprint, shoeprint, tire print, firearms, bitemark, and the like) analysts can compare patterns on evidence from the crime scene and evidence from the accused and find similarities that make it possible (or even likely) that the suspect was the source of the crime-scene evidence. But a determination that the suspect *was* the source always (or nearly always; we cannot rule out every possible odd case) requires additional context information—information that exceeds the analyst’s expertise—to rule out the possibility that the observed similarities were merely a coincidence. Was the accused in the area at the time of the crime, or locked up or otherwise incapacitated? Did the suspect have a motive? Did other evidence place the suspect at the scene? William Thompson explains that analyst opinions about “source probabilities” are problematic because they are “based partly on the examiner’s analysis of the physical characteristics of the items being compared, and partly on the examiner’s assumptions or conclusions about the strength of other evidence that bears on whether the items have a common source.”⁹⁹

Bayesian statistical analysis also can help us understand this point. Again, the insights of forensic pathologist William Oliver are

97. Peterson et al., *supra* note 73, at 2541–42.

98. See Keith A. Findley, *Innocence Protection in the Appellate Process*, 93 MARQ. L. REV. 591, 624 (2009); D. Michael Risinger, *Unsafe Verdicts: The Need for Reformed Standards for the Trial and Review of Factual Innocence Claims*, 41 HOUS. L. REV. 1281, 1291 (2004).

99. William C. Thompson, *How Should Forensic Scientists Present Source Conclusions?*, 48 SETON HALL L. REV. 773, 809 (2018).

instructive. In arguing that contextual information is needed for an ME to make a manner determination, Oliver draws on Bayes's Theorem.¹⁰⁰ In simple terms, Bayes's Theorem teaches that, to make an ultimate determination—what Bayesians call the “posterior odds” of a fact in question—the decisionmaker must take the “prior odds”—that is, the assessed likelihood of the fact in question based on other, pre-existing evidence (*e.g.*, context evidence) and multiply it by the likelihood ratio created by new evidence under consideration. Likelihood ratios are, again in simplified terms, the ratio of the likelihood of seeing a particular piece of evidence if one hypothesis (say, the prosecutor's hypothesis, or the guilt hypothesis) is true divided by the likelihood of seeing the evidence if an alternative hypothesis (the defense hypothesis, or the not-guilty hypothesis) is true.¹⁰¹

In the ME context, the prior probability can be understood as the likelihood that the death was a homicide given the context or background information in the case. The likelihood ratio can then be understood as the strength of the medical evidence, expressed as the likelihood of seeing the particular medical findings if the death was a homicide divided by the likelihood of the medical findings if the death was not a homicide. In the medical context, Oliver explains it this way:

Bayes' theorem notes that the posterior probability of a diagnosis (i.e., the probability of a diagnosis given some evidence) is a function of the prior probabilities of the presence of the diagnosis regardless of the evidence, and the presence of the evidence regardless of the diagnosis These prior probabilities are cohort-specific. History and context are the primary ways in which these cohorts are identified.¹⁰²

This analysis thus makes clear that determining manner of death—that is, reaching an ultimate opinion (in Bayesian terms, assessing posterior odds) on manner of death—*necessarily* requires consideration of prior odds, which unavoidably is based on context evidence. As one of us put it in the context of analyzing broadly the role of forensic expert evidence:

It is the role of the legal fact-finder (judge or jury) to reach ultimate conclusions about guilt or absence of guilt—what

100. Oliver, *supra* note 65, at 651.

101. *See id.*

102. *Id.*

we might think of as an expression of the posterior odds. Theoretically, the legal fact-finder will embark on this task by considering the available relevant evidence in the case to intuit some belief in the prior odds of the defendant's guilt. To that, the testimony of the expert (the forensic analyst) might add an evaluation of the evidence, i.e., a likelihood ratio—that is, an assessment of the likelihood of seeing the particular evidence (the fingerprints, the bullet striations, or the like) if the defendant is the source—which the fact-finder might use intuitively as a multiplier, to arrive at the posterior odds. Breaking down the decision points required to assess the evidence in this way makes it clear that determining the prior odds and the posterior odds is, or least should be, a task reserved for the legal fact-finder, not the forensic analyst. The analyst only adds the likelihood ratio—the likelihood of seeing the particular forensic patterns if the defendant is the source.¹⁰³

Put more simply, ME testimony about manner of death inevitably implicates an opinion about prior odds and posterior odds, and thereby necessarily incorporates ordinary evidence that exceeds the reliability assurances of the expert's expertise and scientific processes.

C. *Unhelpfulness to the Jury*

The foregoing analysis should make it apparent that ME testimony on manner also fails Rule 702 and *Daubert* for another reason, the *Daubert* framework's third requirement: it is not helpful to the jury.¹⁰⁴ Recall that, under Rule 702, even if an expert has reliable expertise, her opinions will be admissible only if they “will help the trier of fact to understand the evidence or to determine a fact in issue.”¹⁰⁵ Certainly, medical expertise can help the jury understand the injuries or illnesses from which an individual suffers, and even help the jury understand whether those medical findings are consistent with homicide or some other action by an accused individual. But the manner determination itself—the conclusion that this was or was not a homicide (or other criminal act)—is different. As the foregoing analysis demonstrates, that determination can only be made on the basis of the medical evidence in combination with the

103. Findley, *Misuse of Statistics*, *supra* note 10, at 647–48.

104. See discussion *supra* Part III.B.

105. FED. R. EVID. 702(a).

non-medical context evidence. But because the jury is fully capable of assessing that non-medical context evidence—the meaning of the locked door or the snow on the porch, or in another case the veracity of a confession or a suicide note or the relationship between victim and accused—expert testimony that depends upon that evidence simply is not helpful. The jurors can assess it themselves.

Because manner determinations *always* will depend at least in part on ordinary, non-medical evidence, determining manner always will include assessment of that ordinary evidence both by the ME and the jury. In effect, although usually unnoticed, that evidence will be double-counted, leading to inappropriate overweighing of the probative value of that evidence. Moreover, because the jury will often be unaware of the ME's reliance on that same ordinary evidence, or at least the extent of that reliance, the jury will be misled by an illusion of independence. To the jury, the ME's opinion will appear to be strong, independent, scientific corroboration of the jury's own assessment of the other evidence in the case, when in fact it may be to a large extent just the ME's own assessment of that same evidence as a thirteenth juror.¹⁰⁶ Moreover, "[t]his problem [is] exacerbated by the fact that when an 'expert' takes the witness stand, preferably in a white lab coat, her testimony takes on a 'mystic infallibility.'"¹⁰⁷

Courts have widely recognized the lack of "helpfulness" as a basis for excluding some manner determinations when they depend on ordinary case evidence. As one court has put it, the general rule is that "if the court or jury is able to draw its own conclusions without the assistance of an expert opinion, the admission of such testimony is not only unnecessary but improper."¹⁰⁸ Typifying this, the Arizona Court of Appeals in *State v. Sosnowicz* held that the ME's manner opinion was inadmissible because the doctor did not rely "on any 'specialized knowledge' to classify the death as a 'homicide' rather than an 'accident.'"¹⁰⁹ Instead, "he based his conclusion that the death was a homicide on the circumstances reported to him by the police. Indeed, Dr. Stano was in no better position to determine the manner of death than was the jury who heard the actual trial testimony of witnesses and had the opportunity to evaluate their

106. For discussions of the double-counting problem and what Simon calls "pseudo corroboration," see Simon, *supra* note 54, at 273; SIMON, IN DOUBT, *supra* note 52, at 181; Findley, *Misuse of Statistics*, *supra* note 10, at 651.

107. Rebecca Brown & Peter Neufeld, *Chimes of Freedom Flashing: For Each Unharmful Gentle Soul Misplaced Inside a Jail*, 76 N.Y.U. ANN. SURV. AM. L. 235, 265 (2021) (quoting *United States v. Addison*, 498 F.2d 741, 744 (D.C. Cir. 1974)).

108. *Cramer v. Theda Clark Mem'l Hosp.*, 172 N.W.2d 427, 429 (Wis. 1969).

109. 70 P.3d 917, 922 (Ariz. Ct. App. 2012).

credibility.”¹¹⁰ To this we add only that because manner determinations inevitably rely on such ordinary evidence in every case, as explained above, the opinions about manner are unhelpful in every case. Again, an ME’s opinion about the medical findings will typically be helpful, but the combination of that expertise-based testimony with ordinary evidence that the jury is fully capable of assessing to reach a manner determination is not.

D. Improper Intrusion into the Core Functions of the Jury

All of this leads to yet another reason why opinion evidence on manner is impermissible: it inevitably intrudes improperly into the core functions of the jury. Courts uniformly carve out some matters that are so central to the jury’s function that no witness is permitted to intrude into them.¹¹¹ Among these central matters is the rule that no witness may testify about the credibility of another witness, and accordingly “expert testimony is not admissible merely to bolster a witness’s credibility.”¹¹² The Iowa Supreme Court in *Tyler* explained the rule this way:

Our system of justice vests the jury with the function of evaluating a witness’s credibility. The reason for not allowing this testimony is that a witness’s credibility “is not a ‘fact in issue’ subject to expert opinion.” Such opinions not only replace the jury’s function in determining credibility, but the jury can employ this type of testimony as a

110. *Id.* The *Sosnowicz* Court went on to cite these additional cases for the same proposition:

As have courts in other jurisdictions under similar circumstances, we conclude that the medical examiner’s testimony was not admissible pursuant to Rule 702. *See, e.g.*, *State v. Vining*, 645 A.2d 20, 21 (Me. 1994) (determining that medical examiner’s testimony that victim’s death was a homicide and not an accident was erroneously admitted: “Her opinion was based solely on her discussions with the police investigators and therefore amounted to an assessment of the credibility and investigatory acumen of the police.”); *State v. Jamerson*, 708 A.2d 1183, 1195 ([N.J.] 1998) (holding that the medical examiner “should not have been permitted to testify that this was a reckless homicide rather than an accidental killing” because “there were circumstances leading up to the accident that were within the understanding of the average juror”); *Bond v. Commonwealth*, 311 S.E.2d 769, 772 (Va.] 1984) (concluding that the medical examiner’s testimony was inadmissible: “The ultimate question was whether the decedent jumped intentionally, fell accidentally, or was thrown to her death. The facts and circumstances shown by the testimony of lay witnesses were sufficient to enable a jury to decide that question. The expert’s opinion was based largely, if not entirely, upon the same facts and circumstances.”).

270 P.3d 917, 923 (Ariz. Ct. App. 2012) (citations omitted in part). To the extent, therefore, that the manner determination might constitute an opinion that the defendant or another witness was lying, it runs afoul of this rule.

111. *See, e.g.*, *infra* notes 112–14 and accompanying text.

112. *State v. Tyler*, 867 N.W.2d 136, 154 (Iowa 2015).

direct comment on defendant's guilt or innocence. Moreover, when an expert comments, directly or indirectly, on a witness's credibility, the expert is giving his or her scientific certainty stamp of approval on the testimony even though an expert cannot accurately opine when a witness is telling the truth. In our system of justice, it is the jury's function to determine the credibility of a witness.¹¹³

More fundamentally and ubiquitously, manner opinions run afoul of the rule that no witness may opine on the guilt or innocence of the accused, because that judgment is reserved for the jury. Courts consistently hold that the final judgment about guilt is reserved solely for the jury.¹¹⁴ To the extent that determining manner of death effectively answers the triable issues related to guilt in a case, such testimony violates this rule.

An analogy to investigating police officers can help make this clear. MEs, as death investigators, serve a role much like that of police—they *investigate* to determine if a crime occurred, and if so, how it occurred. To do so, they may rely on expertise,¹¹⁵ but they will also invariably and appropriately rely on ordinary evidentiary facts. Like MEs, police deploy their expertise and the facts they have amassed to reach a conclusion—an opinion—about criminality in the case. They then forward that conclusion and their opinions to the prosecutor when they refer the case for prosecution. But in the courtroom, police are limited to describing the facts they found in their investigation (or their expert opinions on issues short of guilt); they are never permitted to apply their investigative expertise to the facts they collected and offer an opinion about guilt or about whether a crime occurred.¹¹⁶ It is that same principle that

113. *Id.* (citations omitted) (quoting *State v. Dudley*, 856 N.W.2d 668, 676–77 (Iowa 2014)).

114. *See, e.g.*, *United States v. Wright*, 48 M.J. 896, 901–02 (A.F. Ct. Crim. App. 1998) (“Expert testimony may not be used to determine the credibility of the victim nor may an expert offer an opinion as to the guilt or innocence of the accused.”); *United States v. Thanh Quoc Hoang*, 891 F. Supp. 2d 1355, 1362 (M.D. Ga. 2012) (quoting *Montgomery v. Aetna Cas. & Sur. Co.*, 898 F.2d 1537, 1541 (11th Cir. 1990) (“Although Rule 704(a) abolished the ultimate issue rule, an expert ‘may not, however, merely tell the jury what result to reach. A witness also may not testify to the legal implications of conduct.”); *Stephens v. State*, 774 P.2d 60, 66 (Wyo. 1989) (quoting 3 CHARLES E. TORCIA, *WHARTON’S CRIMINAL EVIDENCE* § 566 (14th ed. 1987) (“[A] witness may not state his opinion as to . . . whether the defendant was guilty or innocent of the crime charged[.]”)).

115. The expertise police and MEs bring to the task will be quite different, but they will each employ a type of expertise.

116. *See, e.g.*, *State v. Steadman*, 855 P.2d 919, 924 (Kan. 1993) (finding error to admit police testimony “that in their opinion the defendant was guilty of the crime and exhibited the pressure felt by a guilty person [and] other persons interviewed were not guilty of the crime . . .”); *State v. Trinidad*, 228 A.3d 1243, 1255–56 (N.J. 2020) (under the rule that “police

drives a rule against ME opinion evidence on manner determinations.

When performing her investigative and bureaucratic functions, the ME actually functions very much like—indeed, typically *in tandem with*—the police. Police officers—but never representatives of the defendant—are often present during the autopsy itself and help shape the ME’s investigation.¹¹⁷ Most of the background and context information MEs rely upon usually comes directly from law enforcement and social service agencies. While such information is often vigorously contested at trial, the ME, not being exposed to those contrary claims, might accept state agency versions of the evidence. But the jury, as fact finder, has an independent duty to assess information, and a far greater opportunity to hear competing information or interpretations of the evidence through contested trial proceedings, and may discount or reject police and ME investigative assumptions and assessments.

E. Violation of Rule 704(b)

This problem of usurping the jury’s core functions now has a specific rule of evidence to underscore it. The Federal Rules of Evidence provide generally that “[a]n opinion is not objectionable just because it embraces an ultimate issue.”¹¹⁸ But this is not so when, in a criminal case, an expert witness proposes to opine on whether the accused did or did not have a mental state or condition that is an element of the crime charged or a defense to it. This the expert may not do, regardless his or her area of expertise.¹¹⁹ Almost

officers may not opine directly on a defendant’s guilt in a criminal case,” it was error for an officer to testify that his investigation led him to conclude that the defendant’s actions “appeared to have been criminal”); *State v. Black*, 745 P.2d 12, 19 (Wash. 1987) (“No witness, lay or expert, may testify to his opinion as to the guilt of a defendant, whether by direct statement or inference.”).

117.

One systemic feature that appears to produce error . . . is that medical examiners long have been close allies of police and prosecutors—frequently partisans, not neutrals. Many allow the police, but not others, to observe autopsies and to influence critical steps in death investigation. They often talk freely to prosecutors, but only grudgingly—if at all—to defense lawyers. In a 2011 survey, 22 percent of medical examiners and coroners reported pressure from government officials to change the cause or manner of death on a certificate.

Peter Neufeld et al., *Thousands of Missed Police Killings Prove We Must Address Systemic Bias in Forensic Science*, WASH. POST (Oct. 15, 2021), <https://www.washingtonpost.com/opinions/2021/10/15/medical-examiners-forensics-bias-police-killings/>.

118. FED. R. EVID. 704(a).

119. FED. R. EVID. 704(b) (“In a criminal case, an expert witness must not state an opinion about whether the defendant did or did not have a mental state or condition that constitutes an element of the crime charged or of a defense. Those matters are for the trier of fact alone.”).

always, when an ME offers an opinion that a death was due to homicide (or accident), he necessarily, if tacitly, is opining on intent, recklessness, or negligence—all elements of a charged offense, typically.

That forensic pathology attempts to limit its manner determination of “homicide” to the non-legal conclusion that a second person was the actor who supplied the cause of death merely strengthens the point that Rule 704(b) excludes that opinion. First, that sort of fine, hair-splitting, definitional distinction between homicide for statistical and other statutory purposes, on the one hand, and legal purposes on the other hand, is likely to be lost on a jury (and may not be a matter of jury instructions by the court). At the very least, this would be a reason to exclude the opinion under Rule 403 because its potential to confuse the jury far outweighs its probative value.¹²⁰ Second, the very definition of homicide for manner determinations concedes that it is an opinion that embraces an element of the offense or a defense, but in a way that conflates the medical examiner’s statutory duties with the different legal offense that the jury must decide. That amounts to a concession that it has no actual probative value in the courtroom. Rule 704(b) exists for exactly that reason. Opinions that merely invite the fact-finder to defer to the conclusions of a stranger to the jury box, in effect to vote by proxy, have no probative value. They tend to prove nothing. Rather, they propose to shift to a non-juror the task of weighing proof.

All of these points explain, too, why the admissibility of even cause-of-death determinations should be considered case by case. Often the cause opinion will not run afoul of the Rules of Evidence and the proper structure of fact-finding in a trial. But on occasion it will. And when non-medical, ordinary evidence underlies an ME’s determination of cause, that opinion is no less contrary to the Rules of Evidence and corrosive of the structural reliance on juries, not government officials, to decide facts and guilt or innocence than when the ME offers manner opinions.

IV. MANNER EVIDENCE RELATED TO OTHER OFFENSES, INCLUDING CHILD ABUSE

Our discussion so far has focused on manner determinations by MEs in death cases. That is most frequently the context in which

120. FED. R. EVID. 403 (“The court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence.”).

these issues are discussed in the cases and the literature. But we want to make clear that the same problems with such opinions as evidence in court apply just as much—truly, often even with more force—in other types of cases in which a physician is called upon to render an opinion about whether a crime occurred, and if so, how it was committed. Most notably, that occurs when child-abuse physicians (or MEs) render opinions that a child was the victim of abuse (sometimes, but not always, leading to death), as in Shaken Baby Syndrome or Abusive Head Trauma (“SBS/AHT”) cases.

Whether a child dies or survives, child-abuse physicians, as well as MEs (in death cases), routinely investigate and render opinions, based upon non-specific medical findings¹²¹ coupled with context evidence, to “diagnose” abuse involving violent shaking or shaking with impact. While these physicians insist that such determinations are medical “diagnoses,”¹²² they clearly go beyond diagnosis to assess manner, and even more specifically, a particular etiology¹²³—that is, they not only diagnose what ails the child’s body and what treatment to prescribe, but also purport to determine what external factors *caused* or were the source of those injuries.¹²⁴ And just like all other manner determinations, the determination of abuse *as the manner of the injury*, or the underlying etiology, depends not just on the physician’s medical expertise and consideration of medical evidence—again, the medical evidence itself that is used to determine SBS/AHT is non-specific—but also on

121. It is universally recognized in the literature that there are no medical findings that are specific for or uniquely diagnostic of abuse, and that indeed all of the diagnostic findings in such cases have multiple known etiologies. See, e.g., Kent P. Hymel et al., *Derivation of a Clinical Prediction Rule for Pediatric Abusive Head Trauma*, 14 PEDIATRIC CRITICAL CARE MED. 210, 212 (2013) (“Gold standard definitional criteria for AHT do not exist.”); *id.* at 217 (“[I]n the absence of a gold standard, clinicians can rarely confirm or exclude AHT with complete certainty”); Sandeep Narang, *A Daubert Analysis of Abusive Head Trauma/Shaken Baby Syndrome*, 11 HOUS. J. HEALTH L. & POL’Y 505 app. at 628 (2011) (listing the numerous conditions or etiologies that can produce subdural hematomas, one of the cardinal findings underlying an SBS diagnosis); *id.* app. at 629 (listing the numerous conditions or etiologies that can produce retinal hemorrhages, the second primary diagnostic finding underlying most SBS/AHT determinations).

122. See Arabinda Kumar Choudhary et al., *Consensus Statement on Abusive Head Trauma in Infants and Young Children*, 48 PEDIATRIC RADIOLOGY 1048, 1051 (2018).

123. See Findley et al., *Feigned Consensus*, *supra* note 17, at 1238 (“The term ‘diagnosis’ is wrong, for these cases do not involve a medical *diagnosis* in the true sense. Rather, they involve a causation inquiry that goes beyond diagnosis, and ventures into etiology—a matter that exceeds the expertise of physicians.”); *id.* at 1238–45 (discussing at length); Randy Papetti, et al., *Outside the Echo Chamber: A Response to the “Consensus Statement on Abusive Head Trauma in Infants and Young Children”*, 59 SANTA CLARA L. REV. 299, 301 (2019) (“SBS/AHT is not a typical medical diagnosis [I]ts dominant function is forensic. It is not a diagnosis made for treatment, but rather to identify abuse—specifically, that the child has been violently shaken or subjected to other severe ‘acceleration-deceleration’ head trauma.”).

124. Findley et al., *Feigned Consensus*, *supra* note 17, at 1238–45.

consideration of non-medical context evidence that jurors are as equipped as a doctor to assess.¹²⁵

Moreover, the SBS/AHT determination inevitably runs afoul of the other rules discussed above, just as does the more general manner-of-death determination. Child-abuse physicians, for example, invariably rely upon information that they have no expertise in assessing: things like confessions,¹²⁶ a parent's demeanor or character,¹²⁷ or the parent's response to the child's condition,¹²⁸ or the caregiver's delay in seeking medical care,¹²⁹ or the veracity of the

125. See *infra* notes 138–144.

126. See generally, e.g., Catherine Adamsbaum et al., *Abusive Head Trauma: Judicial Admissions Highlight Violent and Repetitive Shaking*, 126 PEDIATRICS 546 (2010); Dean Biron & Doug Shelton, *Perpetrator Accounts in Infant Abusive Head Trauma Brought About by a Shaking Event*, 29 CHILD ABUSE & NEGLECT 1347 (2005); George A. Edwards et al., *What Do Confessions Reveal About Abusive Head Trauma? A Systematic Review*, 29 CHILD ABUSE REV. 253 (2020); Suzanne P. Starling et al., *Analysis of Perpetrator Admissions to Inflicted Traumatic Brain Injury in Children*, 158 ARCHIVES PEDIATRIC & ADOLESCENT MED. 454 (2004); Matthieu Vinchon et al., *Confessed Abuse Versus Witnessed Accidents in Infants: Comparison of Clinical, Radiological, and Ophthalmological Data in Corroborated Cases*, 26 CHILD'S NERVOUS SYST. 637 (2010).

127. In foundational literature on “diagnosing” child abuse, Drs. Ray Helfer and Henry Kempe instructed physicians to consider the following as signs of possible abuse:

WHEN THE PARENT:

1. Shows evidence of loss of control, or fear of losing control.
2. Presents contradictory history.
3. Projects cause of injury onto a sibling or third party.
4. Has delayed unduly in bringing child in for care.
5. Shows detachment.
6. Reveals inappropriate awareness of seriousness of situation (either overreaction or underreaction).
7. Continues to complain about irrelevant problems unrelated to the injury.
8. Personally is misusing drugs or alcohol.
9. Is disliked, for unknown reasons, by the physician.
10. Presents a history that cannot or does not explain the injury.
11. Gives specific “eye witness” history of abuse.
12. Gives a history of repeated injury.
13. Has no one to “bail” her (him) out when “up tight” with the child.
14. Is reluctant to give information.
15. Refuses consent for further diagnostic studies.
16. Hospital “shops.”
17. Cannot be located.
18. Is psychotic or psychopathic.
19. Has been reared in a “motherless” atmosphere.
20. Has unrealistic expectations of the child.

Ray E. Helfer & C. Henry Kempe, *The Child's Need for Early Recognition, Immediate Care and Protection*, in *HELPING THE BATTERED CHILD AND HIS FAMILY* 69, 73 (C. Henry Kempe & Ray E. Helfer eds., 1972). No scientific or medical research or data was or has since been cited for the diagnostic value of these factors.

128. “Clinical judgment is used to decide what an appropriate parental response entails. This assessment is subjective and therefore dependent on the clinician's personal biases and previous experience.” Caitlin Farrell et al., *Symptoms and Time to Medical Care in Children With Accidental Extremity Fractures*, 129 PEDIATRICS e128, e132 (2012).

129. See *id.* (“Delay in seeking treatment is frequently cited as behavior that may signal an abusive injury, but no specific definition of ‘delay’ is provided.”).

parent's statements,¹³⁰ and the like. Child abuse physicians invariably also rely on expertise from other domains in which they have no training, like biomechanics and physics.¹³¹ Their opinions therefore depend on assessing matters that exceed their expertise as physicians, and their opinions are not "helpful" to the jury, which is more fully equipped for and appropriately tasked with assessing the ordinary, non-expert evidence. Moreover, to the extent that debate rages about the scientific foundations for the SBS/AHT hypothesis and a physician's ability to determine abuse based on non-specific medical findings, it stumbles on *Daubert's* reliability and scientific-foundation requirements.¹³²

Importantly, the SBS/AHT determination violates the rule that no witness, including an expert, may opine about the guilt of the accused, or about the truthfulness of any witness. Indeed, SBS/AHT violates these prohibitions even more clearly than other manner-of-death determinations. Almost uniquely, in many SBS/AHT cases the expert's opinion is used to satisfy all the legal elements of the prosecution's case—to determine that a crime was committed, with the requisite mental state, and that the accused committed it.¹³³ First, the physician's opinion satisfies the *actus reus* element—what happened—by opining that the child had to have been violently shaken or shaken and slammed.¹³⁴ Second, the physician's testimony then also often satisfies the *mens rea*, or mental state of the perpetrator, element, when the physician opines that the shaking or slamming had to have been so violent it could not have been accidental, but had to have been knowing, or intentional, or reckless, or whatever mental state is required under the charges.¹³⁵ Moreover, because a "diagnosis" of abuse necessarily includes an opinion that the perpetrator inflicted the injuries with

130. See, e.g., Joeli Hettler & David S. Greener, *Can the Initial History Predict Whether a Child with a Head Injury has been Abused?*, 111 PEDIATRICS 602, 602 (2003); Narang, *supra* note 121, at 560 (positing that one of the strongest diagnostic indicators of abuse is if a parent makes statements about what happened that the physicians deems implausible or untrue, i.e., "discrepant" statements).

131. See Keith A. Findley et al., *Shaken Baby Syndrome, Abusive Head Trauma, and Actual Innocence: Getting It Right*, 12 HOUS. J. HEALTH L. & POL'Y 209 231, 236 (2012) [hereinafter Findley et al., *Getting It Right*].

132. See RANDY PAPETTI, *THE FORENSIC UNRELIABILITY OF THE SHAKEN BABY SYNDROME* (2018); Findley et al., *Getting It Right*, *supra* note 131, at 302; Papetti et al., *supra* note 123, at 363–64.

133. See *infra* notes 134–37 and accompanying text.

134. Keith A. Findley, *Flawed Science and the New Wave of Innocents*, in *WRONGFUL CONVICTIONS AND THE DNA REVOLUTION: TWENTY-FIVE YEARS OF FREEING THE INNOCENT* 193 (Daniel S. Medwed ed., 2017); Findley, *Misuse of Statistics*, *supra* note 10, at 650–51; Findley et al., *Feigned Consensus*, *supra* note 17, at 1246.

135. Findley et al., *Feigned Consensus*, *supra* note 17, at 1246–47.

something more than a benign state of mind (otherwise it would not be abuse, but at worst an accident), an SBS/AHT diagnosis violates the explicit command of Rule 704(b) that no witness may opine about the mental state of the accused. And finally, because many child-abuse physicians will testify that a child so injured would become immediately comatose and unresponsive, the expert's opinions will answer the identity question—the person caring for the child at the time of the collapse must have done it.¹³⁶ Because those three elements constitute the entire case, SBS/AHT often constitutes what Professor Deborah Tuerkheimer aptly has described as a “medical diagnosis of murder.”¹³⁷ No other witness is allowed to so fully usurp the role of the jury as ultimate fact-finder in the courtroom.

Some legal authorities are beginning to recognize this problem with SBS/AHT opinion evidence. The American Law Institute (“ALI”), in its newly adopted Restatement on Children and the Law, now explicitly recognizes that determining whether a caregiver “has physically abused a child is a legal determination to be made by the factfinder”—that is, the judge or jury.¹³⁸ The Restatement explains that the role of the expert witness is not to make such determinations but instead is limited to “diagnos[ing] the child’s medical conditions, including for example, broken bones, bruising, internal bleeding, and swelling, as well as the medical consequences of those conditions for the child.”¹³⁹ According to the Restatement:

In addition to allowing a medical expert to render opinions regarding diagnoses of the child’s bodily condition, a court may also allow a medical expert to render opinions regarding the external forces that may have caused the child’s conditions. A medical expert may testify, for example, about whether a child’s injuries are consistent with a parent’s testimony that the child was injured while playing or whether the injuries are consistent with blunt force trauma inflicted by the parent. Determinations regarding the external forces that may have caused the child’s condition exceed the scope of a diagnostic determination,

136. *Id.* at 1248.

137. Deborah Tuerkheimer, *The Next Innocence Project: Shaken Baby Syndrome and the Criminal Courts*, 87 WASH. U. L. REV. 1, 5 (2011); Deborah Tuerkheimer, *Science-Dependent Prosecution and the Problem of Epistemic Contingency: A Study of Shaken Baby Syndrome*, 3 ALA. L. REV. 513, 515–16 (2009); see also DEBORAH TUERKHEIMER, *FLAWED CONVICTIONS: “SHAKEN BABY SYNDROME” AND THE INERTIA OF INJUSTICE* 38 (2014).

138. RESTATEMENT OF CHILDREN AND THE LAW § 3.20 cmt. k (AM. LAW INST. Tentative Draft No. 1, Apr. 6, 2018).

139. *Id.*

however, and therefore the court must separately ascertain that the medical expert has appropriate expertise to render an opinion on such issues and that the opinion is adequately grounded in science.¹⁴⁰

The Reporter's Comment elaborates: "The conclusion that the child's diagnoses were the result of abuse is a decision that should be left solely to the trier of fact."¹⁴¹

Likewise, in *People v. McFarlane*¹⁴² the Michigan Court of Appeals recently applied this limitation in an SBS/AHT case. The court held:

[W]e conclude that in cases involving allegations of abuse, an expert goes too far when he or she diagnoses the injury as "abusive head trauma" or opines that the inflicted trauma amounted to child abuse. The ordinary understanding of the term "abuse"—as opposed to neglect or carelessness—implies a level of willfulness and moral culpability that implicates the defendant's intent or knowledge when performing the act that caused the head trauma. An expert may not offer an opinion on the intent or criminal responsibility of the accused.¹⁴³

The ALI and *McFarlane* court surely are correct about that.¹⁴⁴

Just as ME testimony in death cases can almost always be appropriate and helpful to the jury when constrained to describing and interpreting the *medical* evidence from the examination of the body and associated tests (which will often, but not always, permit opinion testimony about cause, but not manner), so can the child-abuse physician's testimony be appropriate and helpful when limited to describing the medical findings and the various scenarios that *medically could* produce such findings. But they go too far when they purport to "diagnose" abuse—to determine which, among the competing possibilities, was the true external cause of the injuries,

140. *Id.*

141. *Id.* § 3.20 reporter's cmt. k.

142. 926 N.W.2d 339 (Mich. Ct. App. 2018), *appeal denied*, 943 N.W.2d 84 (2020).

143. *Id.* at 350 (citation omitted).

144. Despite its holding banning expert opinions about abusive head trauma or child abuse, the court in *McFarlane* also suggested that physicians may opine that a child's injuries were "inflicted." *Id.* As one of us has noted before, however, "[t]his part of the decision makes little sense . . . because calling an injury 'inflicted' is effectively equivalent to calling it 'abusive.'" Findley et al., *Feigned Consensus*, *supra*, note 17, at 1255 n.190 (quoting *McFarlane*, 926 N.W.2d at 350).

including the state of mind of the third-party perpetrator, and indeed the identity of that perpetrator.

CONCLUSION

Medical examiners, other physicians, and coroners play a critical role in two separate U.S. institutions—the public health system, and the judicial system. While their roles in these two systems overlap, they are in fact distinct. In the public health system, MEs are by law the ultimate fact-finders, who must consider all case evidence of every sort to reach fully informed decisions. In the legal arena, they are not the fact-finders at all, and the rules limit them to offering opinions grounded carefully in their expertise, leaving consideration of non-expert evidence to the proper fact-finders in the courtroom, the jury. Forensic pathologists themselves remind us that, in the public health system, their task is to create aggregate data on cause and manner of death. For that task, getting it right in the individual case, particularly the difficult, ambiguous, and contested case, is of relatively little concern, because those cases make up a tiny proportion of all death investigations—such a small number that they have no significant effect on aggregate statistical data. And for that matter, statistics themselves are not focused on the accuracy of individual instances; by definition, they present broad patterns. But in the legal system, it is the difficult, ambiguous, and contested cases that go to litigation and verdict, and in those individual cases getting it right is all that matters. Manner determinations fit the ME's responsibilities as public health officials but are a misfit for their role as expert witness in the courtroom.

It is past time that courts recognize that, under long-established rules of evidence that protect even older structural roles in trials, manner determinations are for the jury, not the expert. Opinions about manner should be inadmissible in every death case. Moreover, cause-of-death determinations, while generally dependent on medical expertise and discernible from medical expertise, sometimes also are dependent on ordinary, non-medical evidence, and accordingly should be inadmissible in those cases, on a case-by-case basis, as some courts have begun to recognize. Finally, because these principles apply equally to other medical determinations of crime, such as medical opinions about SBS/AHT, those ultimate causation and manner opinions in those cases, when properly understood and analyzed as etiology, not diagnosis, should be inadmissible as well.

On-Screen vs. In Person: How a Tech-Savvy World Is Impacting Jurors' Perceptions of Witnesses

Michael T. Deer*

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* J.D. Candidate, Duquesne University School of Law, 2022; B.A., Political Science, Duquesne University, 2018. I would like to acknowledge Associate Dean Ann L. Schiavone and Professor Katherine L.W. Norton for their input and guidance, as well as my undergraduate professor, Dr. Kristen Coopie, for all of her support. I would also like to express my sincere thanks to my parents and sister.

INTRODUCTION

When speaking to a friend or loved one via video chat, one receives the thrill of seeing that person in real time—without a face-to-face encounter. Video chatting is a popular mechanism in the twenty-first century, as the technology comes in various forms and lives at our fingertips.¹ Whether a family is video chatting with an overseas servicemember during a holiday, a person is attending an online class or work meeting, or someone is seeing his or her doctor by way of a virtual appointment, our notion of “face time” has evolved significantly.² In fact, *Merriam-Webster* now defines “face time” as both “[the] time spent in a face-to-face meeting with someone,” as well as “the amount of time one spends appearing on television.”³

Video chatting technology has forever changed the way we communicate, and its popularity has only grown during the COVID-19 pandemic.⁴ As millions of Americans remained in their homes during the uncertain onset of the lockdown, “videoconferencing” platforms such as Zoom and Microsoft Teams dominated interaction methods for workplaces, schools, and households.⁵

Regardless of our new familiarity with this technology, we must not allow the continued use of virtual communication to jeopardize our constitutional rights. By recognizing that a virtual interaction cannot replicate the experience of a face-to-face encounter, this

1. See Jim Kreyenhagen, *Why Catering to Mobile Users Is Vital for Today's Services*, FORBES (Aug. 30, 2018, 7:30 AM), <https://www.forbes.com/sites/forbescommunicationscouncil/2018/08/30/why-catering-to-mobile-users-is-vital-for-todays-services/>. Today, the smartphone is “[a]n umbilical to everything from the internet, to email, social media, books, banking, bills, games, videos, music and more.” *Id.*

2. In 2014, the younger generation’s reliance on smartphones to communicate led Boston College to establish a course that taught students “how to ask a person out on a date.” Chandra Johnson, *Face Time vs. Screen Time: The Technological Impact on Communication*, DESERET NEWS (Aug. 29, 2014, 4:45 AM), <https://www.deseret.com/2014/8/29/20547284/face-time-vs-screen-time-the-technological-impact-on-communication>.

3. *Face time*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/face%20time> (last visited Oct. 14, 2020). The word “facetiming” evolved from society’s widespread use of video chatting similar to how the word “texting” originated. See *Texting*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/texting> (last visited Oct. 14, 2020). Texting (short for “text messaging”) became a word only a couple decades ago and is defined as “the act or activity of sending text messages from one cell phone to another.” *Id.*

4. See Ann-Marie Alcántara, *Video Chatting Became Popular in 2020, and Improved Along the Way*, WALL ST. J. (Dec. 31, 2020, 10:00 AM), <https://www.wsj.com/articles/video-chatting-became-popular-in-2020-and-improved-along-the-way-11609426800>.

5. See *id.* “Videoconferencing” is defined as “the holding of a conference among people at remote locations by means of transmitted audio and video signals.” *Videoconferencing*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/videoconferencing> (last visited Apr. 19, 2022).

Article stresses the importance of the Sixth Amendment's Confrontation Clause in today's tech-savvy world.

Part I begins with a case law discussion of how the Supreme Court of the United States has treated the practice of live video testimony in criminal cases.⁶ In the landmark case of *Maryland v. Craig*,⁷ Justice Sandra Day O'Connor emphasized that because one's right of confrontation is not absolute,⁸ "one-way closed circuit television" to administer testimony at trial did not violate the accused's Sixth Amendment rights.⁹ Justice O'Connor ultimately held that, "in certain narrow circumstances,"¹⁰ public policy permits the use of such testimony, which allowed a six-year-old victim of sexual abuse to testify via video.¹¹ Part II contrasts the *Craig* majority with the late Justice Antonin Scalia's *Craig* dissent.¹² According to Justice Scalia's textual interpretation of the Confrontation Clause, the right of confrontation is a core constitutional principle that does not allow exceptions of any kind—no matter how minor.¹³ Thus, by contrasting the majority opinion with the dissent, this section highlights that public policy was the deciding factor in *Craig*, as illustrated by the amicus curiae brief filed in that case by the American Psychological Association.¹⁴

Part III introduces data and illustrations showing that humans are prone to misperception when watching someone on-screen.¹⁵ Specifically, this section argues that a jury's perception of an on-screen witness is drastically different than a jury's perception of a witness testifying in the courtroom. As such, transitioning to virtual testimony will be a major change to the traditional method of

6. See discussion *infra* Part I. This Article's references to "live video testimony," "remote testimony," and "virtual testimony" refer to witnesses—fact and expert—testifying via video, outside of the courtroom. By using this method of testimony, a defendant is deprived of the right to confront his or her accuser face-to-face, and a jury is prevented from having an in-person view of a witness.

7. 497 U.S. 836 (1990).

8. *Id.* at 857.

9. *Id.* at 852. *Craig* is the earliest Supreme Court case dealing with both live video testimony of a witness and the Confrontation Clause; hence, it is the foundation of today's public policy push for virtual testimony in criminal trials. See Megan Patituce, *Post-Pandemic Realities: Remote Testimony*, OHIO ASS'N CRIM. DEF. LAWS. (Aug. 7, 2020), https://associationdatabase.com/aws/OACDL/pt/sd/news_article/317201/_PARENT/layout_details/false (indicating that COVID-19 could make "the use of remote [witness] testimony" an important tool at courts' disposal).

10. *Craig*, 497 U.S. at 848.

11. *Id.* at 837–38.

12. See discussion *infra* Part II.

13. *Craig*, 497 U.S. at 863 (Scalia, J., dissenting).

14. See Brief for Amicus Curiae American Psychological Association in Support of Neither Party at 2, *Maryland v. Craig*, 497 U.S. 836 (1990) (No. 89-478) [hereinafter Brief for Amicus Curiae].

15. See discussion *infra* Part III.

jurors evaluating a witness's credibility from the stand.¹⁶ Finally, Part IV addresses the potential risks in allowing across-the-board remote testimony in criminal cases.¹⁷ Although our judicial system currently encompasses many forms of virtual attorney-client interactions and courtroom proceedings,¹⁸ allowing courts to conduct criminal trials through virtual testimony could forever jeopardize the fact-finding process.

I. THE SUPREME COURT'S TAKE ON THE CONFRONTATION CLAUSE

The Sixth Amendment to the United States Constitution reads, in relevant part: "In all criminal prosecutions, the accused shall enjoy the right . . . to be confronted with the witnesses against him."¹⁹ This part of the Sixth Amendment is known as the Confrontation Clause, and many jurists hold that it gives the accused the right to confront his or her accuser face-to-face.²⁰ Two cases examining the Clause are considered below.

Before examining these cases, it is important to note that the Confrontation Clause purportedly has its roots in early Western civilization "under Roman law."²¹ The Framers' "immediate source of the concept, however," originated from England and the common law.²² And as Justice Scalia gathered from Shakespeare's *Richard II* work:

Simply as a matter of Latin as well, . . . the word "confront" ultimately derives from the prefix "con-" (from "contra"

16. Matt Reynolds, *Could Zoom Jury Trials Become the New Norm During the Coronavirus Pandemic?*, A.B.A. J. (May 11, 2020, 8:00 AM), <https://www.abajournal.com/web/article/could-zoom-jury-trials-become-a-reality-during-the-pandemic>.

17. See discussion *infra* Part IV.

18. *How Virtual Meetings Are Changing the Legal Field*, THE RECEPTIONIST, <https://thereceptionist.com/blog/how-virtual-meetings-are-changing-the-legal-field/> (last visited Oct. 23, 2021).

19. U.S. CONST. amend. VI.

20. This assertion tends to be a commonly shared belief by both liberals and conservatives: "This is not a left-right split. This is principle versus pragmatism." David G. Savage, *Criminal Defendants Find an Unlikely Friend in Justice Scalia*, L.A. TIMES (Nov. 24, 2011, 12:00 AM), <https://www.latimes.com/archives/la-xpm-2011-nov-24-la-na-court-scalia-20111125-story.html>. See generally Richard D. Friedman, *The Confrontation Clause Re-Rooted and Transformed*, CATO SUP. CT. REV. 439, 439 (2004) (explaining the Supreme Court's decisive holding in *Crawford v. Washington*, "a testimonial statement cannot be admitted against an accused, no matter how reliable a court may deem it to be, unless the accused has had an adequate opportunity to cross-examine the witness who made the statement.").

21. *Coy v. Iowa*, 487 U.S. 1012, 1015 (1988).

22. *Crawford v. Washington*, 541 U.S. 36, 43 (2004) (finding a Sixth Amendment violation from the prosecution's use of a wife's statement made against her husband during interrogation since the wife did not testify, and the defense could not cross-examine her).

meaning “against” or “opposed”) and the noun “frons” (forehead). Shakespeare was thus describing the root meaning of confrontation when he had Richard the Second say: “Then call them to our presence—face to face, and frowning brow to brow, ourselves will hear the accuser and the accused freely speak”²³

Adding to his argument that the right to confront one’s accuser face-to-face has a deeply embedded historical significance, Justice Scalia quoted *Acts 25:16*, where Paul declared: “It is not the manner of the Romans to deliver any man up to die before the accused has met his accusers face to face, and has been given a chance to defend himself against the charges.”²⁴

To a certain degree, the Framers’ understanding of the Confrontation Clause seems rather clear.²⁵ The present meaning, however, is more difficult to define in a world with advanced video technology.²⁶

A. *The Coy Decision*

In *Coy v. Iowa*, the United States Supreme Court gave its early take on the Confrontation Clause with a dispute involving the placement of a large screen that blocked a criminal defendant, John Avery Coy (“Coy”), from confronting his accusers.²⁷ In a six-to-two ruling strictly interpreting the Confrontation Clause,²⁸ Justice Scalia explained:

The Confrontation Clause does not, of course, compel the witness to fix his eyes upon the defendant; he may studiously look elsewhere, but the trier of fact will draw its own conclusions. Thus, the right to face-to-face confrontation serves much the same purpose as a less explicit component

23. *Coy*, 487 U.S. at 1016 (quoting WILLIAM SHAKESPEARE, *RICHARD II* act 1, sc. 1, l. 15).

24. *Id.* at 1015–16 (quoting *Acts 25:16*).

25. *But see* Jeremy A. Blumenthal, *Reading the Text of the Confrontation Clause: “To Be” or Not “To Be”?*, 3 U. PA. J. CONST. L. 722, 747 (2001) (“[I]t is not true that literal face-to-face confrontation is the core of this Sixth Amendment right. If it were, such language was available to James Madison when he drafted the amendments and could easily have been incorporated into what is now the Sixth Amendment.”).

26. *See generally* Russell Kostelak, *Videoconferencing Technology and the Confrontation Clause* 1 (Cornell L. Sch. J.D. Student Rsch. Papers, Paper No. 33, 2014), https://scholarship.law.cornell.edu/lps_papers/33 (“[F]ederal courts have promulgated different avenues for the allowance of this technology . . . [a]s long as these routes provide a measure of access, the future of videoconferencing technology may lie in the hands of the general public[.]”).

27. *Coy*, 487 U.S. at 1014.

28. *Id.* at 1013. Justice Scalia regarded a strict interpretation of the Confrontation Clause as fundamental to securing its legitimacy. *Id.* at 1017.

of the Confrontation Clause that we have had more frequent occasion to discuss the right to cross-examine the accuser; both “ensur[e] the integrity of the fact-finding process.”²⁹

The *Coy* Court had to decide whether a large screen apparatus obstructing the defendant’s view of his accusers violated his right of confrontation under the Sixth Amendment.³⁰ *Coy* was charged with sexually assaulting a pair of thirteen-year-old girls while they were tent camping at a “house next door to him.”³¹ The girls stated that *Coy* had entered their tent with “a stocking over his head . . . [and] shined a flashlight in their eyes . . . warn[ing] them not to look at him”³² The case raised a Sixth Amendment debate when the girls sought protection under an Iowa statute that allowed “complaining witnesses to testify either via closed-circuit television [(“CCTV”)] or behind a screen.”³³ The state of Iowa argued that the statute “create[d] a presumption of trauma to victims of sexual abuse that outweigh[ed]” *Coy*’s right of confrontation.³⁴ Specifically, the State claimed that, because the girls suffered severe trauma as a result of the incident, the “witnesses needed special protection” to give their grueling testimony.³⁵

Coy, however, argued that the Confrontation Clause granted him the right to confront his accusers face-to-face under the Sixth Amendment.³⁶ *Coy* also claimed that “the screen created a strong and prejudicial inference of guilt, violating his right to a fair trial.”³⁷ The Iowa Supreme Court disagreed with *Coy*’s position, finding it “noteworthy although not constitutionally significant that” the girls could not see *Coy* because he could still “see and hear the girls”³⁸ The court supported its reasoning by articulating that “*Coy*’s attorney cross-examined both girls fully and without limitation[,]” and both girls’ testimony “occurred in court and in full view of the judge and jury,” with “both girls [having] testified under oath.”³⁹

29. *Id.* at 1019–20 (alteration in original).

30. *Coy*, 487 U.S. at 1014.

31. *Id.*

32. *Id.*

33. *Id.* CCTV is a secured system that transfers a video signal to a monitor. See Nat’l Ctr. for Prosecution of Child Abuse, *Closed-Circuit Television Statutes*, NAT’L DIST. ATT’YS ASS’N 1 (2012), <https://ndaa.org/wp-content/uploads/CCTV-2012.pdf>.

34. *Coy*, 487 U.S. at 1012.

35. *Id.*

36. See *id.* at 1015.

37. *State v. Coy*, 397 N.W.2d 730, 733 (Iowa 1986).

38. *Id.* at 734.

39. *Id.*

Later, in a complete reversal by the United States Supreme Court, Justice Scalia said that “[t]here is no merit to the State’s assertion that . . . a presumption of trauma to victims of sexual abuse . . . outweighs [an] appellant’s right to confrontation [I]t would have to be based on something more than the type of generalized findings asserted here”⁴⁰ The Court expressed that face-to-face confrontation “contributes to the establishment of a system of criminal justice in which the perception as well as the reality of fairness prevails.”⁴¹ Justice Scalia also declared that “there is something deep in human nature that regards face-to-face confrontation between [the] accused and accuser as ‘essential to a fair trial in a criminal prosecution.’”⁴² Accordingly, the Court reversed the Iowa Supreme Court’s decision and remanded the case.⁴³

However, because *Coy* was decided without having a sincere public policy debate,⁴⁴ it set the backdrop for another influential Confrontation Clause case, *Maryland v. Craig*.⁴⁵ The *Coy* Court also failed to state whether there are any exceptions to the Confrontation Clause,⁴⁶ but left open the possibility of allowing exceptions to the Clause that “further[ed] an important public policy”⁴⁷ *Craig* ultimately delivered on that possibility.

B. *The Craig Decision*

In *Maryland v. Craig*, the Supreme Court decided whether the Confrontation Clause prohibited the testimony of a witness via one-way CCTV at trial.⁴⁸ Similar to *Coy*, the factual scenario in *Craig* dealt with a disturbing case involving the sexual abuse of a child.⁴⁹ The *Craig* victim was a six-year-old girl who attended a preschool and kindergarten center owned and operated by the criminal defendant, Sandra Ann Craig (“Craig”).⁵⁰ A grand jury decided that there was sufficient evidence to charge Craig with several offenses,

40. *Coy*, 487 U.S. at 1012.

41. *Id.* at 1019 (quoting *Lee v. Illinois*, 476 U.S. 530, 540 (1986)).

42. *Id.* at 1017 (quoting *Pointer v. Texas*, 380 U.S. 400, 404 (1965)).

43. *Id.* at 1022.

44. See Brief for Amicus Curiae, *supra* note 14, at 2 (“In *Coy v. Iowa*, this Court did not decide whether a criminal defendant’s Sixth Amendment right to a literal face-to-face confrontation . . . [permits] . . . exceptions to protect compelling state interests. The Court also did not decide whether . . . protecting child victim-witnesses from emotional distress constitutes such an interest.”) (citation omitted).

45. 497 U.S. 836.

46. See *Coy*, 487 U.S. at 1025 (O’Connor, J., concurring).

47. *Id.* at 1021 (citing *Ohio v. Roberts*, 448 U.S. 56, 64 (1980)).

48. See *Craig*, 497 U.S. at 840.

49. *Id.*

50. *Id.*

including child abuse, first- and second-degree sexual offenses, unnatural and perverted sexual practice, and common law assault and battery—all in connection with the sole victim.⁵¹

The pivotal issue in *Craig* mirrored that in *Coy*, when the trial court granted the witness's request to testify without the defendant being present, thereby sparking a Sixth Amendment debate.⁵² Particularly, the *Craig* victim sought protection under a Maryland statute that granted a child witness permission to testify via one-way CCTV at trial.⁵³ The statute's purpose was to protect a child witness from "suffering serious emotional distress" when testifying, and allowing such testimony was at the discretion of the trial court.⁵⁴ The victims in *Coy* and *Craig* stressed the need for slightly altered testimony because, on its face, compelling sexually abused children to confront their abusers in a courtroom is difficult and potentially harmful to the child.⁵⁵ According to studies conducted by the Committee on Psychosocial Aspects of Child and Family Health about the impact of children testifying, "children experience anxiety surrounding court appearances and . . . [their] main fear is facing the defendant."⁵⁶ Fears of "being hurt by the defendant, embarrassment about crying or not being able to answer questions, and going to jail" are more factors to consider when having a child victim testify in abuse cases.⁵⁷

Despite considering analogous facts in *Coy* and *Craig*, the Supreme Court reached different conclusions in the two cases.⁵⁸ The Court began its analysis in *Craig* by explaining that, under the Maryland statute, if the trial court finds that the "victim [being] in the courtroom will . . . [cause] serious emotional distress such that the child cannot reasonably communicate[.]"⁵⁹ then "the child, prosecutor, and defense counsel [must] withdraw to another room,

51. *Id.*

52. *Id.* at 842.

53. *Id.* at 841.

In a case of abuse of a child . . . a court may order that the testimony of a child victim be taken outside the courtroom and shown in the courtroom by means of a closed circuit television if . . . [t]he judge determines that testimony by the child victim in the courtroom will result in the child suffering serious emotional distress such that the child cannot reasonably communicate.

Id. at 841 n.1 (quoting MD. CODE ANN., CTS. & JUD. PROC. § 9-102(a)(1)(ii) (repealed 1996)).

54. *Id.* (quoting MD. CODE ANN., CTS. & JUD. PROC. § 9-102(a)(1)(ii) (repealed 1996)).

55. See Robert H. Pantell et al., *The Child Witness in the Courtroom*, AM. ACAD. OF PEDIATRICS (Mar. 1, 2017), <https://pediatrics.aappublications.org/content/139/3/e20164008>.

56. *Id.*

57. *Id.*

58. See *Craig*, 497 U.S. at 845.

59. *Id.* at 841 (quoting § 9-102(a)(1)(ii)).

where the child is examined and cross-examined”⁶⁰ During this time, “the judge, jury, and defendant remain in the courtroom, where the [child’s] testimony is displayed.”⁶¹

Taking this procedure into account, the Supreme Court rejected Craig’s argument that the use of CCTV to administer the child’s testimony violated her right of confrontation.⁶² The Court reinforced the trial court’s initial ruling that “Craig retained *the essence of the right to confrontation*” by such method,⁶³ and recognized the occasional need to uphold public policy when there is “a case-specific finding of necessity”⁶⁴ The Court strongly emphasized, however, that this limitation should only be granted “in certain narrow circumstances,”⁶⁵ with the objective of “further[ing] an important state interest”⁶⁶ The trial court must find that the emotional distress suffered by the child witness in the presence of the defendant is more than . . . “mere nervousness or excitement or some reluctance to testify.”⁶⁷

In a five-to-four decision,⁶⁸ Justice O’Connor wrote that the application of the Maryland statute must focus on the “effect” of the defendant’s presence on child witnesses, but refused to establish any evidentiary prerequisites for allowing CCTV.⁶⁹ Justice O’Connor ruled that the Court “need not decide the minimum showing of emotional trauma”⁷⁰ Rather, the Court need only determine that “face-to-face confrontation causes significant emotional distress in a child witness,”⁷¹ which would warrant slightly altered testimony given via video.

With this conclusion, the Court vacated the decision by Maryland’s state court of last resort and remanded the case with its newly established ruling.⁷² Ultimately, the *Craig* decision underlined two points: (1) public policy plays a substantial role in the outcome of judicial decisions (especially when dealing with the well-

60. *Id.* at 841.

61. *Id.* at 836.

62. *Id.* at 852.

63. *Id.* at 836 (emphasis added).

64. *Id.* at 860.

65. *Id.* at 848.

66. *Id.* at 837.

67. *Id.* at 855.

68. *Id.* at 838.

69. *See id.* at 860.

70. *Id.* at 856.

71. *Id.* at 857.

72. *Id.*

being of children); and (2) one-way CCTV seemingly became the pioneer of remote testimony in criminal trials.⁷³

II. THE *CRAIG* MAJORITY VS. THE *CRAIG* DISSENT

Initially, it is important to note that two years before Justice O'Connor's majority opinion in *Craig*, she issued a concurring opinion in *Coy* that read: "Child abuse is a problem of disturbing proportions in today's society. Just last Term, we recognized that '[c]hild abuse is one of the most difficult problems to detect and prosecute, in large part because there often are no witnesses except the victim.'"⁷⁴ Because of this harsh reality, a child victim's testimony is pivotal to the prosecution's case against the abuser.⁷⁵ At the same time, though, safeguarding the child's physical and mental well-being is also a priority, as held by Justice O'Connor in *Craig*.⁷⁶

After the *Coy* decision, Justice O'Connor reinforced public policy's limited—albeit important—role in *Craig* by holding that "a defendant's right to confront accusatory witnesses may be satisfied absent a physical, face-to-face confrontation at trial only where [the] denial of such . . . is necessary to further an important public policy . . ." ⁷⁷ As evidenced by the concurring opinion in *Coy*, "[t]he protection of child witnesses is . . . just such a policy."⁷⁸ Recognizing a need for sexually abused children to testify in a slightly different manner when "testimony by the child victim . . . will result in the child suffering serious emotional distress[,] "⁷⁹ Justice O'Connor rested her decision on empirical studies suggesting that young children may be permanently harmed by testifying:⁸⁰

By the intermediate (late elementary) grades, most children have an appreciation of the nature and purpose of the adversary system and an understanding of many legal concepts. However, preschool and primary grade children often comprehend no more than the most rudimentary legal concepts (*i.e.*, police and judge), if any. . . . Given the fact

73. See Ian A. Mance & John Rubin, *COVID-19 and Remote Testimony in Criminal Trials*, N.C. ADMIN. JUST. BULL. 1, 3 (2020) (explaining that the *Craig* decision "continues to guide courts' evaluation of the admissibility of remote video testimony").

74. *Coy v. Iowa*, 487 U.S. 1012, 1022 (1988) (O'Connor, J., concurring) (alteration in original) (quoting *Pennsylvania v. Ritchie*, 480 U.S. 39, 60 (1987)).

75. Brief for Amicus Curiae, *supra* note 14, at 18.

76. *Craig*, 497 U.S. at 853.

77. *Id.* at 850 (emphasis added) (citing *Coy*, 487 U.S. at 1021).

78. *Coy*, 487 U.S. at 1025 (O'Connor, J., concurring); Brief for Amicus Curiae, *supra* note 14, at 4.

79. *Craig*, 497 U.S. at 841 (quoting MD. CODE ANN., CTS. & JUD. PROC. § 9-102(a)(1)(ii)).

80. See *id.* at 855.

that ambiguity generally fosters anxiety, young children's lack of understanding of the legal process is likely to add to the stress that they experience when they testify.⁸¹

In addition, Justice O'Connor appears to have relied on research showing that "the most frequent fear expressed by children awaiting testimony is a fear of facing the defendant."⁸² For younger children specifically, such as the six-year-old *Craig* victim, research has shown that "[t]he period during which child sexual assault victims are involved in legal proceedings represents a time of special stress for them[.]"⁸³ which "can slow the course of normal cognitive and emotional development . . ."⁸⁴ Hence, it appears that after considering the short-term and potential long-term effects of sexually abused children testifying in front of their abusers,⁸⁵ Justice O'Connor granted a narrow exception that allowed a child victim to testify via one-way CCTV.⁸⁶

In stark contrast, Justice Scalia was quick to express his disagreement with the majority's public policy rationale in his dissent in *Craig*.⁸⁷ Beginning with "[s]eldom has this Court failed so conspicuously to sustain a categorical guarantee of the Constitution against the tide of prevailing current opinion[.]"⁸⁸ Justice Scalia pressed that "the Constitution is meant to protect against . . . 'current widespread belief,'" not conform to it.⁸⁹ He wrote that the purpose of including the Confrontation Clause "in the Constitution was to assure that none of the main policy interests from time to time . . . could [ever] overcome a defendant's right to face his or her accusers in court."⁹⁰ Justice Scalia further argued that the protection offered by the Maryland statute fell squarely within the State's

81. Brief for Amicus Curiae, *supra* note 14, at 8. For a collection of empirical studies, see *id.* at 8 n.15.

82. *Id.* at 9–10.

83. *Id.* at 7.

84. *Id.*

85. See *id.* at 9 (citing Gail S. Goodman et al., *The Emotional Effects on Child Sexual Assault Victims of Testifying in Criminal Court*, FINAL REP. TO THE NAT'L INST. OF JUST., U.S. DEP'T OF JUST. (1989)). "[C]hildren who testified in criminal court . . . compared to that of a matched group of children who were also involved as alleged victims in child sexual assault prosecutions but who did not have to testify . . . evidenced significantly greater distress 7-months post-testimony as well as after the final disposition of their cases." *Id.*

86. *Maryland v. Craig*, 497 U.S. 836, 855 (1990).

87. *Id.* at 860 (Scalia, J., dissenting).

88. *Id.*

89. *Id.* at 861.

90. *Id.*; see also Bryan H. Wildenthal, *The Right of Confrontation, Justice Scalia, and the Power and Limits of Textualism*, 48 WASH. & LEE L. REV. 1323, 1344–61 (1991) (providing an in-depth, methodical outline of Justice Scalia's dissent in *Craig*).

control⁹¹—that is, if a child would suffer severe emotional distress if asked to testify in court, “[w]hy would a prosecutor want to call a witness who cannot reasonably communicate? [I]f he did, it would be the State’s own fault.”⁹² According to Justice Scalia, the majority incorrectly believed that allowing children to testify via CCTV would solve “the physical and psychological well-being” impact associated with confrontation.⁹³ The Maryland statute was based entirely on the child’s unwillingness “to testify in the presence of the defendant[,]”⁹⁴ and “[t]hat unwillingness cannot be a valid excuse under the Confrontation Clause, whose very object is to place the witness under the sometimes hostile glare of the defendant.”⁹⁵

Despite the Court’s history of refusing to limit one’s right of confrontation, the Court was prepared to adopt a narrowly drawn exception in *Craig*.⁹⁶ One of the key takeaways from Justice O’Connor’s opinion is that “‘the Confrontation Clause reflects a *preference* for face-to-face confrontation at trial[,]’ . . . a preference that ‘must occasionally give way to considerations of public policy and the necessities of the case.’”⁹⁷ Regardless of this narrow ruling established in *Craig*, the traditional method of witnesses giving in-person trial testimony could presently be under attack by widespread remote testimony.⁹⁸

III. PERCEPTION: ON-SCREEN VS. IN PERSON

A. *The First Kennedy-Nixon Debate*

The year was 1960, and the stakes could not have been higher. In a race to become the next president of the United States during the peak of the Cold War, John F. Kennedy (then a junior senator from Massachusetts) and Richard M. Nixon (then vice president) debated each other on live television in front of seventy million

91. *Craig*, 497 U.S. at 867 (Scalia, J., dissenting).

92. *Id.*

93. *Id.*

94. *Id.* at 866.

95. *Id.*

96. *See id.* at 857.

97. *Id.* at 849 (quoting *Ohio v. Roberts*, 448 U.S. 56, 63 (1980); *Mattox v. United States*, 156 U.S. 237, 243 (1895)).

98. *See generally* Michael Gentithes, *Confrontation Rights and COVID-19*, APP. ADVOC. BLOG (Sept. 22, 2020), https://lawprofessors.typepad.com/appellate_advocacy/2020/09/confrontation-rights-and-covid-19.html (“[I]t seems likely that frequent remote testimony would not meet with Supreme Court approval if used beyond *Craig*’s circumstances.”).

viewers.⁹⁹ This was the first televised presidential debate in American politics.¹⁰⁰ Both candidates brought unique qualifications to the race, but many scholars and historians believe that the first debate “tipp[ed] the 1960 election in the Democrat’s favor.”¹⁰¹

Heading into the debate, Nixon held a comfortable lead in the national polls and was the clear favorite to win the White House.¹⁰² Nixon’s tenure of serving two terms as vice president under the popular Eisenhower administration had given him national recognition and a major advantage over Kennedy.¹⁰³ Also in 1959—one year before the first Kennedy-Nixon debate—Nixon and Soviet Union leader Nikita Khrushchev debated capitalism and communism in the famously staged American kitchen in Moscow.¹⁰⁴ Once the debate aired on television in the United States and the Soviet Union, Nixon’s brilliant performance of showcasing capitalism landed him global recognition.¹⁰⁵

Yet, the following year at the first presidential debate, Nixon’s on-camera appearance cast major doubt on his presidential hopes.¹⁰⁶ Despite his many accolades and popularity, tens of millions of viewers saw Nixon as “ill, having been recently hospitalized because of a knee injury.”¹⁰⁷ Moreover, and unknown to viewers, Nixon “re-injured his knee as he entered the TV station, and refused

99. NCC Staff, *How the Kennedy-Nixon Debate Changed the World of Politics*, NAT’L CONST. CTR.: CONST. DAILY (Sept. 26, 2017), <https://constitutioncenter.org/blog/the-debate-that-changed-the-world-of-politics>.

100. *The Kennedy-Nixon Debates*, HISTORY (June 10, 2019), <https://www.history.com/topics/us-presidents/kennedy-nixon-debates>.

101. Paul Guggenheimer, *A Lot Has Changed Since Kennedy and Nixon’s First Nationally Televised Presidential Debates*, TRIBLIVE (Oct. 22, 2020, 12:01 AM), <https://triblive.com/news/a-lot-has-changed-since-kennedy-and-nixons-first-nationally-televised-presidential-debates/>. According to Dr. Kristen Coopie, Director of Pre-Law and Professor of Political Science at Duquesne University, the impact of the first televised debate was everlasting. Dr. Coopie said the campaigns realized that “it’s not just about what you say, it’s how you say it, it’s how you look when you say it, it’s how you act when you say it.” *Id.*

102. See NCC Staff, *supra* note 99.

103. President Dwight Eisenhower’s average job approval rating was 65%, which is one of the highest averages in the modern presidential era. *Presidential Approval Ratings – Gallup Historical Statistics and Trends*, GALLUP, <https://news.gallup.com/poll/116677/presidential-approval-ratings-gallup-historical-statistics-trends.aspx> (last visited Dec. 31, 2020).

104. See William Safire, *The Cold War’s Hot Kitchen*, N.Y. TIMES (July 23, 2009), <https://www.nytimes.com/2009/07/24/opinion/24safire.html>. This famous debate became known as the “Kitchen Debate”; see also Molly Hall, *Watch the Heated 1959 “Kitchen Debate” Between Nixon and Khrushchev*, PBS (Feb. 18, 2019), <https://www.pbs.org/wgbh/roadshow/stories/articles/2019/2/18/watch-the-kitchen-debate-of-1959> (stating that the Kitchen Debate “was a relic of a crucial Cold War event that captured the world’s attention”).

105. Jennifer Latson, *When Khrushchev Said No to Pepsi but Yes to Peace*, TIME (July 24, 2015, 10:30 AM), <https://time.com/3961121/khrushchev-nixon-kitchen-debate/>.

106. NCC Staff, *supra* note 99.

107. *Id.*

to call off the debate.”¹⁰⁸ Then, when offered, Nixon refused to wear stage makeup, which made him appear “pale and tired, with a five o’clock shadow beard.”¹⁰⁹ Kennedy, on the other hand, wore stage makeup and looked tan, young, and photogenic, all of which undoubtedly gave him a boost in the polls the following day.¹¹⁰ In fact, Kennedy beat Nixon on November 8, 1960, by a little more than one hundred thousand votes out of nearly sixty-nine million votes cast.¹¹¹ The margin of victory was a slim 49.7% to 49.5%.¹¹² The fascinating part, however, is that “most radio listeners called the first debate a draw or pronounced Nixon the victor,”¹¹³ which showed the weight one’s on-screen appearance had on an audience’s perception.

These results not only support the premise that Nixon’s unfavorable television appearance worked against him, but they also suggest that one’s on-screen perception of another person is a major factor to consider.¹¹⁴ Not many Americans envisioned that a live televised debate would have had the ability to influence the outcome of a presidential election, but the first Kennedy-Nixon debate illustrated exactly that.¹¹⁵ Indeed, the same argument can be made for jurors watching a witness testify via video at trial. Because data suggests that one’s on-screen perception of another can be deceiving, it is vital for a jury to have an in-person view of a witness.¹¹⁶

B. *Jurors Are Highly Attentive to Witnesses’ Behavior*

Studying juries and the actions of jurors is a difficult task. Much of the cognitive science available is derived from simulated jury trials and nonlegal settings.¹¹⁷ Regardless, jurors are instructed to

108. *Id.*

109. *Id.*

110. *See id.* “Before the debate, Nixon led by six percentage points in the national polls,” but ended up losing to Kennedy in November by one of the slimmest margins on record. *Id.*

111. *1960 Presidential Election Results*, JFK PRESIDENTIAL LIBR. & MUSEUM, <https://www.jfklibrary.org/learn/about-jfk/life-of-john-f-kennedy/fast-facts-john-f-kennedy/1960-presidential-election-results> (last visited Mar. 25, 2021).

112. *Id.*

113. *The Kennedy-Nixon Debates*, *supra* note 100.

114. Guggenheimer, *supra* note 101.

115. *See* Greg Botelho, *The Day Politics and TV Changed Forever*, CNN (Mar. 14, 2016, 8:21 AM), <https://www.cnn.com/2016/02/29/politics/jfk-nixon-debate>.

116. *See* Paula Hinton & Tom Melsheimer, *The Remote Jury Trial Is a Bad Idea*, LAW360 (June 9, 2020, 5:33 PM), <https://www.law360.com/articles/1279805> (“You can see the attorney’s reaction to the witness’s answer. You can see the witness’s leg shaking. You can see an associate frantically writing a note to the partner. All of these observations are part of the decision-making process in a live jury trial.”).

117. *See* Lance Stockwell & David C. Schrader, *Factors That Persuade Jurors*, 27 U. TOL. L. REV. 99, 104 (1995).

consider the evidence presented to them at trial, which largely constitutes the testimony of witnesses.¹¹⁸ Because of this, the course of a jury trial consists of many verbal and nonverbal behaviors of witnesses that potentially impact the outcome of any given case.¹¹⁹ Consider watching the Super Bowl or a concert on television versus attending the event in person.¹²⁰ When watching from a screen, “you are at the mercy of the camera operator and producer. You see what the camera operator and producer want you to see. But when you are at the game . . . you have the ability to observe what you believe to be important.”¹²¹

This section overviews a handful of studies that illustrate jurors’ perceptions of witnesses. Although simulated, the studies were conducted as real jury trials would have proceeded.¹²² The point of the studies is to show how attentive jurors are to (1) witnesses, (2) witnesses’ credibility—whether testifying in person or remotely—and (3) nonverbal gestures generally.¹²³

1. *Verbal & Nonverbal Behaviors of Witnesses Study*

In the first study, researchers at Oklahoma State University explained the verbal and nonverbal characteristics “jurors [notice] about trial participants.”¹²⁴ The study was composed of two simulated criminal trials with law students playing advocates, the instructor sitting as judge, and twenty-eight undergraduate students volunteering as jurors.¹²⁵ The following behaviors of witnesses

118. See, e.g., *How Courts Work*, A.B.A. (Sept. 9, 2019), [https:// www.americanbar.org/groups/public_education/resources/law_related_education_network/how_courts_work/juryinstruct/](https://www.americanbar.org/groups/public_education/resources/law_related_education_network/how_courts_work/juryinstruct/). Emphasizing the weight of witness testimony, “[t]he judge will advise the jury that it is the sole judge of the facts and of the credibility (believability) of witnesses. He or she will note that . . . the opening and closing arguments of the lawyers are not evidence.” *Id.*

119. See Janet Lee Hoffman & Andrew Weiner, *The Juror as Audience: The Impact of Non-Verbal Communication at Trial*, 32 OR. STATE BAR LITIG. J. 1, 2 (2013).

120. Hinton & Melsheimer, *supra* note 116.

121. *Id.*

122. The simulations had all the components of a typical jury trial: a sitting judge, jurors, and both parties’ counsel were all present in the courtroom. See discussion and sources cited *infra* Parts III.B.1, III.B.2.

123. Hoffman & Weiner, *supra* note 119, at 1. For example, before becoming an attorney, one juror took part in a three-week jury trial where he noted:

I was struck at the time by the extent to which I was drawn to and distracted by the non-verbal, non-testimonial information conveyed each day during the proceeding. I found myself observing not only the participants in the proceeding itself but also the spectators in the gallery. I remember taking notice of one testifying expert who returned most days to watch the trial unfold. On days he failed to show up, I wondered if that day’s testimony was less important.

Id.

124. Stockwell & Schrader, *supra* note 117, at 104.

125. *Id.*

played a key role in the mock juries' verdicts: (1) vocal immediacy (i.e., fluency, tempo, pleasantness, loudness, and pitch); (2) "kinesic [*sic*] immediacy" (i.e., gestures and facial expressions); and (3) proxemic immediacy (i.e., body lean).¹²⁶ The authors also studied verbal style and verbal content, both of which proved to be significant in determining winning lawyers, but were less significant in determining the credibility of witnesses.¹²⁷

The study ultimately found that the witnesses on the winning side "were more fluent, more vocally pleasant, spoke louder, and used more gestures than the losing witnesses."¹²⁸ These results supported the idea that "vocal immediacy in witnesses was most important in the jurors' minds."¹²⁹ The most interesting part of the study, though, involved the disparity between jurors' perceptions of lawyers and that of witnesses.¹³⁰ According to that analysis, jurors viewed witnesses that used more gestures and exhibited better vocal immediacy as more credible, while disfavoring lawyers that conveyed too much forward body leaning and had an overpowering voice.¹³¹ The authors correlated this observation to lawyers having free roam of the courtroom and appearing more comfortable than witnesses confined to a chair on the stand,¹³² which jurors seemed to take into account when evaluating demeanor.¹³³ Accordingly, the following inferences can be drawn from this study: (1) jurors are more critical of witnesses' behavior than that of lawyers'; and (2) even the most subtle behaviors of a witness are crucial to the fact-finding process, which, when taken as a whole, would be difficult to capture via video.¹³⁴

Further, some studies note that as much as 93% of human interaction is nonverbal, but that number is often refuted.¹³⁵ Today, many psychologists follow the "55/38/7 formula."¹³⁶ That is, "55% of communication is body language, 38% is the tone of voice, and 7%

126. *Id.* at 107.

127. *Id.* at 109. ("Verbal style, as well as the content of the evidence and testimony . . . was not a factor in differentiating between winning and losing witnesses.")

128. *Id.* at 107.

129. *Id.*

130. *Id.* at 108.

131. *Id.* at 106–07.

132. *Id.* at 108.

133. *Id.*

134. Hinton & Melsheimer, *supra* note 116.

135. Kelly Strain, *How Much of Communication Is Really Nonverbal?*, PREMIERE GLOB. SERVS. (Mar. 30, 2020), <https://www.pgi.com/blog/2020/03/how-much-of-communication-is-really-nonverbal/>.

136. Jeff Thompson, *Is Nonverbal Communication a Numbers Game?*, PSYCH. TODAY (Sept. 30, 2011), <https://www.psychologytoday.com/us/blog/beyond-words/201109/is-nonverbal-communication-numbers-game>.

is the actual words spoken.”¹³⁷ Take for instance an extremely shy person giving a speech in front of his entire class, or a painter dropping an opened paint can all over the carpet. In these situations, a person watching either event take place could see the facial expressions and body language of the two, sensing precisely how both persons feel. Various studies have also found that “both children and adults learn better from teachers who use gestures . . . specifically oriented around math and foreign language learning . . .”¹³⁸ In an experiment involving Technology, Entertainment, Design (“TED”) speakers, the results “showed that people are more interested in speakers who use gestures.”¹³⁹ Experimenters suggested that “seeing more physical motion helps people pay attention for a longer time.”¹⁴⁰ In terms of attending class, when a lecture is via Zoom, the instructor is relegated to being in front of the computer screen, whereas in person, he or she can move freely around the classroom to keep students attentive.

2. *Live Witnesses vs. Remote Witnesses Study*

In a second study—conducted in Sweden—twelve undergraduate students were told beforehand that they would be watching a staged collision between a driver talking on a cell phone and a cyclist riding on the road.¹⁴¹ The collision involved the driver taking too wide of a turn and colliding into the cyclist, causing him to fall to the ground.¹⁴² The entire scenario lasted around five minutes, but the collision itself lasted about thirty seconds.¹⁴³ Then, three weeks after the incident, “six truth telling and six lying witnesses testified about the event,”¹⁴⁴ with mock jurors viewing the witnesses either in person or via video.¹⁴⁵ Focusing solely on jurors, the study explored the effects of witnesses appearing both in person and via video, and how each method affected jurors’ (1) perceptions of the

137. *Id.*

138. Strain, *supra* note 135. As an aside, most people can distinctly remember a high school teacher, or perhaps an elementary school teacher, that used a silly hand gesture to teach the class a difficult concept.

139. *Id.*

140. *Id.*

141. See Sara Landström et al., *Witnesses Appearing Live Versus on Video: Effects on Observers’ Perception, Veracity Assessments and Memory*, 19 APPLIED COGNITIVE PSYCH. 913, 918 (2005).

142. *Id.*

143. *Id.*

144. *Id.* at 913.

145. *Id.*

witnesses; (2) “assessment[s] of the witnesses’ veracity”; and (3) “memory performance” of the witnesses’ testimonies.¹⁴⁶

In short, the study revealed that “live observers attribute[d] more honesty to the [in-person] witnesses than” the video witnesses.¹⁴⁷ In explaining why, the authors credited the results to jurors having “face-to-face immediacy of the witness[es]” in the courtroom.¹⁴⁸ Specifically, because jurors had the ability to physically see the witnesses in real time, jurors were given a better opportunity to make credibility judgments.¹⁴⁹ Concerning memory, the results showed that jurors viewing in-person witnesses “considered themselves to remember the witnesses’ statements significantly better,” despite showing no major effect on “actual veracity.”¹⁵⁰ Jurors also viewed the in-person “witnesses’ appearance[s] in a more positive way and perceived the witnesses as being more honest” than the remote witnesses,¹⁵¹ but it did not appear that this observation attributed to any “judgment biases.”¹⁵² The authors noted, however, “it is reasonable to argue that presentation mode is an important factor in the process of assessing witnesses’ testimonies.”¹⁵³

The study’s results also supported previous findings involving child witnesses.¹⁵⁴ Particularly, regarding “adults’ perception[s] of child witnesses”¹⁵⁵:

[C]hildren testifying live in court are viewed more positively than children testifying out of court [via CCTV or by videotaped statements] . . . [C]hildren in court are viewed as more confident, more intelligent and less likely to provide false statements. An explanation for this is that video observers may more easily adopt the role of an objective judge, and thus be more able to . . . evaluate the witness in a critical way.¹⁵⁶

146. *Id.* at 927.

147. *Id.* at 928. All jurors were physically in the courtroom; thus, the mentioning of “video observers” refers to jurors watching witnesses via video, and “live observers” refers to jurors seeing witnesses in person. *Id.* at 913.

148. *Id.* at 929.

149. *See id.*

150. *Id.* at 925. That is, jurors claimed to have recalled more testimony of in-person witnesses than witnesses testifying via video. *Id.*

151. *Id.* at 930.

152. *Id.*

153. *Id.* This is one of the underlying premises addressed by this Article.

154. *See id.* at 928.

155. *Id.*

156. *Id.* (internal citations omitted).

This finding closely parallels the *Craig* decision where Justices O'Connor and Scalia disagreed as to whether sexually abused children are benefitted when testifying via video in their respective cases.¹⁵⁷

To summarize, it is widely understood that much of human communication is nonverbal.¹⁵⁸ Similarly, research suggests that people are often more attentive to those who use gestures while speaking and, as seen from simulated jury trials, it has been shown that witnesses who use more gestures are seen as more credible.¹⁵⁹ Drawing upon these conclusions, data supports the notion that jurors may be more inclined to believe in-person witnesses rather than virtual witnesses, adding to the argument against remote testimony.¹⁶⁰ Some lawyers have voiced that they too are at a disadvantage when using video technology, specifically when selecting jurors, because “[l]awyers screen prospective jurors the same way; like poker players, they tend to value unspoken signals and tells.”¹⁶¹

C. *The Damaging Effects of Live Video Testimony*

Because credible studies suggest that jurors are more attentive to witnesses' behavior than is typically assumed—including what is said, how it is said, and what gestures are made—allowing remote testimony to be conducted in criminal trials could severely harm the fact-finding process.¹⁶² Though, similar to the lack of empirical studies regarding jurors' perceptions of witnesses, there are mostly small, concentrated studies available for evaluating witnesses'

157. See *supra* Part II.

158. Thompson, *supra* note 136.

159. See generally Amy Cuddy, *Your Body Language May Shape Who You Are*, YOUTUBE (Oct. 1, 2012), https://www.youtube.com/watch?v=Ks_Mh1QhMc (demonstrating how crucial nonverbal behavior is from this study, observers with no knowledge of the hypothesis watched recordings of simulated job interviews and preferred the interviewees who displayed more confident positions—the “high-power posers”—over those who sat in timid positions). This TED Talk has more than sixty-four million views to date. Amy Cuddy, *Your Body Language May Shape Who You Are*, TED (2012), https://www.ted.com/talks/amy_cuddy_your_body_language_may_shape_who_you_are.

160. See Alicia Bannon & Janna Adelstein, *The Impact of Video Proceedings on Fairness and Access to Justice in Court*, BRENNAN CTR. FOR JUST. (Sept. 10, 2020), <https://www.brennancenter.org/our-work/research-reports/impact-video-proceedings-fairness-and-access-justice-court>.

161. Eric Scigliano, *Zoom Court Is Changing How Justice Is Served*, ATLANTIC (Apr. 13, 2021), <https://www.theatlantic.com/magazine/archive/2021/05/can-justice-be-served-on-zoom/618392/>.

162. See Douglas Keith & Alicia Bannon, *Promise and Peril as Courts Go Virtual Amid Covid-19*, BRENNAN CTR. FOR JUST. (May 29, 2020), <https://www.brennancenter.org/our-work/analysis-opinion/promise-and-peril-courts-go-virtual-amid-covid-19>.

credibility on the stand.¹⁶³ Accordingly, the present lack of data concerning remote witness testimony in criminal trials poses unforeseen risks that need to be studied in greater detail.¹⁶⁴

One former trial lawyer and now-retired United States District Court Judge for the District of Massachusetts has firsthand experience with videoconferencing technology in her courtroom.¹⁶⁵ Judge Nancy Gertner explains that the jury's opportunity to evaluate a witness's credibility is diminished when testifying via video:

[T]he jurors were discussing the testimony of an old man who claimed to have heard a fight in the apartment above him, and then a loud noise, like a body hitting the floor. He reported that *he ran to his apartment door* just in time to see the defendant running down the stairs. One of the jurors, himself an elderly man, reminded the others about the way the elderly witness had walked to the stand before testifying; dragging one of his feet, he walked in a labored fashion, his gait slowed by some disability. It was an observation that would have been missed if the only aspect of the witness that the jurors saw was his face.¹⁶⁶

Although such an example may appear insignificant by itself, when similar actions occur in the courtroom and collectively go unnoticed, both sides of the adversarial system are impacted as a result.¹⁶⁷ In this case, because opposing counsel and the jury would only see the witness's face from a screen—depending on which party called the man as its witness—either the defense or prosecution

163. See Fredric I. Lederer, *The Road to the Virtual Courtroom? A Consideration of Today's—and Tomorrow's—High-Technology Courtrooms*, 50 S.C. L. REV. 799, 820 (1999).

164. For instance, perhaps a team of colleges and universities can conduct a series of ten “witness-heavy,” simulated jury trials with members of the public sitting as jurors. The ten trials would be conducted in person with all jurors present, but five of the trials would only have witnesses appearing via Zoom. The jurors in the trials with remote witnesses would not be informed ahead of time that the witnesses would be testifying via Zoom. The goal of the study would be to analyze how the different sets of jurors (those viewing in-person witnesses and those watching witnesses via Zoom) arrived at their verdicts. Did the jurors with remote witnesses tend to rule in favor of the plaintiff or defendant? Did the jurors with in-person witnesses rule differently? How many digital mishaps occurred in the trials with remote witnesses? Did that influence any of the jurors' decisions?

165. See Nancy Gertner, *Videoconferencing: Learning Through Screens*, 12 WM. & MARY BILL RTS. J. 769, 773 (2004).

166. *Id.* at 783–84 (emphasis added). This example, taken from the movie *Twelve Angry Men*, explains how subtle yet impactful off-camera observations can be for jurors' credibility determinations, which is not an issue when witnesses testify in the courtroom.

167. See Hinton & Melsheimer, *supra* note 116.

would be stripped of a potential argument against the man's problematic testimony.¹⁶⁸

In regard to another observation during her tenure on the bench, Judge Gertner expressed her concern with live video testimony and the decline of courtroom formality in general:

Testimony in a courtroom, in the gravitas of that setting, has an impact on all participants. We are used to looking at screens, in our bedrooms and living rooms, our offices, the train station, in restaurants. The court, however, is different as seen with “the formality that attaches to the ceremony, the robed judge, the witness’ [*sic*] oath, the public’s scrutiny, the creation of an appellate record formed in a moment experienced simultaneously by all parties.”¹⁶⁹

Specifically, there remains little (if any) data showing whether remote witnesses are more or less inclined to testify truthfully when on camera.¹⁷⁰ Drawing upon her notion of the formal presence one feels when being in the courtroom, Judge Gertner indirectly raised the proposition that live video testimony may or may not give a witness the impression that it is easier to lie on-screen than in the courtroom.¹⁷¹ Although Judge Gertner refused to speculate further, acknowledging that “[w]e lack any experimental evidence that might indicate” such,¹⁷² whereas a traditional witness is placed on the stand and asked questions directly in front of the judge and jury, a remote witness is not subject to the same experience. A remote witness could be testifying from the comfort of his or her home or counsel’s office, raising additional concerns with potential witness coaching.¹⁷³ If this would be the case, who is to say that no one is positioned off camera holding signs for the witness to read? Despite her general concerns affiliated with remote witness testimony, Judge Gertner conceded that videoconferencing technology remains vital to the modern-day criminal justice system, adding: “[H]ow can

168. *Id.* (“So much of what happens in a courtroom is nonverbal. Clients make eye contact with their attorneys, signaling a discrepancy in testimony or a piece of evidence that should be revisited at a later time.”).

169. Gertner, *supra* note 165, at 784 (quoting *United States v. Nippon Paper Indus. Co.*, 17 F. Supp. 2d 38, 40 (D. Mass. 1998)).

170. *See id.* at 784 n.91 (citing Lederer, *supra* note 163, at 820).

171. *Id.* at 784.

172. *Id.* at 784 n.91 (citing Lederer, *supra* note 163, at 820).

173. *See, e.g.*, Shalini Nangia & Julia A. Perkins, *The Pros and Cons of Zoom Court Hearings*, NAT’L L. REV. (May 20, 2020), <https://www.natlawreview.com/article/pros-and-cons-zoom-court-hearings>.

we preserve this atmosphere without losing the advantages of videoconferencing?”¹⁷⁴

Building on Judge Gertner’s rationale, courts should first implement small-scale, limited use of virtual testimony to safeguard one of the most sacred practices of the criminal justice system. If courts move to suddenly implement remote testimony in response to the pandemic, (1) the accused may be permanently stripped of a core constitutional right; (2) “a jury’s ability to assess the demeanor of the witness firsthand” would be diminished;¹⁷⁵ and (3) it could lead to a loss of courtroom formality and an undermining of the fact-finding process overall.¹⁷⁶

D. Public Policy’s Push for Live Video Testimony

Because the pandemic and the twenty-first century have pushed Americans to embrace videoconferencing technology, many believe that live video testimony is now justified.¹⁷⁷ Strictly from a financial perspective, the chance to lessen a client’s legal fees by using videoconferencing technology is ideal.¹⁷⁸ Not including today’s expensive airfares and hotel rates,¹⁷⁹ a medical expert’s hourly rate can total as much as \$741 per hour,¹⁸⁰ while his or her trial testimony can cost more than \$1,000 per hour.¹⁸¹ From this logic, using videoconferencing technology to capture an expert’s trial testimony may be financially worthwhile for some clients.¹⁸² Many also

174. Gertner, *supra* note 165, at 784.

175. Reynolds, *supra* note 16. According to Locke Bowman, Executive Director of the MacArthur Justice Center in Chicago, “conviction has always turned on a jury’s ability to assess the demeanor of the witness firsthand. When you take that away, you’ve lost something precious.” *Id.*

176. See Anthony Garofano, Comment, *Avoiding Virtual Justice: Video-Teleconference Testimony in Federal Criminal Trials*, 56 CATH. U. L. REV. 683, 701 (2007).

177. See, e.g., Meghann Cuniff, *Judges Differ on When It’s Safe to Hold In-Person Jury Trials*, A.B.A. J. (Feb. 1, 2021, 3:35 AM), <https://www.abajournal.com/magazine/article/judges-differ-on-when-its-safe-to-hold-in-person-jury-trials>.

178. Esquire Deposition Sols., LLC, *Clients Are Ready for Legal Profession to Embrace Technology*, JD SUPRA (Oct. 28, 2020), <https://www.jdsupra.com/legalnews/clients-are-ready-for-legal-profession-46563/>.

179. Hannah Sampson, *Travel Was Cheap When No One Was Traveling. That Era Is Over.*, WASH. POST (July 1, 2021, 5:28 PM), <https://www.washingtonpost.com/travel/2021/07/01/summer-cheap-flights-europe-us/>.

180. *Expert Witness Fee Calculator*, EXPERT INST., <https://www.expertinstitute.com/resources/expert-witness-fees/#:~:text=Average%20rates,trial%20testimony%20is%20%24478%2Fhour> (last visited June 11, 2021).

181. *Id.* In most cases, a medical expert’s hourly deposition rate is more expensive than both the expert’s review fee and trial testimony rate. See *id.*

182. See, e.g., Linda L. Mitchell, *The Pros and Cons of a Virtual Testimony from the Perspective of an Expert Witness*, FORENSIC QDE LAB LLC (Jan. 26, 2021), <https://www.forensicdoexaminer.com/the-pros-and-cons-of-a-virtual-testimony-from-the-perspective-of-an-expert-witness/>.

contend that the technology of the twenty-first century is reliable enough to enable virtual testimony.¹⁸³ Yet, from the examples below, this may not entirely be the case.

1. *The Technology is Here (Right?)*

It is no secret that the newest tech gadgets have incredible graphics and Internet speed capabilities. Apple's latest iPhone 13 series likely represents the savviest smartphones on the market,¹⁸⁴ while Sony's PlayStation 5 has some of the most advanced graphics ever seen in the video game industry.¹⁸⁵ Artificial intelligence in the legal profession today can "scan legal documents . . . and find relevant casework for lawyers."¹⁸⁶ Some estimates hold that as much as "23% of work done by lawyers can be automated by existing technology."¹⁸⁷ Therefore, as technology "continues to become more commonplace" in our lives, there is an argument that "public acceptance may push [courts]" to implement virtual testimony in trials.¹⁸⁸

In *Craig*, the Court stressed the importance of reliability,¹⁸⁹ which has been one of the larger questions surrounding videoconferencing technology and specifically, remote testimony.¹⁹⁰ Today, everyone who uses the Internet experiences some form of connection issues when checking his or her e-mail, browsing the Web, playing video games while connected to Wi-Fi, or when watching television.¹⁹¹ Although some users have faster Internet speeds and experience less connection issues than others, "it is of paramount importance that we do not undermine the constitutional rights

183. See Kostelak, *supra* note 26, at 4.

184. See, e.g., Matt Swider & David Lumb, *Best iPhone 2021: Which Apple Phone Is for You?*, TECHRADAR (Oct. 24, 2021), <https://www.techradar.com/news/best-iphone>.

185. See, e.g., Brandt Ranj, *PlayStation 5 Review: Fast 4K Gaming with a Fresh Design*, ROLLING STONE (Nov. 6, 2020, 8:02 AM), <https://www.rollingstone.com/product-recommendations/electronics/playstation-5-review-1086705/>.

186. Abigail Johnson Hess, *Experts Say 23% of Lawyers' Work Can Be Automated—Law Schools Are Trying to Stay Ahead of the Curve*, CNBC (Feb. 18, 2020, 5:13 AM), <https://www.cnbc.com/2020/02/06/technology-is-changing-the-legal-profession-and-law-schools.html>.

187. *Id.*

188. Kostelak, *supra* note 26, at 5.

189. *Id.* at 4.

190. See Nina J. Ginsberg, *From the President: The Perils of Virtual Trials*, NAT'L ASS'N OF CRIM. DEF. LAWS. (2020), <https://www.nacdl.org/Article/May2020-FromthePresidentThePerilsofVirtualTrials> (stating that "even the best technology has its limitations").

191. See, e.g., Artur Bergman & Jana Iyengar, *How COVID-19 Is Affecting Internet Performance*, FASTLY (Apr. 8, 2020), <https://www.fastly.com/blog/how-covid-19-is-affecting-internet-performance> (explaining that, for states hit hardest by the pandemic—such as New York and California—Internet users saw noticeable slowing in download speeds).

guaranteed to criminal defendants for the sake of expediency.”¹⁹² Only when it is shown that video technology can overcome this hurdle and prove its reliability can it potentially “serve as a worthy placeholder for physical face-to-face confrontation.”¹⁹³ Because a poor Internet connection can easily “distort nonverbal cues, such as facial expressions, gazes, postures, and gestures[,]”¹⁹⁴ imagine jurors watching a witness testify via video with a delayed screen time.¹⁹⁵ Better yet, consider a period of awkward silence occurring when a witness is testifying on-screen. The initial thought would likely be a poor connection or that the witness unintentionally pressed the wrong button.¹⁹⁶ All of these possibilities need to be carefully considered before courts decide to implement remote testimony.

Another issue that gets little attention is the digital divide that exists in the United States.¹⁹⁷ According to data from the United States Department of Commerce, minorities have the largest digital divide rate in America, specifically Black and Hispanic households.¹⁹⁸ This means that Black and Hispanic households have less access to broadband Internet-capable devices than other races and ethnicities.¹⁹⁹ The Pew Research Center found that “[r]oughly one-third (35%) of households with children ages 6 to 17 and an annual

192. Ginsberg, *supra* note 190.

193. Kostelak, *supra* note 26, at 4.

194. *Id.*

195. *Id.*

196. In some cases, especially when using Zoom to videoconference, a person can accidentally use a filter to become an animal or inanimate object, which is what happened to a Texas lawyer during a court hearing. Using the filter options on Zoom, a lawyer became a cat for a moment, taking over the Internet for a day. See, e.g., Debra Cassens Weiss, *Lawyer's Zoom Hearing Is a Purr-Fect Storm Tech Glitch*, A.B.A. J. (Feb. 9, 2021, 3:32 PM), <https://www.abajournal.com/news/article/lawyers-zoom-hearing-is-a-purr-fect-storm-tech-glitch>.

197. See Norma C. Izzo, *How Litigators Are Confronting COVID in the Courtroom*, A.B.A. (Aug. 31, 2020), <https://www.americanbar.org/groups/litigation/committees/trial-practice/articles/2020/covid-19-video-testimony-courtrooms/>.

198. *The Digital Divide: Percentage of Households by Broadband Internet Subscription, Computer Type, Race and Hispanic Origin*, U.S. CENSUS BUREAU (Sept. 11, 2017), <https://www.census.gov/library/visualizations/2017/comm/internet.html> [hereinafter *The Digital Divide*]. See generally Katherine L.W. Norton, *Mind the Gap: Technology as a Lifeline for Pro Se Child Custody Appeals*, 58 DUQ. L. REV. 82, 83 (2020) (proposing a “band-aid” solution to the perils of the “justice gap” in the United States, Professor Norton suggests that “technology can significantly assist those who lack the means to have counsel to effectively navigate procedural matters”).

199. *The Digital Divide*, *supra* note 198; see also Monica Anderson & Andrew Perrin, *Nearly One-in-Five Teens Can't Always Finish Their Homework Because of the Digital Divide*, PEW RSCH. CTR. (Oct. 26, 2018), <https://www.pewresearch.org/fact-tank/2018/10/26/nearly-one-in-five-teens-cant-always-finish-their-homework-because-of-the-digital-divide/> (finding that “17% of teens say they are often or sometimes unable to complete homework assignments because they do not have reliable access to a computer or internet connection.”).

income below \$30,000 a year do not have a high-speed internet connection at home,”²⁰⁰ which the pandemic brought to light as millions of American households had no choice but to suddenly transition to online learning.

A second Pew Research Center study found that “29% of adults with household incomes of less than \$30,000 did not have a smartphone . . . and 46% did not own a personal computer.”²⁰¹ As such, similar to the pandemic’s sweeping effects that blindsided American households, courts are now faced with the same burden, and the American Bar Association has hit the panic button, stating: “[w]hile there is over 20 years of case law allowing us to examine the slow advancement of technology in litigation and in the courtroom,” the COVID-19 pandemic “has forced the system to adapt not incrementally, but with an incredible leap forward.”²⁰² In addition to all other flaws the COVID-19 pandemic exposed, it showed the world that even the United States was unprepared for a rapid technological shift.²⁰³

However, as is the case with much of American society, once a facet of public policy is implemented and becomes widely adopted, it is difficult to suddenly pause or change course. For example, working from home because of the pandemic has become the “new normal,” and it will be difficult to abandon completely.²⁰⁴ In fact, as of March 2, 2021, both the Pennsylvania Bar Association Committee on Legal Ethics and Professional Responsibility and the Philadelphia Bar Association Professional Guidance Committee have determined that “a lawyer who lives in one state may practice remotely in another state, such as a Pennsylvania-licensed lawyer

200. Brooke Auxier & Monica Anderson, *As Schools Close Due to the Coronavirus, Some U.S. Students Face a Digital ‘Homework Gap’*, PEW RSCH. CTR. (Mar. 16, 2020), <https://www.pewresearch.org/fact-tank/2020/03/16/as-schools-close-due-to-the-coronavirus-some-u-s-students-face-a-digital-homework-gap/>. The term “homework gap” was coined in reference to this predicament. *Id.*

201. Matt Reynolds, *Courts Attempt to Balance Innovation with Access in Remote Proceedings*, A.B.A. J. (Feb. 1, 2021, 3:30 AM), <https://www.abajournal.com/magazine/article/courts-attempt-to-balance-innovation-with-access-in-remote-proceedings>.

202. Izzo, *supra* note 197.

203. See Ginsberg, *supra* note 190 (explaining how disastrous the digital divide is in the United States, many impoverished and rural families share one broadband Internet-capable device for the entire household). Imagine asking one of these families to surrender the household’s sole computer so a parent can participate in a lengthy virtual jury trial. *Id.*

204. See Kim Parker et al., *How the Coronavirus Outbreak Has – and Hasn’t – Changed the Way Americans Work*, PEW RSCH. CTR. (Dec. 9, 2020), <https://www.pewsocialtrends.org/2020/12/09/how-the-coronavirus-outbreak-has-and-hasnt-changed-the-way-americans-work/> (“For workers who are working from home all or most of the time now but rarely or never did before the pandemic . . . there have been some clear upsides associated with the shift to telework. About half (49%) say they now have more flexibility” in choosing their hours.”).

who lives in New Jersey but is not licensed there practicing from a home office physically located in New Jersey.”²⁰⁵ Similar examples below will show that the COVID-19 pandemic, coupled with twenty-first century technology, have forever changed the legal profession.

IV. THE LEGAL PROFESSION & TECHNOLOGY

As law professor Tracy L. Allen described: “On January 1, 2020, ‘zoom’ was a verb, a noise a car makes. Three months later, Zoom became a noun. It happened in the blink of an eye, like when Amazon no longer referred to a river in the rainforest, and Apple was no longer [just] a fruit.”²⁰⁶ In the last ten to fifteen years, trial technology has improved drastically to account for the new generation of tech-savvy jurors.²⁰⁷ The “old school” trial lawyers that previously used giant notepads to illustrate handwritten bullet points and projectors to display images have become practically nonexistent.²⁰⁸ In their place, the use of PowerPoint presentations and other means of twenty-first century technology became the standard.²⁰⁹ As a result, this older generation had little choice but to implement new technology in the courtroom to keep jurors captivated.²¹⁰ Similar to students in schools and employees in workplaces, jurors “began to expect some level of electronic aid in the courtroom,”²¹¹ which trial lawyers had to account for. “In today’s world, juries expect to be entertained.”²¹²

Tantamount to other professions that have embraced technology to keep pace with the twenty-first century—and now the pandemic—“[t]echnology [has] started to infiltrate the practice of law . . .”²¹³ For better or for worse, “[t]he practice will never be the

205. Pa. Bar Ass’n Comm. on Legal Ethics & Pro. Resp. & Phila. Bar Ass’n Pro. Resp. Comm., Formal Op. 2021-100 (2021) (discussing ethical considerations for lawyers practicing law from physical locations where they are not located).

206. Tracy L. Allen, *Pandemic Pivot: ADR Poised for Prominence During Recovery*, 99 MICH. BAR J. 42, 42 (2020).

207. See Adam Bloomberg, *Trial Technology: What Has & Hasn’t Changed in Nearly Two Decades*, LITIG. INSIGHTS (Nov. 5, 2018), <https://www.litigationinsights.com/trial-technology-changes/>.

208. See, e.g., F. Dennis Saylor IV & Daniel I. Small, *Trial Advocacy in the Modern World*, MASS. LAWS. WKLY. (Sept. 17, 2015), <https://www.hklaw.com/files/Uploads/Documents/Articles/trial-advocacy-in-the-m.pdf> (“The idea of standing up in front of a jury, or any group of people, and just talking for 12 hours is [now] unimaginable.”).

209. See Matt Lalande, *Courtroom Effective Technology*, L. TECH. TODAY (Aug. 14, 2019), <https://www.lawtechnologytoday.org/2019/08/courtroom-effective-technology/>.

210. *Id.*

211. Bloomberg, *supra* note 207.

212. Lalande, *supra* note 209.

213. Allen, *supra* note 206, at 42.

same.”²¹⁴ Yet, because the legal profession has typically been viewed as a field representative of an older population,²¹⁵ getting the bulk of older generational attorneys to use new technology has been challenging.²¹⁶ One national survey found that “73% of lawyers in private practice say they want to practice law until they ‘die at their desks.’”²¹⁷ Despite these obstacles, the use of technology in the judicial system is now more prevalent than ever before and continues to gain traction.²¹⁸ Today, videoconferencing technology is increasingly used in “pretrial hearings, consultations, conferences, depositions, arraignments, trial proceedings, and sentencing hearings.”²¹⁹ To account for a steady rise in online mediations, negotiations, and arbitrations, practitioners have fostered the term “online dispute resolution” (“ODR”) to refer to this transformation.²²⁰ Moreover, because of the pandemic, recent surveys suggest that clients are “expecting lawyers to make greater use of technology in their law practices[,]”²²¹ which is something that cannot go unrecognized.

A. *Advantages of Video Technology in the Law*

First, it must be acknowledged that the use of videoconferencing technology in the law offers many benefits. As to convenience,²²² the cost-effectiveness and time that is saved by videoconferencing is at the forefront of those advantages.²²³ At the outset of the pandemic during the lockdown, “Texas courts logged over 700,000

214. *Id.*

215. According to national surveys, “lawyers are no more interested in retirement now than before Lawyers are living longer, their practice settings are changing, and the nature of the work itself is in flux.” Edward C. Winslow III, *Not Fade Away: Can Old Lawyers Age Successfully?*, L. PRAC. TODAY (Jan. 14, 2020), <https://www.lawpracticetoday.org/article/old-lawyers-not-fade-away-age-sooner-retire-later/>.

216. See Saylor IV & Small, *supra* note 208.

217. Winslow III, *supra* note 215.

218. See, e.g., Chris Gerardi & Jeffrey Skinner, *Two Ways Technology Has Changed How Lawyers Practice*, NAT’L L. REV. (Oct. 29, 2019), <https://www.natlawreview.com/article/two-ways-technology-has-changed-how-lawyers-practice>.

219. Brendan R. McDonald et al., *The Attorney-Client Working Relationship: A Comparison of In-Person Versus Videoconferencing Modalities*, 22 PSYCH. PUB. POL’Y & L. 200, 201 (2016).

220. Anthony J. Fernandez & Marie E. Masson, *Online Mediations: Advantages and Pitfalls of New and Evolving Technologies and Why We Should Embrace Them*, 81 DEF. COUNS. J. 395, 396 (2014). But see John Miles, *What’s Next for ADR?*, MILES MEDIATION & ARB. (May 11, 2020), <https://www.milesmediation.com/blog/whats-next-for-adr/> (“[M]ediation has the best chance to succeed when conducted in person by a professional in an inclusive and welcoming environment. While Zoom, and other virtual platforms, have allowed neutrals to assist clients in this time of lockdown, it is no substitute for what occurs in-person.”).

221. Esquire Deposition Sols., *supra* note 178.

222. See Nangia & Perkins, *supra* note 173.

223. See McDonald et al., *supra* note 219, at 200.

hours of virtual court hearings [T]here were [also] reports of (1) increased efficiencies because of reduced judicial travel between court locations and (2) more defendants in criminal cases showing up for hearings because of the ease of logging on from home.”²²⁴ As litigation has become more complex and often extends beyond state lines, the opportunity to cut clients’ travel costs is now fundamental to good lawyering.²²⁵ “Video-teleconferencing . . . technology allows a witness to testify from anywhere in the world.”²²⁶ Hence, virtually all immigration proceedings are conducted online, as the vast number of clients located across the United States and abroad makes it challenging to conduct in-person proceedings.²²⁷ “In 2012 alone, immigration judges conducted over 134,000 hearings in which the trial judge and the immigrant litigant met over a television screen, rather than face-to-face.”²²⁸ That number equates to roughly one-third of all immigrants held in detention today.²²⁹

The pandemic has shifted a large portion of family law proceedings to online formats as well.²³⁰ Between January and April of 2020, divorce rates “increased by 34% in the US, with newer couples being the most likely to file for divorce.”²³¹ Divorce lawyers became equipped with the ability to meet with clients and conduct proceedings via Zoom, while many pro se litigants took matters into their own hands and e-filed their documents rather than traveling to the courthouse.²³²

Second, the use of videoconferencing technology has greatly benefitted witnesses and clients who are physically unable to attend in-person proceedings because of health conditions or transportation

224. Herbert B. Dixon Jr., *Pandemic Potpourri: The Legal Profession’s Rediscovery of Teleconferencing*, A.B.A. J. (Nov. 6, 2020), https://www.americanbar.org/groups/judicial/publications/judges_journal/2020/fall/pandemic-potpourri-legal-professions-rediscovery-teleconferencing/.

225. See, e.g., Porter Wells, *Virtual Depositions: Change Forced by Covid Aims to Stick*, BLOOMBERG L. (Dec. 29, 2020, 11:07 AM), <https://news.bloomberglaw.com/us-law-week/virtual-depositions-change-forced-by-covid-aims-to-stick> (noting that “[v]irtual depositions can cut costs by up to a third when factoring in travel expenses”).

226. Garofano, *supra* note 176, at 683.

227. See Ingrid V. Eagly, *Remote Adjudication in Immigration*, 109 NW. U. L. REV. 933, 934 (2015).

228. *Id.*

229. *Id.*

230. See, e.g., Taylor Brownwell, *Divorce Rates and COVID-19*, NAT’L L. REV. (Oct. 16, 2020), <https://www.natlawreview.com/article/divorce-rates-and-covid-19>.

231. *Id.*

232. See Zaira Perez, *Pandemic Stymied Most Denton County Court Proceedings—but Not Divorces*, DENTON REC.-CHRON. (May 12, 2021), https://dentonrc.com/news/denton_county/pandemic-stymied-most-denton-county-court-proceedings-but-not-divorces/article_ae1d2970-debb-5970-80c4-0bb689742ae0.html.

challenges.²³³ For instance, if a person is terminally ill or detained in prison, the ability for him or her to appear virtually is extremely accommodating.²³⁴ Also, in some cases (especially with mediation), those who may be fearful to face their opponents in person now have the option to appear remotely.²³⁵ Formerly a staunch opponent of “virtual mediations for years,”²³⁶ Professor Lynn E. MacBeth explains:

For some people who are in high conflict, that tiny step away from reality to virtual feels a little safer for them. For me, I am finding that the more I get used to relating to people online, the better I get at reading body, face, hand, and voice signals.²³⁷

Consider a divorce mediation in which one of the spouses is abusive and the victim spouse is terrified to confront the abusive spouse. In such a case, the ability to participate in online legal proceedings is groundbreaking for those who may need a sense of security.²³⁸ Moreover, with ODR in particular, the perks associated with erasing travel time and cutting costs by participating in online proceedings is an attractive alternative for sole practitioners (both lawyers and mediators).²³⁹ With this option, these parties now have “the ability to operate outside of a formal court structure, and the self-executing aspect of automated resolution, which in some instances . . . [removes] the need for legal representation” altogether.²⁴⁰

233. See, e.g., *United States v. Gigante*, 166 F.3d 75, 79 (2d Cir. 1999) (allowing a fact witness “in the final stages of an inoperable, fatal cancer” to testify remotely); see also Izzo, *supra* note 197.

234. See *Gigante*, 166 F.3d at 79. The witness in *Gigante* “was under medical supervision at an undisclosed location” and testified “via closed-circuit television due to his illness and concomitant infirmity.” *Id.*

235. Lynn E. MacBeth is an attorney, author, and a nationally recognized conflict mediator who has mediated more than 3,000 cases to date. See *Lynn MacBeth*, DUQ. UNIV., <https://www.duq.edu/academics/faculty/lynn-macbeth-jd> (last visited Mar. 25, 2021). MacBeth also serves as an Adjunct Professor of Law at Duquesne University School of Law, where she teaches “The Art of Mediation.” *Id.*

236. E-mail from Lynn E. MacBeth, Adj. Prof. of L., Duq. U. Sch. of L., (Feb. 10, 2021, 03:43 EST) (on file with author).

237. *Id.*

238. *Id.*

239. See Fernandez & Masson, *supra* note 220, at 398.

240. *Id.* at 399.

B. Disadvantages of Video Technology in the Law

“When the eyes say one thing, and the tongue another, a practiced man relies on the language of the first.” — Ralph Waldo Emerson²⁴¹

Using the newly-embraced ODR process as an example, some legal professionals have voiced that online interactions in this area of practice do not match the traditional in-person “experience that is so essential to offline” dispute resolutions.²⁴² Regarding mediations specifically, *Black’s Law Dictionary* defines “mediation” as “the act of a third person who interferes between two contending parties with a view to reconcile them or persuade them to adjust or settle their dispute.”²⁴³ Although there is no rule stating that mediations must be conducted in person, the profession has typically viewed mediations as in-person events.²⁴⁴ Namely, since “face-to-face interactions . . . enable the parties to feel each other out,”²⁴⁵ the argument is that a “mediator’s perception of emotions from each of the parties during traditional mediation enables her to convey the verbal and non-verbal messages qualified by the parties’ attitudes”²⁴⁶ Thus, without mediation occurring in person, a mediator may have trouble measuring the parties’ intentions, failing to secure a more definite understanding of the negotiations.²⁴⁷

According to attorney and scholar Joseph W. Goodman: “[H]elping parties to listen and understand concerns, empathize with each other, vent feelings and confront emotions is considered to be an important part of mediation.”²⁴⁸ Ultimately, “mediation is about the ‘venting’ of feelings and emotions that [participants] would be unable to express in a more formal setting such as a courtroom.”²⁴⁹ There is also an important aspect of trust that accompanies in-person mediations.²⁵⁰ In this regard, “[t]he elements of building trust and maintaining a non-hostile environment are . . .

241. Hoffman & Weiner, *supra* note 119, at 2; Ralph Waldo Emerson, *Culture, in THE CONDUCT OF LIFE* lxxv (Project Gutenberg 2012) (1860), <https://www.gutenberg.org/ebooks/39827>.

242. Fernandez & Masson, *supra* note 220, at 399.

243. *Mediation*, BLACK’S LAW DICTIONARY (11th ed. 2019).

244. *See* Miles, *supra* note 220.

245. Fernandez & Masson, *supra* note 220, at 399.

246. *Id.* at 400. This, according to the authors, “is an aspect of the mediation process that cannot be conveyed during fully automated online mediations.” *Id.*

247. *Id.* at 399–400.

248. Joseph W. Goodman, *The Pros and Cons of Online Dispute Resolution: An Assessment of Cyber-Mediation Websites*, 2 DUKE L. & TECH. REV. 1, 10 (2003).

249. *Id.*

250. *See* Fernandez & Masson, *supra* note 220, at 400.

assisted by behavioral interactions during the traditional mediation process[.]”²⁵¹ which would be difficult to capture when mediation is occurring on-screen. In scenarios involving parties with cultural or language barriers, not only is establishing trust an issue, but the chances for miscommunication are increased significantly when mediating over the computer.²⁵²

C. *The Death of Criminal Trials*

On a different note, many advocate that the current push toward online legal proceedings is further minimizing courtroom interactions, as trials have already become a rarity.²⁵³ In criminal cases specifically, nearly all disputes are resolved before going to trial.²⁵⁴ The Pew Research Center indicated that in fiscal year 2018, only 2% of federal criminal cases went to trial out of nearly eighty-thousand eligible cases.²⁵⁵ The general consensus is that trial has become far too expensive and risky for clients to take the gamble, so they are routinely advised to enter into plea bargains with prosecutors—“even innocent people.”²⁵⁶ Although there is no definitive number as to how many cases are resolved through plea bargaining, academics generally contend that it is roughly “90 to 95 percent of both federal and state court cases”²⁵⁷ As such, “[t]he decline in the number of trials, and the litigation that precedes them . . . [is] caus[ing] [lawyers’] advocacy skills to atrophy on both sides of the adversarial system.”²⁵⁸

Shockingly, in 2015, the busy federal courthouse in Manhattan, New York, saw only fifty trials.²⁵⁹ The result of this trend is that lawyers on both sides “have not tried cases in years,”²⁶⁰ which does

251. *Id.*

252. *Id.*

253. See John Gramlich, *Only 2% of Federal Criminal Defendants Go to Trial, and Most Who Do Are Found Guilty*, PEW RSCH. CTR. (June 11, 2019), <https://pewrsr.ch/2F1Qxn7>.

254. See *id.*

255. *Id.*

256. *The Trial Penalty: The Sixth Amendment Right to Trial on the Verge of Extinction and How to Save It*, NAT’L ASS’N OF CRIM. DEF. LAWS. 6 (2018), <https://www.nacdl.org/getattachment/95b7f0f5-90df-4f9f-9115-520b3f58036a/the-trial-penalty-the-sixth-amendment-right-to-trial-on-the-verge-of-extinction-and-how-to-save-it.pdf> [hereinafter NACDL]. Called the “trial penalty,” the NACDL suggests that defendants are so coerced into accepting pleas that “even innocent people can be convinced to plead guilty to crimes they did not commit.” *Id.* This, in turn, is undermining the criminal justice system and eroding defendants’ Sixth Amendment right to trial. *Id.*

257. Lindsey Devers, *Plea and Charge Bargaining: Research Summary*, BUREAU OF JUST. ASSISTANCE (Jan. 24, 2011), <https://bja.ojp.gov/sites/g/files/xyckuh186/files/media/document/PleaBargainingResearchSummary.pdf>.

258. NACDL, *supra* note 256, at 9.

259. *Id.*

260. *Id.*

not bode well for the younger generation of aspirational trial lawyers. With this in mind, allowing live video testimony to be conducted in the slim number of criminal trials that exist would be a further disservice to the profession.²⁶¹ “As the U.S. criminal justice system churns some 11 million people through its courtroom doors every year, trial[s] by jury actively engage the public in this critical process of democracy.”²⁶² Hence, absent a few exceptions, “such as when traumatized children or rape victims testify on video,”²⁶³ it is vital for jurors to have the in-person ability to assess a witness.²⁶⁴ Absent this opportunity, jurors will base their credibility determinations solely on what is perceived over a screen, failing to consider the various verbal and nonverbal behaviors a video camera neglects to capture.²⁶⁵ Or, on the other hand, jurors will critique a witness’s on-screen appearance to his or her detriment, which is what happened to Nixon while debating Kennedy.²⁶⁶

CONCLUSION

The traditional notion of a witness testifying in the confines of a courtroom—where the judge, jury, both parties’ counsel, and spectators are all present—is at the heart of the American criminal justice system. Yet, because technology has shown that virtual interactions can be an attractive substitute for face-to-face encounters, the practice of giving in-person testimony is presently under attack. While this Article does not propose an ultimate solution for dealing with every context where remote testimony may be desired, the answer is not to jeopardize a long-standing practice of constitutional fairness. With roughly 95% of criminal cases resolving before trial today, judges rarely oversee trials and attorneys seldom acquire trial experience. The rights of the accused and visual perceptions of witnesses far outweigh the need for widespread virtual testimony. Perhaps the best solution for courts is to allow virtual

261. This is also true for civil litigation. In civil disputes, upwards of 97% of cases that get “filed are resolved other than by a trial.” Gregory Brown, *What Factors Make It Harder to Settle a Civil Case?*, BROWN & CHARBONNEAU, LLP (Feb. 26, 2020), <https://www.bc-llp.com/factors-make-harder-settle-civil-case>. This is not to say that all, or even most, criminal and civil cases should go to trial; that is not what this Article suggests, nor is it a logical rationale given the vast number of cases.

262. NACDL, *supra* note 256, at 10.

263. Scigliano, *supra* note 161.

264. *See* Ginsberg, *supra* note 190.

265. *See* Hinton & Melsheimer, *supra* note 116.

266. *See supra* notes 99–115 and accompanying text.

testimony “in certain narrow circumstances,”²⁶⁷ as articulated by Justice O’Connor in *Craig*.

267. *Maryland v. Craig*, 497 U.S. 836, 848 (1990).

From Beyoncé to Bohemia: Reforming Joint Copyright Ownership

*William Frank Weber**

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INTRODUCTION

JaQuel Knight. Reading this name, for many, will give them no feeling of recognition. The same people that do not know his name will more than likely immediately recognize this next name, Beyoncé. Her name immediately conjures up iconic images, songs, and music videos. She is a global star that has released six studio solo albums, all of which have reached number one on the U.S. Billboard charts.¹ Two of Beyoncé's hit songs are "Single Ladies (Put a Ring on It)" and "Formation." "Formation," with its numerous Beyoncé dance routines, the solo dance of a young, hooded boy in front of a line of police officers, and powerful message, won eleven different outstanding or best music video awards and currently has over 200

* J.D. Candidate, Duquesne University School of Law, 2022; B.A., Political Science Seton Hill University, 2019. William acknowledges Professor Aman Gebru and his undergraduate professor Dr. Kellee Van Aken for their input and guidance. He also thanks his parents for their support.

1. *Beyoncé Chart History: Billboard 200*, BILLBOARD MEDIA, <https://www.billboard.com/music/beyonce/chart-history/TLP> (last visited Dec. 17, 2020).

million views on YouTube.² “Single Ladies (Put a Ring on It)” became an iconic music video, not only because of the hit song but also the familiar, and often imitated dance movements. The track won “best music video” at the 2009 MTV Music Video Awards³ and accumulated over 800 million views on YouTube.⁴ Both of these music videos also won the MTV Video Music Award for Best Choreography in a Video.⁵

The massive success of these projects makes the story of JaQuel Knight a compelling position to consider. The dance movements from “Single Ladies (Put a Ring on It)” have become ingrained into pop culture.⁶ These movements are attributed to Beyoncé, but she did not create them. The creation of these iconic movements, along with the choreography from “Formation” came from JaQuel Knight.⁷ Despite over one billion views between the two of these videos, JaQuel Knight is far from a household name. Knight does not have his name mentioned anywhere as choreographer on the YouTube pages for either of these videos.⁸ This unknown status is reflected in his compensation for the music. While Mike WiLL Made-It, the producer of “Formation,” made millions of dollars off of the song,⁹ Knight, who helped create the iconic imagery responsible for the songs popularity and whose work garnered the song a best choreography award,¹⁰ was treated like a temporary hire and given only a weekly rate.¹¹ The work that came from Knight’s mind was treated as if it belonged to somebody else, and any credit he did receive was often found in a random social media post, which does not bestow ownership or control to the commercial choreographer.¹²

2. Beyoncé, *Beyoncé - Formation*, YOUTUBE (Dec. 9, 2016), https://www.youtube.com/watch?v=WDZJPJV_bQ.

3. *The 2009 MTV VMAs Winners List*, ROLLING STONE (Sept. 14, 2009, 3:56 AM), <https://www.rollingstone.com/music/music-news/the-2009-mtv-vm-as-winners-list-81389/>.

4. Beyoncé, *Beyoncé - Single Ladies (Put a Ring on It)*, YOUTUBE (Oct. 3, 2009), <https://www.youtube.com/watch?v=4m1EFMoRFvY>.

5. *VMAs 2016: See the Full List of Winners*, BILLBOARD MEDIA (Aug. 28, 2016), <https://www.billboard.com/articles/news/vm-as/7487873/vmas-2016-winners-list>; *The 2009 MTV VMAs Winners List*, *supra* note 3.

6. Rebecca Milzoff, *Inside ‘Single Ladies’ Choreographer JaQuel Knight’s Quest to Copyright His Dances*, BILLBOARD MEDIA (Nov. 5, 2020), <https://www.billboard.com/articles/business/9477613/jaquel-knight-beyonce-megan-thee-stallion-billboard-cover-story-interview-2020/>.

7. *Id.*

8. *Beyoncé - Formation*, *supra* note 2; *Beyoncé - Single Ladies (Put a Ring on It)*, *supra* note 4.

9. Milzoff, *supra* note 6.

10. *VMAs 2016: See the Full List of Winners*, *supra* note 5.

11. Milzoff, *supra* note 6.

12. *Id.*

Knight is lucky, however. With the help of intellectual property attorney David L. Hecht, he was able to win the uphill battle of having his choreography for “Single Ladies (Put a Ring on It)” registered with the Copyright Office on July 9, 2020.¹³ This victory makes Knight “the first commercial choreographer in pop music to succeed” in having his work approved for registration by the Copyright Office.¹⁴ The artistic value of his work can be seen not only in the music videos but in the Labanotations¹⁵ of choreographical works produced by the Dance Notation Bureau as well. Knight is now recognized as the owner of the choreography he has created.

JaQuel Knight may have been granted his rightful recognition, but dramaturg Lynn Thompson was not extended the same recognition for the Broadway musical *RENT*.¹⁶ The music, lyrics, and book of *RENT* are all credited to Jonathan Larson.¹⁷ The original concept behind the show came from Billy Aronson, who wanted to create a musical version of the Puccini opera *La Bohème* with Larson.¹⁸ Unfortunately, Larson and Aronson wanted to take the show in different directions.¹⁹ The two amicably parted ways in 1991, with Larson getting the opportunity to make the show his own, and Aronson getting credit and compensation if a production ever materialized.²⁰ Over the next two years, Larson was able to complete a draft of the show and convince the director of the New York Theater Workshop, James Nicola, to develop the production.²¹ At the first staged reading, in 1993, the songs and music were praised but the story was unclear and had major pacing issues.²² The problems with the structure of the story continued into the spring of 1995, when Nicola insisted that Larson work with Lynn Thompson.²³

13. *Id.*

14. *Id.*

15. Labanotations are like sheet music for dance. The sheets use one vertical staff per performer and different symbols that show body parts, direction, length, and intention of specific movements. *Id.*

16. David Lefkowitz, *Rent Dramaturg Suit Dismissed*, PLAYBILL (July 23, 1997), <https://www.playbill.com/article/rent-dramaturg-suit-dismissed-com-71067>.

17. Rachel Paige, *Rent Will Always Be Relevant—Its Late Creator Jonathan Larson Made Sure of It*, REFINERY29 (Jan. 27, 2019, 3:00 PM), <https://www.refinery29.com/en-us/2019/01/222364/who-is-jonathan-larson-rent-creator-history>.

18. Anthony Tommasini, *Theater; The Seven-Year Odyssey That Led to ‘Rent’*, N.Y. TIMES (Mar. 17, 1996), <https://www.nytimes.com/1996/03/17/theater/theater-the-seven-year-odyssey-that-led-to-rent.html>.

19. *Id.*

20. *Id.*

21. *Id.*

22. *Id.*

23. Rebecca Milzoff, *RENT: The Oral History*, VULTURE, <https://www.vulture.com/2016/05/rent-oral-history-c-v-r.html> (last visited Oct. 16, 2021).

The musical would go on to become a success.²⁴ However, shortly before previews began, Larson died from an aortic aneurysm.²⁵ After the success of the show, Lynn Thompson sued the Larson estate, claiming she was underpaid for her efforts on *RENT*.²⁶ She believed she was a joint author on the work, contributing nine percent of the lyrics and forty-eight percent of the libretto.²⁷ Her efforts were scorned by the majority of playwrights, who painted her as a usurper.²⁸ But, Thompson had support from industry luminaries like Tony Kushner and Craig Lucas, who, among others, believed that Thompson transformed the work.²⁹ These supporters saw that Thompson took a show mired in the workshopping process for years and helped rewrite it so it worked for a full production.³⁰ The original case was dismissed, as the judge agreed that Larson did not intend for Thompson, or anyone else to be a co-author.³¹ The parties settled the case outside of court, before the appellate court decided the trial court's dismissal.³²

Regardless of the validity of Lynn Thompson's claim, her story opens a can of worms in intellectual copyright law, especially in extremely collaborative artforms. American copyright law must be reformed to address the idea of joint authorship. This reform should be inspired by the United Kingdom law on joint authorship, while the foundation remains firmly grounded in the American joint authorship law, thereby creating a new law that addresses the inequities of the current joint authorship law.

This Article begins by discussing the development of joint authorship law in the United States and compares it to joint authorship law in the United Kingdom. Part II looks at how the American courts have misinterpreted the Copyright Act. Part II also proposes the new hybrid law that the United States should adopt and shows how this new law addresses the inequities present in the current joint authorship law.

24. Michael Gioia, *The Creation of Rent—How Jonathan Larson Transformed an Idea into a Groundbreaking Musical*, PLAYBILL (Feb. 05, 2016), <https://www.playbill.com/article/the-creation-of-rent-how-jonathan-larson-transformed-an-idea-into-a-groundbreaking-musical>.

25. Tommasini, *supra* note 18.

26. Lefkowitz, *supra* note 16.

27. *Id.*

28. Dan Friedman, *The Dramaturg: Help or Hindrance? (Part 2 of 2)*, BACKSTAGE (Sept. 27, 2002, 12:00 AM), <https://www.backstage.com/magazine/article/dramaturg-help-hindrance-part-19603/>.

29. Lefkowitz, *supra* note 16.

30. Friedman, *supra* note 28.

31. Lefkowitz, *supra* note 16.

32. Friedman, *supra* note 28.

I. BACKGROUND

A. General History of Copyright Law

Historically, copyright law began to develop after Johannes Gutenberg invented the printing press in the West.³³ In England, publishers and judges believed that authors held perpetual property rights in their works through common law.³⁴ This perpetual common law right lasted through multiple statutory schemes until 1710, when the Statute of Anne vested copyright protection only to authors of books for fourteen years, and the chance at an additional fourteen years of protection if the author survived the expiration of the original copyright protection.³⁵ The Statute of Anne, which required registration, was the model statute for state copyright laws that most states passed after gaining independence.³⁶ This state-led approach created choice of law issues, leading to a consensus that a national copyright law was necessary.³⁷

The foundation for the national solution is found directly in the Constitution: “The United States Congress shall have the power . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”³⁸ The Copyright Clause granted Congress the ability to create national patent and copyright protections. President George Washington advocated for the need for a national intellectual copyright law in his first State of The Union Address. President Washington stated:

[T]here is nothing which can better deserve your patronage than the promotion of science and literature. Knowledge is in every country the surest basis of public happiness. In one in which the measures of government receive their impressions so immediately from the sense of the community as in ours it is proportionably essential.³⁹

33. 2 PETER S. MENELL ET AL., INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE: COPYRIGHTS, TRADEMARKS & STATE IP PROTECTIONS 495 (2019).

34. H. Tomás Gómez-Arostegui, *Copyright at Common Law in 1774*, 47 CONN. L. REV. 1, 9 (2014).

35. MENELL ET AL., *supra* note 33, at 496.

36. *Id.* at 497.

37. *Id.*

38. U.S. CONST. art. I, § 8, cl. 8 (“the Copyright Clause”).

39. George Washington, First Annual Address to Congress (Jan. 8, 1790) (transcript available through the University of California, Santa Barbara’s American Presidency Project at <https://www.presidency.ucsb.edu/documents/first-annual-address-congress-0>).

Washington further stated that enacting a national intellectual property law would contribute to the security of a free Constitution.⁴⁰

The first national copyright law, the Copyright Act of 1790, granted protections to authors for the same fourteen-year period as the Statute of Anne.⁴¹ The 1790 Act had the additional requirements that copyrights must be registered with the local district court and notice of the copyright must be published in local newspapers.⁴² Congress expanded copyright protection in 1909.⁴³ The 1909 Act granted protection to all writings and expanded the length of protection to twenty-eight years, with an additional twenty-eight years upon renewal.⁴⁴ The next big reform occurred in 1976, and “continues to serve as the principal framework for copyright protection in the United States.”⁴⁵ The 1976 Act protected all written works as soon as they were “fixed in a tangible medium of expression” and the duration of protection was vastly expanded to the life of the author plus fifty years.⁴⁶ Numerous amendments and reforms have been added to the 1976 Act since its passage, including the Audio Home Recording Act of 1992, the Digital Performance Right in Sound Recordings Act of 1995, the No Electronic Theft Act of 1996, the Music Modernization Act of 2018, and the Digital Millennium Copyright Act of 1998.⁴⁷ Even with all of these changes to the copyright law, the underlying purpose has remained the same: “to stimulate artistic creativity for the general public good.”⁴⁸

B. Development of Joint Authorship Law: Intent

Joint authorship, or “joint work” as the law refers to it, comes directly from the 1976 Copyright Act.⁴⁹ The 1976 Act defines joint work as “a work prepared by two or more authors with the intention that their contributions be merged into inseparable or

40. *Id.*

41. MENELL ET AL., *supra* note 33, at 497.

42. *Id.*

43. *Id.* at 498.

44. *Id.*

45. *Id.*

46. *Id.* The duration of copyright protection was eventually expanded to life of the author plus 70 years in a later reform in 1998. *Id.* at 500.

47. *Id.* at 499.

48. *Twentieth Century Music Corp. v. Aiken*, 422 U.S. 151, 156 (1975); *see also Sony Corp. of America v. Universal City Studios, Inc.*, 464 U.S. 417, 429 (1984) (“It is intended to motivate the creative activity of authors . . . and to allow the public access to the products of their genius[.]”); *Fox Film Corp. v. Doyal*, 286 U.S. 123, 127 (1932) (“[T]he primary object in conferring the monopoly lie in the general benefits derived by the public from the labors of authors.”).

49. 17 U.S.C. § 101.

interdependent parts of a unitary whole.”⁵⁰ On its face, the statute seems to require a showing of intent that all of the independent works created be combined into a single work at the end of the process.⁵¹ Furthermore, the courts have found that the intent to create a united work must be present at the time that each independent work is created.⁵²

The establishment of intent as the cornerstone of determining joint authorship comes from the Senate and House notes attached to the 1976 Act.⁵³ The House Report for the statute explains what makes a true joint work: “The touchstone here is the intention, at the time the writing is done, that the parts be absorbed or combined into an integrated unit[.]”⁵⁴ However, immediately before this statement, the House Report gives a broader, more inclusive definition.⁵⁵ “[A] work is ‘joint’ if the authors collaborated with each other, or if each of the authors prepared his contribution with the knowledge and intention that it would be merged with the contributions of other authors as ‘inseparable or interdependent parts of a unitary whole.’”⁵⁶ This exact passage also appears in the Senate Report for the 1976 Act.⁵⁷

In one of the seminal cases in joint authorship law, *Childress v. Taylor*, the Court of Appeals for the Second Circuit looked to define a joint work under the 1976 Act.⁵⁸ To determine whether a contested play had more than one author, the *Childress* court looked to both the language of the statute and the congressional reports behind the 1976 Act.⁵⁹ The court recognized that the reports indicate there are “two alternative criteria”⁶⁰ to find that a joint work exists, but took a textualist approach and read the statute literally so as to impose the intent requirement in all findings of joint authorship.⁶¹ This decision does not account for the Congressional Reports’ inclusion of two alternative criteria, instead determining that intent is a requirement in all joint authorship scenarios.⁶²

50. *Id.*

51. *Id.*

52. *Weissman v. Freeman*, 868 F.2d 1313, 1318 (2d Cir. 1989).

53. S. REP. NO. 94-473, at 103 (1975); H.R. REP. NO. 94-1476, at 120 (1975).

54. H.R. REP. NO. 94-1476, at 120.

55. *Id.*

56. *Id.*

57. S. REP. NO. 94-473, at 103.

58. *Childress v. Taylor*, 945 F.2d 500, 505 (2d Cir. 1991).

59. *Id.*

60. *Id.*

61. *Id.* at 506.

62. *Weissman v. Freeman*, 868 F.2d 1313, 1318 (2d Cir. 1989).

C. Minority View on Independent Copyrightability

The second requirement to find joint authorship is that the contribution of each author must be independently copyrightable, a requirement not found anywhere in the text of the 1976 Act.⁶³ Unlike the alternative intent requirement, the independent copyrightability requirement is also not found anywhere in the congressional reports on the 1976 Act.⁶⁴ This requirement has caused a division among copyright scholars and the courts,⁶⁵ with the majority of courts holding that independent copyrightability is a requirement to find joint authorship.⁶⁶

The minority view on independent copyrightability argues that only the final product between the two authors needs to be copyrightable.⁶⁷ The most vocal academic who promotes this point of view is Professor David Nimmer, who carries on the work of his father, the late Professor Melville B. Nimmer (collectively, “Nimmer”). Nimmer speaks to this very issue in his treatise on copyright law.⁶⁸ Nimmer’s argument stands on the fact that the language of the Copyright Act itself contains no requirement that each author “contribute an independently copyrightable component to the product.”⁶⁹ Nimmer also focuses on the fact that the legislative history behind the act “elevates intention as the touchstone, without placing any further parsing as to the copyrightable status of each individual component that the parties intend to contribute to the work as a whole.”⁷⁰

Nimmer also argues that requiring each element to be independently copyrightable goes against the stated goal of granting copyright protection, which is to foster creativity.⁷¹ Nimmer believes that copyright protection should extend to both the “contributor of the skeletal ideas and the contributor who fleshes out the project[,]” because to truly encourage creativity, copyright protection should extend to “all parties who labor together to unite idea

63. 17 U.S.C. § 101.

64. See S. REP. NO. 94-473 (1975); H.R. REP. NO. 94-1476 (1975).

65. See MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 6.07 (2020); Timothy J. McFarlin, *Father(s?) of Rock & Roll: Why the Johnnie Johnson v. Chuck Berry Songwriting Suit Should Change the Way Copyright Law Determines Joint Authorship*, 17 VAND. J. ENT. & TECH. L. 575 (2015); Margaret Chon, *New Wine Bursting from Old Bottles: Collaborative Internet Art, Joint Works, and Entrepreneurship*, 75 OR. L. REV. 257 (1996).

66. *Childress*, 945 F.2d at 506.

67. *Id.*

68. NIMMER & NIMMER, *supra* note 65.

69. *Id.*

70. *Id.*

71. *Id.*

with form[.]”⁷² This idea is anchored by the fact that while a contribution may not be protectable, it may be vitally important to the final product.⁷³ All efforts vitally important to the final product should be rewarded and the party that fleshes out the idea should not be made the sole owner of the final product at the expense of the person who contributed a vitally important, but non-protectable expression.⁷⁴

This view, expressed by Nimmer and others, has been flatly rejected by most courts.⁷⁵ But the issue of independent copyrightability is not completely resolved. While the *Childress* court held that each part contributed to the final product must be independently copyrightable, the court opined that the issue was both “open” and “troublesome.”⁷⁶ Even before stating that the contributions all need to be independently copyrightable, the *Childress* court recognized that if the focus of copyright is on encouraging the production of creative works, there is no reason why all of the contributions need to be copyrightable.⁷⁷ The *Childress* court uses the example of a skilled writer that never produces a significant work without an idea supplied by somebody else.⁷⁸ The value of the work should not be diminished because one person contributed an unprotectable idea and the other person provided the expression.⁷⁹ These reservations by the *Childress* court have been further espoused by subsequent court decisions, despite those decisions coming to the same conclusion.⁸⁰

In 2004, Nimmer was finally ready to concede that independent copyrightability was fully accepted by the courts and it was a requirement of finding a joint work exists.⁸¹ However, that same year, the Seventh Circuit accepted Nimmer’s argument against

72. *Id.*

73. *Id.*

74. *Id.*

75. *Id.* See *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061, 1072 (7th Cir. 1994) (“We agree that the language of the Act supports the adoption of a copyrightability requirement.”); *Tang v. Putruss*, 521 F. Supp. 2d 600, 605 (E.D. Mich. 2007) (“Accordingly this Court will apply the copyrightable subject matter test as set forth in *Erickson*.”); *Ballas v. Tedesco*, 41 F. Supp. 2d 531, 540 (D.N.J. 1999).

76. *Childress v. Taylor*, 945 F.2d 500, 506 (2d Cir. 1991).

77. *Id.*

78. *Id.*

79. *Id.*

80. See *Ashton-Tate Corp. v. Ross*, 916 F.2d 516, 521 (9th Cir. 1990) (deciding that independent copyrightability was a necessity but noting that the issue was not completely settled in case law); *Cabrera v. Teatro Del Sesenta, Inc.*, 914 F. Supp. 743, 765 (D.P.R. 1995) (accepting the independent copyrightability test but also noting that it may produce unfair results).

81. NIMMER & NIMMER, *supra* note 65.

independent copyrightability in *Gaiman v. McFarlane*.⁸² Todd McFarlane created the *Hellspawn* comic series, but after the series was criticized for poor writing, McFarlane invited Neil Gaiman to write a new script, where Gaiman introduced three new characters.⁸³ Gaiman gave descriptions of these characters to McFarlane, who then illustrated the debut issue, thus creating the joint authorship issue between the two collaborators.⁸⁴ The court held that independent copyrightability is generally a requirement to find joint authorship.⁸⁵ But the court recognized there are certain types of media where that requirement is not feasible and creates fiercely unjust results.⁸⁶ This includes the paradoxical result where no one could claim copyright over a final product.⁸⁷ Writing for the court and using Nimmer's treatise as a foundation, Judge Richard A. Posner opined on a hypothetical case where one professor has brilliant ideas but the inability to write, and another professor has generic ideas but excels in writing.⁸⁸ If the two professors collaborate, one giving his ideas and the other actually writing the article, Posner believed they should be joint authors even though alone each contribution may not have been independently copyrightable.⁸⁹ With this hypothetical in mind, the court reached the conclusion that in media types where the final product is the result of such contribution and mixing of copyrightable ideas, the independent copyrightability requirement creates unjust and paradoxical results.⁹⁰

D. Majority View on Independent Copyrightability

The majority of courts still institute the independent copyrightability requirement for joint authorship.⁹¹ Even in the Seventh Circuit, where there seemed to be a turn towards rejecting this framework, the court in *Gaiman* only rejected the test in a specific circumstance.⁹² The majority of precedent endorses the independent

82. *Gaiman v. McFarlane*, 360 F.3d 644, 659 (7th Cir. 2004).

83. *Id.* at 649–50.

84. *Id.* at 650.

85. *Id.*

86. *Id.* at 659.

87. *Id.* at 658–59.

88. *Id.* at 659.

89. *Id.*

90. *Id.* at 658–59, 661.

91. *See, e.g.,* *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061, 1071 (7th Cir. 1994) (“We agree that the language of the Act supports the adoption of a copyrightability requirement.”); *S.O.S., Inc. v. Payday, Inc.*, 886 F.2d 1081, 1087 (9th Cir. 1989) (“To be an author, one must supply more than mere direction or ideas”); *Tang v. Putruss*, 521 F. Supp. 2d 600, 605 (E.D. Mich. 2007) (agreeing with the Court of Appeals for the Seventh Circuit that requiring independent copyrightability better promotes the primary objective of the Copyright Act).

92. *Gaiman*, 360 F.3d at 659.

copyrightability requirement, as does the United States Copyright Office, which oversees the Copyright Act.⁹³

The courts that require independent copyrightability hang their argument on the definition of "author."⁹⁴ The source of this argument is that in the statute a joint work is defined as a "work prepared by two or more authors."⁹⁵ These courts have held that all parties claiming to be owners of the final joint work must meet the definition of an author.⁹⁶ These courts hold that "to be an author, one must supply more than mere direction or ideas."⁹⁷ The general rule is that the author must be "the person who translates an idea into a fixed, tangible expression entitled to copyright protection[.]" with an exception carved out for "works made for hire."⁹⁸ If a party claiming to be a joint author supplied only an idea, that party cannot claim to be an author because there is no copyright protection for ideas.⁹⁹ According to these courts, a party who merely supplies the skeleton of a project has as much right to be named author as the manufacturer of the book, which is to say that party has no right to be named the author.¹⁰⁰

The courts also look to the predictability that the independent copyrightability requirement provides to parties.¹⁰¹ If all contributed elements are required to be independently copyrightable, then parties are able "to predict whether their contributions to a work will entitle them to copyright protection as a joint author."¹⁰² By requiring independent copyrightability of each contribution, the courts believe there will be certain answers as to whether the party claiming to be a joint author should be viewed as such.¹⁰³ The policy is that because the law is predictable there will be fewer "post-contribution disputes concerning authorship[.]"¹⁰⁴

To the *Childress* court, the most important factor for instituting the independent copyrightability requirement was that this requirement "strikes an appropriate balance in the domains of both

93. *Childress v. Taylor*, 945 F.2d 500, 506 (2d Cir. 1991).

94. *S.O.S., Inc.*, 886 F.2d at 1087.

95. 17 U.S.C. § 101.

96. *S.O.S., Inc.*, 886 F.2d at 1087.

97. *Id.*

98. *Cnty. for Creative Non-Violence v. Reid*, 490 U.S. 730, 737 (1989) (holding that if the work is considered made for hire, then the employer or hiring party is considered the author of the work and the initial owner of its copyright).

99. *S.O.S., Inc.*, 886 F.2d at 1087.

100. *Id.*

101. *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061, 1071 (7th Cir. 1994).

102. *Id.*

103. *Id.*

104. *Id.*

copyright and contract law.”¹⁰⁵ With a contract, a person is able to hire someone else to create a copyrightable work, and the copyright protection is given to the employer.¹⁰⁶ This same idea applies to joint authorship law.¹⁰⁷ If a person contributes only non-copyrightable material, that person would be able to create a contract to disclose the material in return for gaining authorship status and partial ownership.¹⁰⁸ The existence of a contract also minimizes the risk of subsequent disputes about joint authorship, as the contract preemptively defines the relationships between all parties.¹⁰⁹ If no contract exists, then copyright protection is given only to the parties that created independently copyrightable material.¹¹⁰

E. Joint Authorship Law in the United Kingdom

Under the United Kingdom’s Copyright, Designs, and Patents Act, joint authorship is defined as “a work produced by the collaboration of two or more authors in which the contribution of each author is not distinct from that of the other author or authors.”¹¹¹ The Copyright Act in the United Kingdom requires that each potential joint author provide an independently copyrightable contribution to the final work, but the statutes do not require any mutual intent on the part of the parties to work together as joint authors at the time of creation.¹¹² This is a stark difference from the joint authorship laws in the United States, that hold intention at the time of creation as the touchstone for finding joint authorship.¹¹³ Instead of requiring intent, the United Kingdom courts require only a showing of collaboration, in addition to the independently copyrightable contribution.¹¹⁴ The United Kingdom courts have interpreted the collaboration requirement to mean that, barring any contractual agreement to the contrary, the contributions from each proposed joint author must be both “significant” and “original.”¹¹⁵

105. *Childress v. Taylor*, 945 F.2d 500, 507 (2d Cir. 1991).

106. *Id.*

107. *Id.*

108. *Id.*

109. *Id.*

110. *Id.*

111. Copyright, Designs, and Patents Act, c. 48, § 10 (UK).

112. David M. Liston, *Songwriter, Side Musician, or Sucker?: The Challenge of Distinguishing Composers from Contributors Under U.S. Copyright Law and the Lessons of a Famous British Case*, 65 RUTGERS L. REV. 891, 911 (2013).

113. *Thomson v. Larson*, 147 F.3d 195, 199 (2d Cir. 1998).

114. Lior Zemer, *Constitutional Challenges to Copyright: Is Intention to Co-Author an “Uncertain Realm of Policy”?*, 30 COLUM. J.L. & ARTS 611, 611 (2007).

115. Liston, *supra* note 112, at 911–12. See *Fisher v. Brooker* [2006] EWHC (Ch) 3239 [46] (Eng.).

II. ANALYSIS

A. *Intent*

As stated by multiple courts and the House and Senate Reports behind the 1976 Act, intent at the time of creation is a fundamental requirement to the finding of joint authorship.¹¹⁶ But the courts misinterpret the Act to require intent at the time of creation in every finding of joint authorship. When interpreting statutes, the function of the courts is to “give effect to the intent of Congress,”¹¹⁷ and there seems to be an agreement that this is the Court’s actual function.¹¹⁸ The debate among the courts comes not from the function of the courts, but how to fulfill this function because there is no invariable rule that governs how courts are supposed to find the true intent of Congress.¹¹⁹

The overarching canon of statutory interpretation is the plain meaning rule.¹²⁰ This rule states that the meaning of the statute is to be sought first in the language of the act and if the language of the act is plain, then “the sole function of the courts is to enforce it according to its terms.”¹²¹ When the language of the statute is clear and unambiguous, this language becomes “the sole evidence of the ultimate legislative intent.”¹²² When the meaning of the words used in the statute are clear and unambiguous, then these words are “taken as the final expression of the meaning intended.”¹²³

The 1976 Act, when defining a joint work, seems to be clear and unambiguous in the need for intent to be present for the court to hold that material is a joint work.¹²⁴ But several caveats have been added to the plain meaning rule. If the language is plain and unambiguous it is the “sole evidence of the ultimate legislative intent [.]” unless using the plain meaning leads to absurd or wholly

116. See *Thomson*, 147 F.3d at 199; *Childress v. Taylor*, 945 F.2d 500, 509 (2d Cir. 1991); S. REP. NO. 94-473, at 286 (1975); H.R. REP. NO. 94-1476, at 120 (1975).

117. *United States v. Am. Trucking Ass’ns*, 310 U.S. 534, 542 (1940).

118. See *Shotz v. City of Plantation*, 344 F.3d 1161, 1178 (11th Cir. 2003); *Swindell-Filiaggi v. CSX Corp.*, 922 F. Supp. 2d 514, 517 (E.D. Pa. 2013); *Shays v. FEC*, 337 F. Supp. 2d 28, 47 (D.D.C. 2004).

119. *Am. Trucking Ass’ns*, 310 U.S. at 542.

120. See *State v. Obas*, 130 A.3d 252, 257 (Conn. 2016) (“We are also guided by the plain meaning rule for statutory construction.”); *Merril v. Sugarloaf Mt. Corp.*, 745 A.2d 378, 384 (Me. 2000) (“The most fundamental rule of statutory construction is the plain meaning rule.”); *Gulf Chem. & Metallurgical Corp. v. Hegar*, 460 S.W.3d 743, 747 (Tex. App. 2015) (“When resolving an issue of statutory construction, we must first and foremost follow the plain language of the statute.”).

121. *Caminetti v. United States*, 242 U.S. 470, 485 (1916).

122. *Id.* at 490.

123. *United States v. Missouri Pac. R.R. Co.*, 278 U.S. 269, 278 (1929).

124. 17 U.S.C. § 101.

impracticable consequences.¹²⁵ The absurdity canon, which is a default rule that would reflect what any legislature would want, aims to ensure that statutes be interpreted in a way that avoids absurd results.¹²⁶

Lynn Thomson's story of working on *RENT* shows how forcing the intent requirement in every finding of joint authorship leads to absurd results. When Lynn Thomson began her work on *RENT*, she and Johnathon Larson rewrote or substantially altered around 1,212 of the 2,542 lines in the script, resulting in nearly half of the entire work being either completely new or completely different from the original piece.¹²⁷ Thomson contributed around nine percent, roughly 109 lines of the new script on her own.¹²⁸ After *RENT* won the 1996 Pulitzer Prize for Drama, both the director, Michael Greif, and one of the producers, Jeffrey Seller, believed that Thomson's work was integral to *RENT* winning the award.¹²⁹ In fact, Greif told everyone present at the rehearsal where it was announced that *RENT* had won the Pulitzer that everyone should thank Thomson because she helped to make that moment possible.¹³⁰ Even Larson said that Thomson had transformed the show.¹³¹

Yet, Thomson was never credited as a joint author of *RENT*. Thomson was denied joint authorship status because Larson did not intend for her to be a joint author at the time *RENT* was created.¹³² But he could never have intended Thomson to be a joint author at time of creation because *RENT* was created years before Thomson was brought onto the project.¹³³ She is credited by all involved for being the reason why *RENT* won a prestigious award, but does not get a seemingly deserved authorship credit and all that comes with that title. This seems to be an absurd result, thus triggering the absurdity exception to the plain meaning rule of statutory construction.¹³⁴

125. *Caminetti*, 242 U.S. at 490.

126. Einer Elhauge, *Preference-Estimating Statutory Default Rules*, 102 COLUM. L. REV. 2027, 2051 (2002).

127. Faye Buckalew, *Joint Authorship in the Second Circuit: A Critique of the Law in the Second Circuit Following Childress v. Taylor and as Exemplified in Thomson v. Larson*, 64 BROOK. L. REV. 545, 552 (1998).

128. *Id.*

129. *Id.*

130. *Id.*

131. *Id.*

132. *Thomson v. Larson*, 147 F.3d 195, 206–07 (2d Cir. 1998).

133. Tommasini, *supra* note 18.

134. *Caminetti v. United States*, 242 U.S. 470, 490 (1916).

The problem with the absurdity canon is that proving absurdity is a high bar to clear.¹³⁵ The Supreme Court, very early in its history, said that the absurdity of the result must “be so monstrous, that all mankind would, without hesitation, unite in rejecting the application.”¹³⁶ This test has been reaffirmed in the courts where the Second Circuit held that the absurd result must be one “where it is quite impossible that Congress could have intended the result and where the alleged absurdity is so clear as to be obvious to most anyone.”¹³⁷ This is a difficult test to pass. Even if Lynn Thomson’s situation seems absurd on its face, it would be difficult to prove that the result is “so monstrous, that all mankind . . . without hesitation” would protest the result.¹³⁸

The plain meaning rule is also limited in another fashion. The Supreme Court has cautioned that taking a few words from their legislative context and isolating them to determine their meaning, does not contribute to finding the legislative intent behind the statute.¹³⁹ In fact, the Court has detailed that even “[i]n ascertaining the plain meaning of the statute, the court must look to the particular statutory language at issue, as well as the language and design of the statute as a whole.”¹⁴⁰ In interpreting statutes the courts must first use the plain language if it is clear and unambiguous, but even then, the plain meaning must support the design of the statute as a whole.¹⁴¹

So, what is the purpose and design of the 1976 Copyright Act? The original purpose of the 1976 Act was to strengthen copyright protection and protect against new forms of piracy that developed with the advent of cable television and jukeboxes.¹⁴² But the power of Congress to enact any copyright legislation comes directly from the Constitution, and the Constitution dictates that the purpose behind the 1976 Act and all additional copyright legislation is “[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries[.]”¹⁴³ Following on this Constitutional purpose behind copyright legislation, the courts have said

135. *Sturges v. Crowninshield*, 17 U.S. (4 Wheat.) 122, 203 (1819).

136. *Id.*

137. *Catskill Mts. Chapter of Trout Unlimited, Inc. v. EPA*, 846 F.3d 492, 517 (2d Cir. 2017).

138. *Sturges*, 17 U.S. at 203.

139. *United States v. Am. Trucking Ass'ns*, 310 U.S. 534, 542 (1940).

140. *K Mart Corp. v. Cartier, Inc.*, 486 U.S. 281, 291 (1988).

141. *Id.*

142. MENELL ET AL., *supra* note 33, at 498.

143. U.S. CONST. art. I, § 8, cl. 8.

that the monopoly of copyright is granted to motivate creative activity and allow the American public to benefit from access to the final products.¹⁴⁴ Because even the plain meaning of the statute must support the statutory design as a whole,¹⁴⁵ the intent requirement for finding joint authorship must fit the purpose of motivating creative activities.¹⁴⁶

There is a much lower standard for proving that a statute fails to align with the purpose of the legislation, which only requires a showing that the statute is absurd, futile, or unreasonable.¹⁴⁷ It is clear that even if Lynn Thomson writing one third of *RENT* does not meet the absurdity standard, it is unreasonable that someone credited with completely transforming the work and being the reason it won a Pulitzer is not also named an author of the work. Denying someone who has done this degree of work on a project is also at variance with the purpose to motivate creation. No one wants to work with someone else to create and not get the credit they deserve.

Where the language of the statute results in an unreasonable or absurd outcome which is at odds with the central purpose of the legislation, the Court has expressed that it is “entirely appropriate to consult all public materials, including the background of . . . and the legislative history of its adoption.”¹⁴⁸ The Court has even held that whenever there is any material that can assist in finding the meaning of words there is no rule of law that can forbid its use.¹⁴⁹

This rule justifies incorporating the House and Senate Reports into an interpretation of the Copyright Act of 1976, as background materials that can assist in finding the meaning and Congressional intent.¹⁵⁰ Both reports say that “a work is ‘joint’ if the authors collaborated with each other, or if each author prepared his contribution with the knowl[e]dge and inten[t]ion that it would be merged with the contributions of other authors as ‘inseparable or interdependent parts of a unitary whole.’”¹⁵¹ The key word in that entire definition of a joint work is “or.” The use of the word “or” is a deliberate choice that has great impact on what defines a joint work. Based on the language of the House and Senate Reports, a joint

144. *Sony Corp. of America v. Universal City Studios, Inc.*, 464 U.S. 417, 429 (1984).

145. *K Mart Corp.*, 486 U.S. at 291.

146. *Sony Corp. of America*, 464 U.S. at 429.

147. *United States v. Am. Trucking Ass'ns*, 310 U.S. 534, 543 (1940).

148. *Green v. Bock Laundry Mach. Co.*, 490 U.S. 504, 527 (1989) (Scalia, J., concurring).

149. *Am. Trucking Ass'ns*, 310 U.S. at 543–44.

150. S. REP. NO. 94-473, at 286 (1975); H.R. REP. NO. 94-1476, at 120 (1975).

151. S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

work seems to be created in two separate instances.¹⁵² In one instance, all that is required is collaboration between those claiming to be joint authors. In the other instance, intent to collaborate at the time each independent work is created is necessary.¹⁵³ If either collaboration or intent is present, then a joint work has been created.¹⁵⁴ The *Childress* court, before determining that it will read the statute literally and impose the intent requirement in all findings of joint authorship, acknowledged that the Congressional Reports indicate that there are “two alternative criteria” to find that a joint work exists.¹⁵⁵

Because the requirement of intent to find joint authorship in all situations leads to unreasonable results at variance with the purpose of the 1976 Act and, arguably, goes against the absurdity canon of statutory construction, the courts should look to background materials to define the functions and protections of the 1976 Act.¹⁵⁶ There is no better background material for the 1976 Act than the two Congressional Reports that flesh out definitions for which works qualify for protection, and provide the courts with a statement of the Congressional intent behind the Act.¹⁵⁷ Congress, through the use of the word “or,” clearly intended for there to be “two alternative criteria”¹⁵⁸ where the courts can find that a joint work exists.¹⁵⁹ One where there is intent at the time of creation, which the courts insist is a standalone criterion, and another when there is merely collaboration between the two parties.¹⁶⁰

B. Independent Copyrightability

The second error that the courts have made is the addition of the independent copyrightability requirement in order to find the presence of a joint work. The courts have inserted this requirement, even though there is no language that indicates this is a requirement of a joint work in the 1976 Act itself or either of the Congressional Reports.¹⁶¹ The courts have given three main reasons for why

152. S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

153. S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

154. S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

155. *Childress v. Taylor*, 945 F.2d 500, 505 (2d Cir. 1991).

156. *United States v. Am. Trucking Ass'ns*, 310 U.S. 534, 543-44 (1940).

157. S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

158. *Childress*, 945 F.2d at 505.

159. S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

160. S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

161. 17 U.S.C. § 101; S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

this requirement is included.¹⁶² The first is because of the way courts have defined “author.”¹⁶³ The second rationale is that the requirement engenders predictability.¹⁶⁴ The third is that the requirement strikes a balance between contract law and intellectual property law.¹⁶⁵ The issue is that all of the rationales behind adopting this never-mentioned requirement are directly adverse to the purpose of the 1976 Act.

The issue with the argument about the definition of “author” is that it is based on a misinterpretation of the meaning of “author.” Courts use a definition of “author” based on the copyright law principle that a person cannot copyright an idea.¹⁶⁶ The definition of “author,” according to Merriam-Webster, is “one that originates or creates something.”¹⁶⁷ Based on this definition, someone who originates the uncopyrightable idea is an author. Consider a recipe, for example, which is not protected by copyright.¹⁶⁸ But the fact that the recipe itself is not copyrightable does not mean that the person who created the recipe is not its author. The courts insist that because the word “author” is included in the definition of joint work, that anyone claiming to be a joint author must be an author of a copyrightable contribution.¹⁶⁹ But this is not the definition of an author in its ordinary sense,¹⁷⁰ and the Act does not give a special meaning to the word “author,” a point that is heavily emphasized by the *Childress* court.¹⁷¹ In fact, if the courts were so strict about the definition of “author” meaning the person who fixes the idea into a protectable expression, then work for hire would not be allowed because, as the *Childress* court points out, the employer is not creating protectable expression, only hiring someone who can.¹⁷²

The best argument made for this requirement is that it makes the law predictable because it allows each contributor to know if they qualify as a joint author.¹⁷³ But predictability of the law should not be elevated at the expense of sacrificing the purpose of

162. *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061, 1071 (7th Cir. 1994); *Childress*, 945 F.2d at 507; *S.O.S., Inc. v. Payday, Inc.*, 886 F.2d 1081, 1087 (9th Cir. 1989).

163. *S.O.S., Inc.*, 886 F.2d at 1087.

164. *Erickson*, 13 F.3d at 1071.

165. *Childress*, 945 F.2d at 507.

166. 17 U.S.C. § 102(b).

167. *Author*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/author> (last visited Feb. 19, 2021).

168. *Publ'ns Int'l, Ltd. v. Meredith Corp.*, 88 F.3d 473, 480–81 (7th Cir. 1996).

169. *S.O.S., Inc. v. Payday, Inc.*, 886 F.2d 1081, 1087 (9th Cir. 1989).

170. *Author*, *supra* note 167.

171. *Childress v. Taylor*, 945 F.2d 500, 506 (2d Cir. 1991).

172. *Id.*

173. *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061, 1071 (7th Cir. 1994).

the law. The purpose of copyright is to “motivate the creative activity of authors and inventors by the provision of a special reward[.]”¹⁷⁴ But creation comes in all forms. As Nimmer points out, under the current regime, someone who creates high level ideas but cannot translate them into a tangible, fixed expression cannot be a joint author, but their partner who takes the other’s ideas and writes them down would be eligible for copyright protection.¹⁷⁵ This is unjust because both people worked together to create the final product. The great writer had no ideas so could never actually create something that could be legally protected. The person with amazing ideas lacked writing skills, and so could never fix those ideas into a tangible expression. Each of them individually could create nothing. They had to come together to create a final product, but only the one who fixed the idea would obtain copyright protection because of the independent copyrightability requirement. Even the courts are beginning to recognize that in certain collaborative creative fields, this leads to absurd results where there could be a copyrightable final product, but no one actually holds the copyright because each individual part that was contributed by individual team members is not on its own independently copyrightable.¹⁷⁶ There is no justice in denying someone the protection they deserve simply because the vital part of the project they contributed is not copyrightable on its own.

Nimmer proposes that a version of the *de minimis* test be the alternative to the independent copyrightability requirement.¹⁷⁷ Under the joint author *de minimis* test, which differs from the *de minimis* standard for copyrightability, an author must contribute more than a word or line but something substantial to the work.¹⁷⁸ This test has been rejected by courts because ideas do not receive protection under copyright.¹⁷⁹ This is true but is a misunderstanding of the standard. The *de minimis* test merely recognizes that in collaborative situations, one who contributes a major piece of the work that is not copyrightable on its own still deserves protection and ownership over the final product, which would not have existed without them.¹⁸⁰ A version of the *de minimis* standard is already used to determine if a work obtains copyright.¹⁸¹ In the *Gaiman*

174. Sony Corp. of America v. Universal City Studios Inc., 464 U.S. 417, 429 (1984).

175. NIMMER & NIMMER, *supra* note 65.

176. Gaiman v. McFarlane, 360 F.3d 644, 658–59 (7th Cir. 2004).

177. NIMMER & NIMMER, *supra* note 65.

178. *Id.*

179. 17 U.S.C. § 102(b).

180. NIMMER & NIMMER, *supra* note 65.

181. *Id.*

case, the court expresses that if the *Spawn* characters at issue were just vague ideas floated out by a random contributor or even an editor, then neither party would be deemed a coauthor.¹⁸² But a situation where a party contributes the key, central idea behind a work and that idea is used in the final product, is entirely different and distinguishable from the above scenario. There is some predictability to the *de minimis* test. And while it may not be as predictable as the independent copyrightability standard, it would lead to fewer absurd results that contradict the central purpose behind the 1976 Copyright Act.

The final argument for independent copyrightability—the balance between intellectual property law and contract law—is rather easy to dismiss. The *Childress* court emphasized that the independent copyrightability requirement strikes an appropriate balance between the two domains of law and minimizes disputes between parties at a later date.¹⁸³ The issue is that the independent copyrightability requirement does not exclusively provide this benefit. The court explains that contract law allows a person to hire someone to create a copyrightable work and the employer will be recognized as the author, or work for hire while allowing a person who does not bring any copyrightable contributions to the project to be recognized as an author.¹⁸⁴ This is true, but these facts of contract law are not dependent on the independent copyrightability requirement.

If the standard for joint authorship was instead the *de minimis* standard, contract law would still allow for work for hire contracts and allow creators to sign contracts relating to their authorship status, regardless of what they contribute. Changing the joint authorship law to make it more equitable does not decimate contract law. The *de minimis* standard simply removes some of the inequities that are caused by the independent copyrightability standard, while still maintaining the appropriate balance between intellectual property law and contract law.

C. Proposed Solution

The solution to the problems created by misinterpretation and modification of the joint authorship rule can be found in two main sources. By combining ideas and interpretations from American law and British law, there lies a more fair and equitable joint

182. *Gaiman v. McFarlane*, 360 F.3d 644, 658 (7th Cir. 2004).

183. *Childress v. Taylor*, 945 F.2d 500, 507 (2d Cir. 1991).

184. *Id.*

authorship rule that has none of the inequities or absurdities present in these two laws individually.

i. Taking from the American Law

The foundation for the new joint authorship law must come from the American law because the source of all copyright law is the U.S. Constitution.¹⁸⁵ The basis of finding joint authorship should be the “two alternative criteria”¹⁸⁶ found in the Congressional reports behind the 1976 Act.¹⁸⁷ Having both of these criteria written into the joint authorship law will address the inequities from having only the intent requirement, and maintains the intent that Congress articulated in the Congressional Reports.¹⁸⁸ For this Article’s proposed joint authorship law, both collaboration and intent can be used to show that a work of joint authorship exists.

This Article’s proposed joint authorship law expressly rejects the independent copyrightability requirement. This requirement is not mentioned in the 1976 Act or in either of the Congressional Reports.¹⁸⁹ And, as shown above, this requirement goes against the Constitutional purpose behind copyright law.¹⁹⁰ It can also create absurd results that can leave a work—such as one where no one person made an independently copyrightable contribution—without anyone who owns the copyright over the final product.¹⁹¹ The new standard would instead be incorporated into the way that the courts would find collaboration without intent. If the two parties intend to create a joint work, this ends the question of whether a joint work exists. The intention on the part of all parties shows that a joint work exists and there is no need for a second requirement or further inquiry, beyond seeing if the final product itself is copyrightable. But when no intent to create a joint work is present, the courts should use the collaboration standard of the United Kingdom’s joint authorship law.

185. U.S. CONST. art. I, § 8, cl. 8.

186. *Childress*, 945 F.2d at 505.

187. S. REP. NO. 94-473, at 286 (1975); H.R. REP. NO. 94-1476, at 120 (1975).

188. S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

189. 17 U.S.C. § 101; S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

190. *Twentieth Century Music Corp. v. Aiken*, 422 U.S. 151, 156 (1975); *see also Sony Corp. of America v. Universal City Studios, Inc.*, 464 U.S. 417, 429 (1984) (“It is intended to motivate the creative activity of authors . . . and to allow the public access to the products of their genius[.]”).

191. *Gaiman v. McFarlane*, 360 F.3d 644, 658–59 (7th Cir. 2004).

ii. Taking from the United Kingdom's Law

Under the United Kingdom's joint authorship law, the collaboration requirement only means that each proposed joint author must contribute something that is significant and original.¹⁹² The lack of an intent requirement makes the British joint authorship requirements perfect to mix with the American joint authorship statute to create a more fair and equitable joint authorship law. Once again, the independent copyrightability requirement in the United Kingdom's law must be ignored for all reasons stated in Section III.B.¹⁹³ The part of the British law that would be adopted is its focus on collaboration and how the British courts interpret this requirement.¹⁹⁴

iii. The New Proposed Hybrid Law

By taking the foundation of the American joint authorship law and the requirements of the British joint authorship law, legislators can achieve fairness and equity in the interpretation of joint authorship. The new focus would be on intent or collaboration as two alternative criteria to find if joint authorship exists. If intent is present, then there is no need to interpret anymore or find another element because all of the parties intended to act as joint authors and create a work that they own together.

The difference is that there will now be alternative criteria for intent to find joint authorship, as is expressed in the Congressional Reports behind the 1976 Act.¹⁹⁵ Collaboration will be the alternative to intent to find that a joint work exists. Collaboration should be interpreted in the way that the British courts interpret this same term, requiring significant and original contributions made by every party.¹⁹⁶ To be a significant contribution, it would only need to meet the *de minimis* standard as proposed by Nimmer, which requires that a party make more than a suggestion or contribute more than just a line or a word.¹⁹⁷ To be an original contribution, it would merely need to meet the originality requirement that is necessary for any copyright claim. Originality, in the copyright context, "means little more than a prohibition of actual copying."¹⁹⁸

192. Fisher v. Brooker [2006] EWHC (Ch) 3239 [46] (Eng.).

193. See discussion *infra* Section III.B.

194. Fisher v. Brooker [2006] EWHC (Ch) 3239 [46] (Eng.).

195. S. REP. NO. 94-473, at 286; H.R. REP. NO. 94-1476, at 120.

196. Fisher v. Brooker [2006] EWHC (Ch) 3239 [46] (Eng.).

197. NIMMER & NIMMER, *supra* note 65.

198. Alfred Bell & Co. v. Catalda Fine Arts, Inc., 191 F.2d 99, 103 (2d Cir. 1951) (quoting Hoague-Sprague Corp. v. Frank C. Meyer, Inc., 31 F.2d 583, 586 (E.D.N.Y. 1929)).

The proposed joint authorship law would remove the inequities of requiring only intent at the time of creation and the independent copyrightability requirement. As evidenced earlier, with the story of *RENT*, this exclusive intent requirement can cost a person who completely transforms a work any ownership protection over what that person contributed. This also removes the possible paradoxical result where because the endeavor is extremely collaborative, no one is able to hold copyright over the copyrightable final product.¹⁹⁹ In the end, the proposed law would express the notion that someone who contributes the skeletal outline for a work or the idea that sparks creation would have rightful ownership over the final product that expresses the ideas within.

With all of this in mind, the proposed joint authorship law would read:

A joint work is a work prepared by two or more authors if the authors collaborated with each other, or if each of the authors prepared the contribution with the knowledge and intension that it would be merged with the contributions of other authors, as inseparable or interdependent parts of a unitary whole.

This proposed law cures the inequities that are present in the current joint authorship law, grants copyright protection to those who deserve it, and promotes the Constitutional purpose behind granting Congress the power to make copyright laws, all while maintaining the appropriate balance between contract law and intellectual property law.

CONCLUSION

If the purpose of extending the monopoly of copyright protection is “to stimulate artistic creativity for the general public good,”²⁰⁰ then the current joint authorship law in America is failing to achieve that purpose. The courts have taken a purely textualist approach to interpreting the joint authorship law,²⁰¹ but failed to consider the unreasonable results. Absent intent at the time of creation, if a party makes an original and significant contribution to the final product, that party should be recognized as a joint author. The party has earned the protection and the recognition that comes from holding copyright through the efforts exhausted in helping to

199. *Gaiman v. McFarlane*, 360 F.3d 644, 658–59 (7th Cir. 2004).

200. *Twentieth Century Music Corp. v. Aiken*, 422 U.S. 151, 156 (1975).

201. *Childress v. Taylor*, 945 F.2d 500, 505–06 (2d Cir. 1991).

make the final product. The courts have also placed the requirement of independent copyright ability into the joint authorship law, a requirement that has no basis in the text of the statute nor the congressional discussion behind the statute.²⁰² This requirement fails to protect people who make incredibly important contributions to a project, like structure and the original idea that sparks the creation of the project. It also can create results where the copyright over a final product is owned by no one involved in its creation, as evidence by *Gaiman*.²⁰³ Ideally, this requirement should be completely abolished. But if a secondary requirement is necessary, then the *de minimis* standard, as proposed by Nimmer, would suffice to ensure the protections that are needed for equity and fairness.²⁰⁴ Under this system, Lynn Thomson may have had a meritorious claim to copyright protection as a collaborator.

The essence of copyright law is to incentivize creation.²⁰⁵ To properly do this, copyright law must incentivize solo and joint works. The best way to do this is to incorporate the “two alternative criteria”²⁰⁶ Congress focused on when passing the 1976 Act: intent or collaboration.²⁰⁷ Because the American courts have set intent as the sole criterion, the meaning of “collaboration” should be derived from the United Kingdom’s joint authorship law, which has no intent requirement and focuses on collaboration in terms of significance and originality.²⁰⁸ This new joint authorship system would focus not only on intent but also encourage collaboration. This would work to cure the current inequities present in the joint authorship law, opening up a new world of creativity and allowing the public to flourish in a way the Constitution intended.

202. 17 U.S.C. § 101; S. REP. NO. 94-473, at 286 (1975); H.R. REP. NO. 94-1476, at 120 (1975).

203. *Gaiman*, 360 F.3d at 658–59.

204. NIMMER & NIMMER, *supra* note 65.

205. *Sony Corp. of America v. Universal City Studios, Inc.*, 464 U.S. 417, 429 (1984).

206. *Childress*, 945 F.2d at 505.

207. H.R. REP. NO. 94-1476, at 120.

208. *Fisher v. Brooker* [2006] EWHC (Ch) 3239 [46] (Eng.).



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