

The Contribution of Forensic and Expert Evidence to DNA Exoneration Cases

 An Interim Report

December 2022



**INNOCENCE
PROJECT**



THE NATIONAL REGISTRY
OF EXONERATIONS

The National Registry of Exonerations is a project of the University of California Irvine Newkirk Center for Science & Society, University of Michigan Law School & Michigan State University College of Law

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Seventeen years after Robert McClendon was sentenced to 15 years to life in prison for allegedly raping his own daughter, a joint investigation by the Ohio Innocence Project and the Columbus Dispatch led to DNA testing that proved his innocence and exonerated him of the crime. He was released from prison in August 2008. McClendon was convicted in part based on the state's allegation that he had failed a polygraph examination, a rare use of polygraph evidence during trial. (Image: Shari Lewis / Columbus Dispatch)

■ Introduction

In 2017, Gerald LaPorte published a study on the role of forensic science in wrongful convictions.¹ LaPorte pointed out a discrepancy between the Innocence Project (IP) and the National Registry of Exonerations (NRE) in their coding of forensic science as an influential factor in wrongful convictions in the United States. He noted that the IP reported forensic science played a role in 157 (46%) of the 342 DNA exoneration cases listed by the IP. LaPorte checked the same cases in the NRE and found forensic science listed as a contributor in only 133 (39%) of those 342 cases. In other words, there were coding discrepancies in 24 of 342 cases. The implication appeared to be that the IP overstated the contribution of forensic science to wrongful conviction. Some forensic

scientists previously leveled that charge explicitly.²

This report describes a five-year process of reconciliation undertaken by the two organizations and the results of that reconciliation. It offers a more accurate accounting of the role of forensic science in DNA exoneration cases. This is an "Interim Report" because it is part of a larger process by which the NRE will produce a comprehensive report on the contribution of forensic and expert evidence to all exoneration cases since 1989, currently more than 3,200. That project will take some time to complete. In the meantime, this Interim Report may clarify the record on the use of faulty forensic science in DNA exoneration cases.

■ Background

Since the 1940s, research on wrongful convictions³ in the United States has involved the compiling of “lists” of wrongful convictions. Such lists serve several purposes, (1) to document that wrongful convictions do occur, (2) to enable researchers to count various categories of cases, and (3) to develop rough measures on issues of interest, such as the prevalence of, and contributing factors in, wrongful convictions.

Another common — even ubiquitous — activity in wrongful conviction research has been the naming and counting of common factors that contribute to, if not necessarily cause, significant numbers of wrongful convictions. While the number and names of

the contributors have varied, over the years a general consensus has emerged around a familiar list of factors. A list of often cited factors includes:

- 1. Eyewitness misidentification
- 2. False accusation
- 3. False confession
- 4. Forensic evidence
- 5. Inadequate legal defense
- 6. Informant evidence
- 7. Police misconduct
- 8. Prosecutorial misconduct

The IP and the NRE track the contributing factors:

Table 1. Contributing factors listed by the IP and NRE.

IP	NRE
Eyewitness Misidentification	Mistaken Witness Identification
False / Confession / Admission	False Confession
Informants	Perjury or False Accusation
Misapplication of Forensic Science	False or Misleading Forensic Evidence
	Official Misconduct
	Inadequate Legal Defense

The IP started as a litigation organization dedicated to using the power of forensic DNA profiling to exonerate wrongly convicted persons. Following its early success in that endeavor, the IP partnered with the National Institute of Justice (NIJ) to enter the world of list-making and factor-counting. The 1996 NIJ publication, *Convicted by Juries, Exonerated by Science* offered a list of 28 “DNA exonerations” — persons who had been exonerated by means of post-conviction DNA testing.⁴

Convicted by Juries changed the landscape of exoneration list-making. An earlier list had been vulnerable to challenge by innocence skeptics who disputed whether one or more individuals on the list was truly innocent.⁵ Such challenges were less plausible for DNA exonerations in which, typically, the exoneree had been excluded as a contributor to a highly incriminating crime scene stain of biological fluid.

The task of listing DNA exonerations shifted to the IP co-founders’ book, *Actual Innocence*, and then to the IP’s [website](#). For about a decade, it became the canonical “list” of wrongful convictions in the United States, relied on by courts, scholars, journalists, and the public concerning the risk of wrongful conviction.⁶

Still, the IP list had a crucial restriction. It was limited to what are commonly called “DNA exonerations” — that is, exonerations that had been brought about through post-conviction DNA testing of preserved evidence. But people had been exonerated for decades before the development of DNA testing (see the [Registry of Exonerations before 1989](#)), and they continued to be exonerated by other means after its development.

Indeed, it was well understood within the field that “DNA exonerations” were only possible in a small set of criminal cases meeting a specific set of conditions. Roughly, these were:

1. The perpetrator left an analyzable quantity of genetic evidence at the crime scene;
2. There was general agreement that the

person who was source of that genetic evidence was responsible for the crime and it was not innocently deposited by someone not involved in the crime (e.g., the genetic evidence was collected in a rape kit in a single-assailant stranger rape case);

3. No, or inadequate, DNA testing on that evidence was performed before trial;
4. The person charged with the crime was convicted of the crime;
5. The biological evidence was preserved;
6. DNA testing of the evidence was done after conviction and produced probative results.⁷

“DNA exoneration” was unlikely in cases that did not meet that stringent list of conditions. But plain “exoneration” occurred in many cases nonetheless. There were other means to exoneration aside from post-conviction DNA testing such as witness recantations, the development of alibis, discovery of new witnesses, new physical or forensic evidence, the identification of the true perpetrator, and “no-crime” cases.⁸

Other researchers continued to compile more inclusive lists of exonerations.⁹ The NRE launched in 2012 with the goal of providing a comprehensive archive of all known exonerations in the United States. The NRE can be characterized as an effort to consolidate and rationalize all of the various list-making activities that had been occurring over the previous couple of decades. Such activities would include, in addition to the work of the IP, the work of the Center on Wrongful Convictions (CWC); scholarly efforts, such as those of Gross and colleagues, Bedau and Radelet, and Garrett; efforts to develop a proposed *Encyclopedia of Wrongful Convictions* by Warden and Radelet; and *Justice Denied*, a website compiled by Hans Scherrer.¹⁰ The distinction between the NRE and the IP lists is that the NRE list is not confined to “DNA exonerations” — it includes exonerations by any means. Beginning in 2012, the NRE emerged as the authoritative list of all known exonerations in the United States.

Exonerations are not the same as wrongful convictions, and defining exonerations in a manner that

does a good job including the innocent and excluding the guilty is a difficult task. The NRE's definition of exoneration ([a complete version of which is available on the NRE web site](#)) is deferential to legal actors, rather than researchers' judgments, in designating a formerly convicted person as "exonerated." The definition is designed to include as many factually innocent people, while including as few factually guilty people, as possible. Nonetheless, the definition is conservative; it is crafted to exclude many more factually innocent than it includes factually guilty people.

The NRE definition of exoneration requires:

1. That a person be convicted of a crime;
2. Be relieved of all the consequences of that conviction and all related convictions;
3. That the relief be granted at least in part because of new evidence of innocence;
4. Without unexplained physical evidence of guilt.

Many factually innocent people probably do not meet this definition. To name just one example that will be mentioned below, convicted persons who take Alford pleas — pleading guilty while not conceding guilt — are not listed as exonerated. In post-conviction litigation, it is not uncommon for people convicted of a crime to be offered Alford plea deals that would be irrational for even a factually innocent person to decline (i.e., taking the plea allows them to go home; declining it requires staying in prison and hoping the criminal legal system redresses the false conviction in some other way).

A crucial point of this background is that the IP and the NRE maintained very different lists. The IP curated a smaller, specialized list of "DNA exonerations" now numbering 375. The NRE developed a much larger list of all exonerations in the United States since 1989, now numbering more than 3,200. Despite these differences, the two organizations did share a common data set: DNA exonerations. The NRE publicly labelled DNA exoneration cases, which allowed researchers (like LaPorte) to narrow the NRE data set to be

equivalent to the IP data set and compare the two. The NRE's decision to treat 1989, the year of the first DNA exoneration, as its inception year also helped match the two data sets.¹¹

The two lists had other similarities as well. Both undertook social science coding of their cases, although their coding schemes were different (see Table 1), and both published narrative summaries of each case.

LaPorte was correct that having inconsistent coding between the two leading archives of a common data set was undesirable and confusing for researchers. He did both organizations a service in pointing out the problem. The IP and NRE's efforts to address it have resulted in better coordination between the two organizations, greater clarity with respect to false convictions data, and improved procedures for coding cases within and between both organizations.

While this project was ongoing, another important development transpired. The IP changed its policy for listing cases on its website. The IP *used* to track all DNA exonerations nationwide (cases in which post-conviction DNA testing was central to exoneration, both the IP's cases and others) but for a variety of reasons, after reaching 375 DNA exonerations nationwide in early 2020, they pivoted to tracking *all* IP successes (meaning DNA exonerations *and* exonerations with other evidence *and* other victories such as post-conviction Alford pleas¹²) and *only* IP successes (meaning no cases that they didn't do substantial work on). Accordingly, the IP website has a static page summarizing [the first 375 DNA exonerations nationwide](#) and a dynamic page summarizing [the 241 IP victories to date](#) (which is updated quarterly).¹³

Both of these pages are different from what the NRE presents. The reasons that the NRE reports higher numbers of DNA exonerations are: 1) they have continued to track these cases since 2020; and 2) they have a more expansive definition of DNA exoneration than the IP has historically used (the IP only

counted cases in which post-conviction DNA testing was “central” to exoneration, whereas the NRE counts exoneration cases in which post-conviction DNA testing played a role in the exoneration). Researchers can also obtain real-time lists of DNA exoneration cases, by this more expansive definition, by [filtering the National Registry of Exonerations for DNA](#).

In this report, the term “DNA exoneration” refers to the narrower IP definition, unless it is described as “NRE-defined.”

■ Procedure

Initial Data Set

The IP and NRE began by identifying DNA exoneration cases in which the IP and the NRE were inconsistent in their coding of forensic evidence as a contributing factor. The IP and NRE soon discovered that LaPorte had understated the problem. In addition to the 24 cases LaPorte identified, the IP and NRE found 5 additional DNA exoneration cases that the IP had coded with a forensic evidence contribution and the NRE had not, for a total of 29 misaligned coding classifications. Conversely, the IP and NRE found 13 DNA exoneration cases with the opposite situation: the NRE reported that forensic evidence

contributed to the false conviction, but the IP reported that it did not.

The IP and NRE also consulted a third data source: Garrett’s archive of the DNA exoneration cases, [Convicting the Innocent](#) (CTI).¹⁴ This constitutes a third archive of this common data set, and the IP and NRE found 4 cases for which CTI coded a forensic contribution that neither the IP, nor the NRE mentioned. Garrett provided the IP and NRE with useful information but did not participate in the reconciliation process. This gave the IP and NRE an initial data set of 46 DNA exoneration cases in which there was a coding discrepancy between the three organizations (Table 2).

Table 2. Initial data set of 46 DNA exoneration cases coded inconsistently with regard to forensic science contribution, as of October 14, 2017.

Forensic science contribution?		
National Registry of Exonerations	Innocence Project	
	Yes	No
	Yes	13
	No	4

Figure 1. Forensic science contribution to 351 DNA exonerations according to Innocence Project and National Registry of Exonerations, as of October 14, 2017.

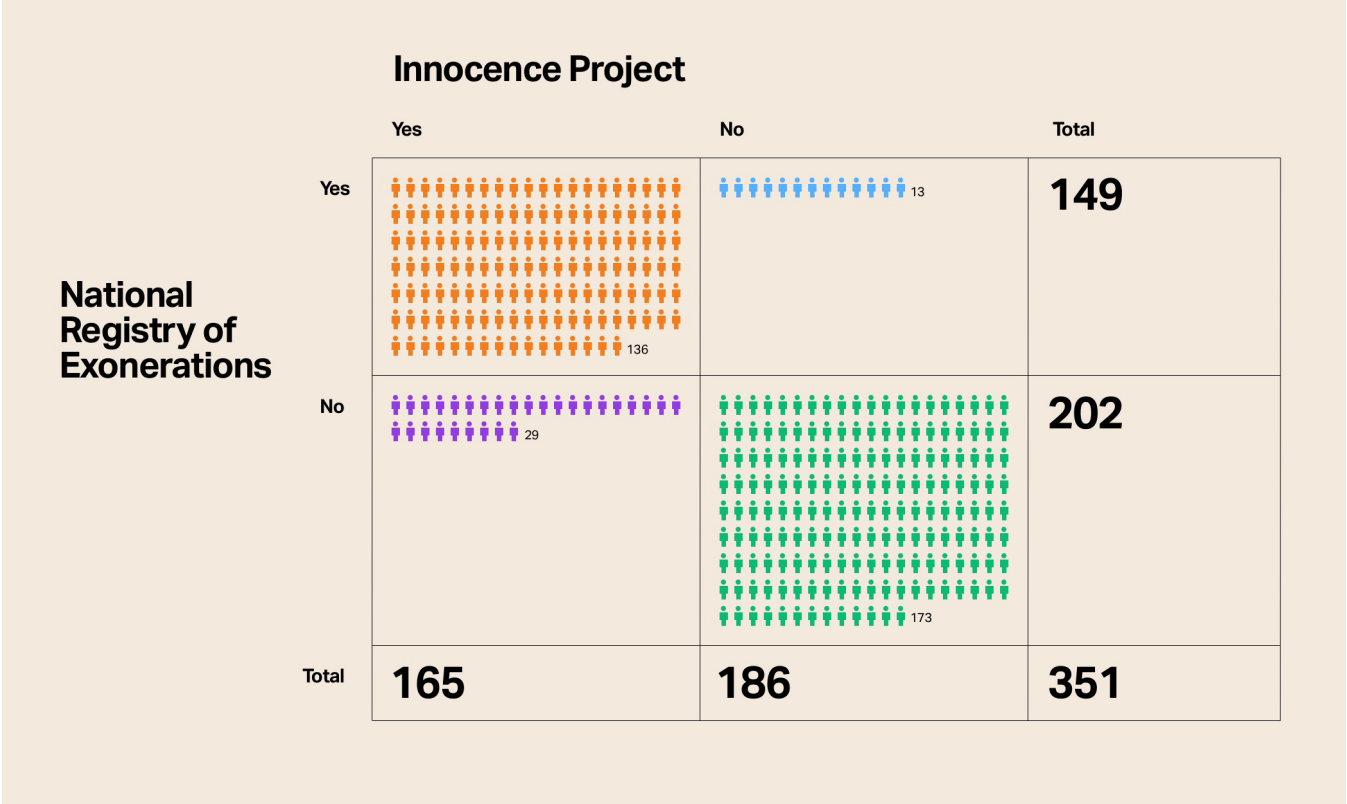


Figure 1 shows the coding by the two organizations of all 351 DNA exonerations known at the time we began the reconciliation process on October 14, 2017.

The Forensic Contributing Factor

While both the IP and the NRE coded a forensic evidence contributing factor, the two organizations’ definition of that factor was not the same. The IP definition in 2017 was:

Misapplication of Forensic Science (MFS) — For the purposes of IP research, the misapplication of forensic science is defined as an instance in which we know that forensic evidence was

used to associate, identify, or implicate someone who was later conclusively proven innocent with post-conviction DNA testing, thereby demonstrating (in most cases or situations) that the original forensic evidence was incorrect. This includes unreliable or invalid forensic disciplines, insufficiently validated methods, misleading testimony, mistakes, and misconduct. This does not include instances in which forensic evidence was properly collected and preserved, analyzed using valid and reliable techniques, and presented accurately and completely (e.g., ABO blood typing of a non-contaminated sample which correctly reports population statistics and accounts for “masking”).

The NRE definition was:

False or Misleading Forensic Evidence (F/MFE) — Exoneree’s conviction was based at least in part on forensic information that was (1) caused by errors in forensic testing, (2) based on unreliable or unproven methods, (3) expressed with exaggerated or misleading confidence, or (4) fraudulent.

The IP and NRE entered into discussions to consider a common definition. While the IP and NRE entered the process with open minds as to the possibility of agreeing upon a common definition, the IP and NRE were well aware that might not be possible. The immediate goal was to articulate, understand, and clarify the two organizations’ definitional differences rather than to eliminate them. In addition to the IP and NRE discussing these questions with one another, we convened a Forensic Advisory Group consisting of 14 experts (see the [Acknowledgements](#) for a list) with a variety of perspectives on forensic evidence. Partly as a result of these discussions, the NRE revised its definition of F/MFE to:

False or Misleading Forensic Evidence (F/MFE) — Faulty or misleading expert or forensic evidence may have led to a factually erroneous conclusion, at any stage of the investigation or adjudication, that contributed to the false conviction.

Table 3. Final disposition of 46 cases in reconciliation process between Innocence Project and National Registry of Exonerations, May 27, 2022.

Final Results	Yes	No
Forensic Contributing Factor?	39	7

A detailed account of the NRE’s decisions and reasoning in redefining F/MFE may be found in Appendix 1. In the discussion below, this report uses the Forensic Contributing Factor (FCF) as a general term that encompasses both F/MFE and MFS.

Results

The IP and NRE then applied the definition of F/MFE to the 46 cases in the data set. Although many cases were straightforward, there were a number of challenging cases that forced the authors to make difficult coding decisions and better refine the IP and NRE’s definitions.

This process resulted in a final coding of all 46 cases. Table 3 shows the final distribution of the 46 cases considered. As shown, most cases (39) turned out to be coded “Yes” for a forensic evidence contribution after the reconciliation process.

Other Coding Changes

False conviction research is beset by informational deficits. Although the NRE usually has access to important public legal documents, such as judicial rulings, briefs and motions, and sometimes trial transcripts, it has incomplete information about almost every case. The NRE is also a living archive. This has two consequences. First, the NRE constantly adds new cases (the NRE adds almost one new exoneration for every business day of the year). During the review period, the NRE added 24 new exoneration cases that met the IP’s definition of a DNA exoneration. Second, the NRE continually receives new information about its more than 3,200 cases. Based on this new information, the NRE routinely updates those stories. In some cases, these revisions require coding changes.

It is not surprising then, that, during a five-year period (half the NRE’s existence) other coding changes occurred in DNA exoneration cases in response to new information that came to light by other means. In some cases, new details may be provided to the NRE by external researchers. In other cases, the NRE may

revisit, rewrite, or recode a case for other reasons and discover previously overlooked or miscoded forensic evidence. The following discussion summarizes how many cases were assigned to each category and why.

Detailed Discussion of Coding Changes

Consensus-Yes-to-No Changes (Orange in Figure 1)

During the five-year review process, four of the 136 cases that both organizations had initially coded Yes for FCF were recoded No. All four ([Robert Wilcoxson](#), [Damian Mills](#), [Larry Williams, Jr.](#), and [Teddy Isbell](#)) were convicted of the same murder that [Kenneth Kagonyera](#) was convicted of. In this troubling case, the five were convicted despite the fact that DNA testing excluded all of them. Kagonyera requested the DNA results, but the results were not turned over to the attorneys of any of the five suspects, all of whom pleaded guilty. Under the IP and the NRE's revised definition of FCF, concealment of exculpatory results is a form of prosecutorial misconduct, not a form of FCF, *unless the concealment was done by the forensic service provider* (see Appendix 1 for further discussion of this coding rule). In these cases, the IP and the NRE have no evidence that it was the laboratory, rather than the prosecutor, that concealed the exculpatory forensic evidence, so the cases are coded No for FCF.

Consensus-No-to-Yes Changes (Green in Figure 1)

In the reverse process, 12 of the 173 cases that both organizations initially coded No for FCF were recoded Yes. All 12 are cases in which hitherto unnoticed information about forensic evidence was brought to the two organizations' attention during the review period. Three of the cases ([Kenneth Waters](#), [Anthony Caravella](#), and [Lafonso Rollins](#)) were highlighted for reconsideration because CTI coded them Yes for FCF. Caravella and Rollins are clear cases of FCF involving biological evidence that was overlooked by both

organizations. The Waters case hinged on the question of whether FCF "counts" when perpetrated by an official actor other than a forensic analyst (in the Waters case a police officer). The IP and NRE's answer is: Yes. See Appendix 1 for further discussion of this coding rule.

Three additional cases ([Knolly Brown, Jr.](#), [Dale Mahan](#), and [Ronnie Mahan](#)) were brought to the NRE's attention by another NRE research project on microscopic hair comparison analysis (MHCA). Previously overlooked MHCA evidence contributed to the Mahan brothers' case. Although MHCA evidence prompted the NRE to take a closer look at the Brown case, the MHCA evidence did not, in fact, contribute to the conviction. However, previously unnoticed biological evidence did contribute.

Four cases ([Scott Fappiano](#), [Calvin Willis](#), [Nicholas Yarris](#), and [Charles Chatman](#)) are cases involving serology evidence that were brought to the NRE's attention by an external researcher. More thorough review of the serological evidence persuaded the NRE that these cases should be coded Yes for FCF. Two cases ([Damon Thibodeaux](#) and [Malcolm Bryant](#)) came to the NRE's attention when NRE researchers were updating the cases in light of new information unrelated to forensic evidence. In rewriting and recoding the cases, they discovered that there was FCF that had not been coded.¹⁵

IP-Yes-NRE-No Cases (Purple in Figure 1)

Of the 29 discrepant cases that the IP coded "Yes" and the NRE coded "No," the IP turned out to be "right" almost all the time. The NRE recoded 28 of those 29 cases "Yes." In half (14) of those 28 cases, the NRE had lacked complete information about the forensic evidence in the case. Most (11) of those were serology cases for which, after the cases were originally coded, more has been learned about the problem of "masking" in serology.¹⁶ Two cases ([Rolando Cruz](#) and [Alejandro Hernandez, who were convicted of the same murder](#)) involved shoe prints, and one case ([Douglas Warney](#)) involved fingerprint evidence.

With regard to the other half (14) of the 28 recoded cases, eight were MHCA cases in which the NRE had

coded testimony that questioned hairs were “consistent with” known hairs from a person of interest as not F/MFE. The NRE now codes such testimony as F/MFE, and has recoded these cases accordingly. See Appendix 1 for further discussion of this coding rule and the forthcoming NRE report on MHCA evidence in false conviction cases. Five involved disciplines which the NRE had not been coding as “forensic.” Three ([Juan Rivera](#), [Byron Halsey](#), and [Robert McClendon](#)) were lie detection cases, one ([James Ochoa](#)) was a canine evidence case, and one ([Ronald Cotton](#)) involved “shoe rubber analysis.” Both organizations now adhere to an inclusive definition of forensic and expert evidence (see Appendix 1 for further discussion of this coding rule). The last case ([James O'Donnell](#)) involved bitmark evidence and had been miscoded by the NRE. The one of the 29 cases that remained coded “No” ([Walter Snyder](#)) was a serology case in which the evidence had been appropriately presented.¹⁷

NRE-Yes-IP-No Cases (Blue in Figure 1)

Of the 13 discrepant cases that the NRE coded Yes, and the IP coded “No”, the IP recoded 9 “Yes” and 4 “No”. The nine cases were coded “Yes” for a variety of reasons. Three ([Randolph Arledge](#), [Sharraf Wilson](#), and [Anthony Yarbough](#)) involved forensic pathology, which, at the time, the IP did not include in its classification of forensic science. Both organizations now adhere to an inclusive definition of forensic and expert evidence (see Appendix 1 for further discussion of this coding rule). Two cases involved the kind of “consistent with” evidence discussed in the previous section — one ([Richard Alexander](#)) involving hair, and one ([Entre Nax Karage](#)) involving serology. One case ([Garry Diamond](#)) was a serology case for which the IP lacked complete information. One case ([Marcellius Bradford](#)) was originally coded No by the IP because it was believed that the evidence implicated people charged with the same crime as Bradford, but not Bradford himself and Bradford pled guilty without knowledge of that evidence.¹⁸ The IP and the NRE now code FCF when forensic evidence implicates one of multiple people charged with the same crime (see Appendix 1 for further discussion of this coding rule).

In one case ([Maurice Patterson](#)), DNA evidence was concealed in part by the actions of the forensic laboratory in addition to the police and the prosecutor.¹⁹ The case thus falls within the rule that excluded the *Kagonyera et al.* cases discussed above. And, one case ([Larry Holdren](#)) involved the denial of a reasonable request for DNA testing. The IP and NRE only code such cases when they were brought about by the activity of a forensic service provider, rather than, say, a prosecutor (see Appendix 1 for further discussion of this coding rule). Holdren requested DNA testing of the rape kit, but the hospital destroyed it within 3 months of collection.²⁰ Because the evidence in question was a rape kit, the IP and the NRE consider the hospital to be a forensic service provider.

The four cases that were coded “No” were so coded for various reasons. In two cases ([David Lee Wiggins](#) and [Anthony Chaparro](#)), negative tests for biological material were contradicted years later by positive tests. The IP and NRE’s view is that the negative results were not FCF given the technology of the time. In one case ([Kerry Kotler](#)), the serologist who testified was later convicted of perjury for falsifying his credentials in other cases. The IP and NRE did not code this case FCF because the IP and the NRE have no evidence that he falsified his credentials in Kotler’s case (although the IP and the NRE do not have a transcript of the trial, so the IP and the NRE do not know for sure). The last case ([Jerry Miller](#)) was simply a coding error by the NRE.

Newly Added Cases

Finally, as noted above, 24 new IP-defined DNA exonerations were added during the review. False or misleading forensic evidence contributed to one quarter (6) of them.

Summary

Figure 2 shows a snapshot of the NRE’s assignment of the FCF among the 375 DNA exonerations listed by the IP on April 28, 2022 compared to the assignment of the FCF to these cases on Oct. 14, 2017. Figure 2 reflects not only the recoding of the 46 discrepant cases, but

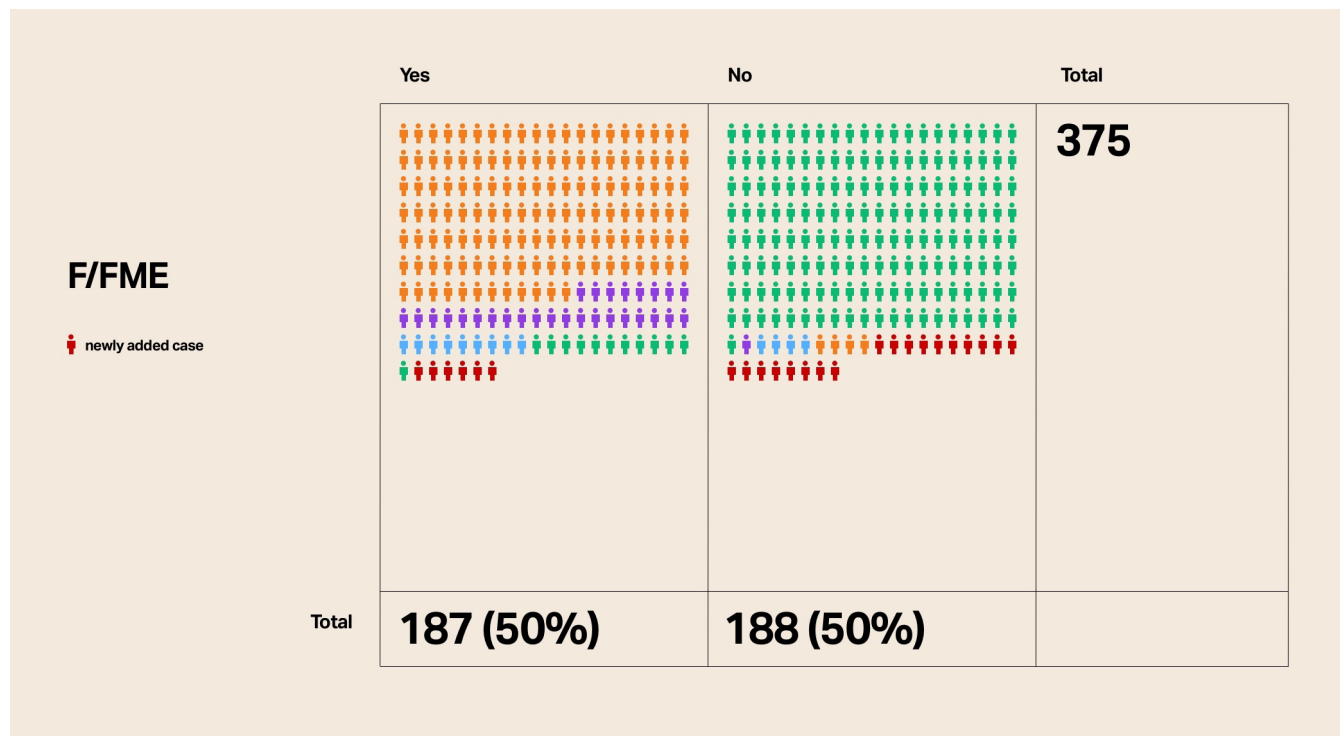
also other coding changes that occurred during this interval. Figure 2 offers what the IP and NRE believe is the current best accounting of the contribution of forensic science to DNA exonerations. However, coding decisions on some of these cases may change in response to new information. Although coding changes go in both directions, in the aggregate, coding changes trend in the direction of a greater occurrence of FCF. This is because coding changes are usually in response to new information, and new information tends to find more previously unknown problems with forensic evidence.

As Figure 2 shows, false or misleading forensic evidence contributed to half of the 375 IP-defined DNA exonerations. This report's final figure — that forensic evidence contributed to half of IP-defined DNA exonerations — is slightly higher than both the discrepant figures (46% and 39%)— cited in LaPorte's article. Some of this increase is a result of the IP and NRE's joint reconsideration of their definitions of the

FCF which resulted in a more inclusive definition. However, as the above discussion shows, most of the recoded cases were recoded not because of a changing definition, but because of new information.

This is an important point. The more the IP and the NRE learn about false convictions, the more they find that forensic or expert evidence contributed to them. In the IP and the NRE's experience, review processes, like this one, will result in cases being recoded in both directions (Yes to No and No to Yes). On balance, a review process tends to yield more changes toward Yes than toward No. Again, this is because false conviction research is always working with incomplete information. There is always more to learn about a case. In general, the more you learn about a false conviction, the more problems you find. This suggests that the IP and the NRE's count remains a conservative undercount. It further indicates that there remain forensic contributions to false convictions that wrongful conviction researchers do not know about.

Figure 2 . Forensic science contribution to DNA exonerations, May 27, 2022. Colors refer to the case's original status as shown in Figure 1 except for red, which refers to newly added cases.



■ Non-DNA Exonerations

If one wanted to use the NRE to question the IP's claims about the prominent role that forensic evidence plays in exoneration cases, one might consider non-DNA exonerations. As we've mentioned, the NRE lists more than 3,200 exoneration cases; fewer than 20% of those cases are DNA exonerations by any definition. At the time of writing, F/MFE contributed to 23% of all exonerations; that proportion has remained generally consistent, at about one quarter, throughout the NRE's existence. This number is expected to increase slightly, but not dramatically, as the NRE applies the revised definition to non-DNA cases.

The reason for this is that FCF occurs more frequently in DNA exonerations than in non-DNA exonerations. The current rate of F/MFE for non-DNA exonerations alone is 18% (495/2716, as of November 4, 2022). Thus, while forensic evidence does appear to contribute to nearly half of all DNA exoneration cases, it appears to contribute to only about one quarter of all exonerations, and less than a fifth of exonerations with no DNA evidence. This is hardly surprising. DNA exonerations are cases in which the analysis of biological evidence contributed to the exoneration. Thus, forensic evidence existed for the case, and forensic evidence was therefore more likely to contribute to the conviction in the first place.²¹ Non-DNA exonerations are a more heterogeneous set of cases.

The distinction between DNA and non-DNA exonerations is also important for LaPorte's claim that "there has not been a significant number of erroneous convictions related to forensic science since the mid-1990s." LaPorte made this observation on the basis of data about DNA exonerations, and it is accurate for DNA exonerations based on convictions since the late 1990s (regardless of when the exonerations occurred). However, the decline in forensic-contributed false convictions that LaPorte observed is better explained by a decline in DNA exonerations generally

than by a decline in forensic-contributed false convictions (or, as perhaps implied, an improvement in forensic science in the 21st century). Figure 3 displays the numbers of DNA exonerations and of forensic-contributed DNA exonerations by year of conviction. It shows that the decline in forensic-contributed DNA exonerations after 1990 — and especially after 1998 — reflects a decline in DNA exonerations generally.

The cause of the decline in DNA exonerations is well understood. Almost three quarters of DNA exonerations are from rape or rape-murder convictions in which DNA evidence was used to prove that the person convicted of the crime was not the rapist. There were 215 such rape-murder DNA exonerations for convictions in the 1980s, but only 27 for convictions since 2000, and none for convictions in the last 12 years.²² Cases with misidentified people convicted of rape probably go to trial less frequently today. Starting in the late 1980s, forensic DNA testing has become increasingly available throughout the country. It is now routinely used to evaluate the guilt or innocence of any rape suspect who denies sexual contact with the victim before charges are filed. This change is a singular accomplishment of forensic science.

Figure 4 displays the numbers of exonerations by the years in which the exonerations occurred, years or sometimes decades after the original erroneous conviction. It shows that while the annual number of exonerations by means other than post-conviction DNA testing has increased greatly since the year 2000, the number of DNA exonerations has drifted slightly lower, and the share of all exonerations that include DNA evidence has declined substantially.

Again, the reader gets a more complete picture by looking at all exonerations, rather than just DNA

Figure 3 . Year of conviction of all IP-defined DNA Exonerations and those with False or Misleading Forensic Evidence (F/MFE). The data table for this figure is available at <https://n2t.net/ark:/88112/x2bg8f>.

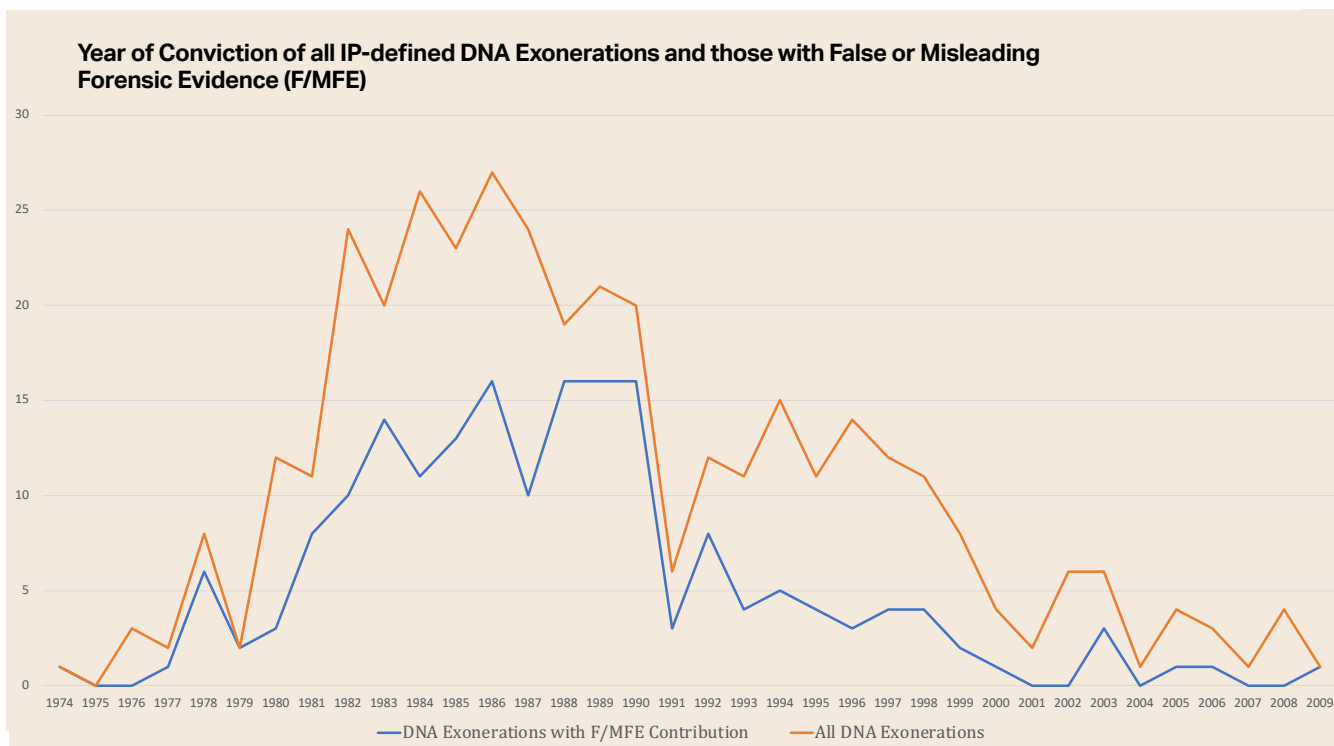
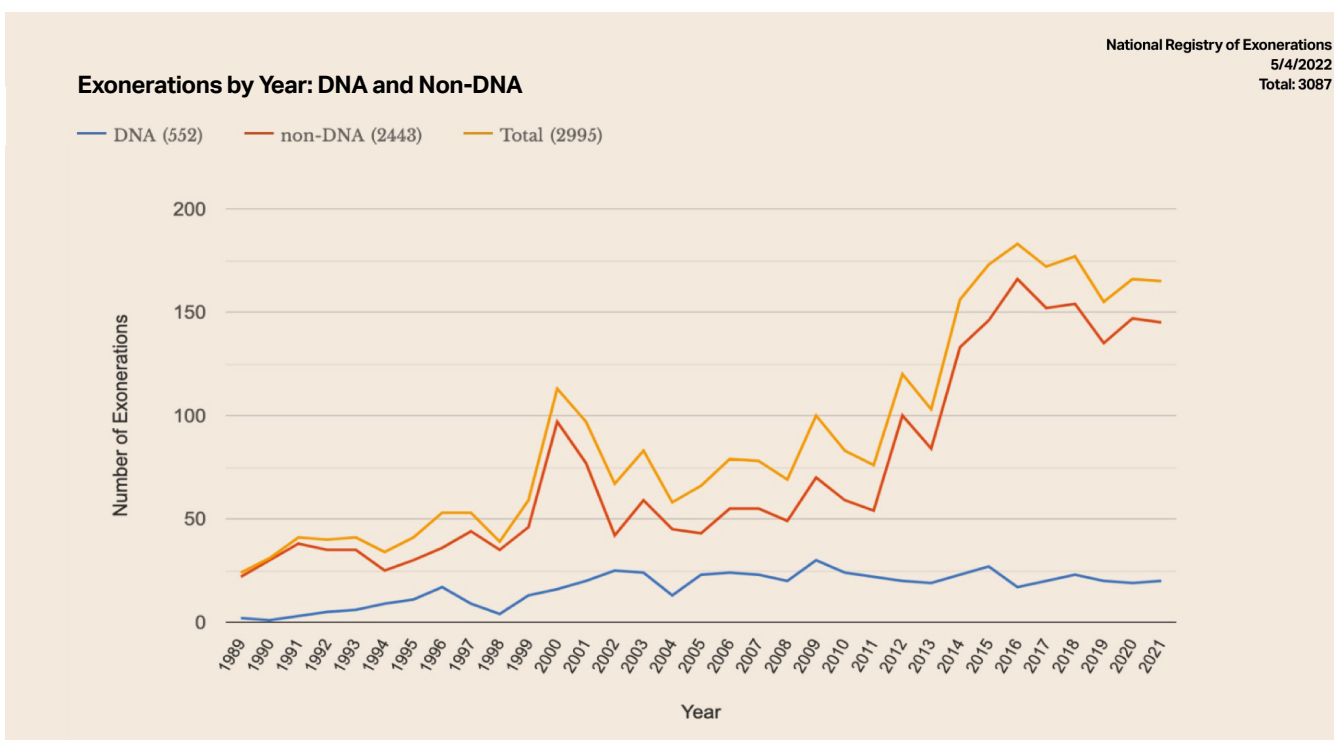


Figure 4 . DNA and non-DNA exonerations by year of exoneration through 2021. NRE broader definition of "DNA exoneration" is used. Source: National Registry of Exonerations, <https://www.law.umich.edu/special/exoneration/Pages/Exoneration-by-Year.aspx>, snapshot on May 4, 2022.



exonerations. Figure 5 shows that when all exonerations are considered, rather than just DNA exonerations, there is no general decline in the number of forensic-contributed exonerations by year of conviction since the early 1980s. Rather, forensic-contributed false convictions generally track all false convictions. There is, inevitably, a decline in all exonerations for convictions after 2014 because the time lag from conviction to exoneration — on average, 11.6 years — means that many exonerations from those years have yet to happen. That effect is somewhat larger for exonerations with F/MFE, which have a larger average lag from conviction to exoneration, 13.1 years.

Whereas LaPorte's study of forensic-contributed

DNA exonerations found that for 83% of them the conviction occurred prior to 1991, for all forensic-contributed exonerations the conviction occurred prior to 1991 in only 37% (266/723). Likewise, while LaPorte's study found that only 2 of 133 forensic-contributed DNA exonerations were from convictions after 2000, the conviction occurred after 2000 in 38% (277/723) of all forensic-contributed exonerations. These observations do not support a claim that the problems of 20th century forensic science have been solved in the 21st century.

Another view is shown in Figure 6. The brown line in Figure 6 displays all exonerations in the NRE as of May 4, 2022, by year of conviction, from 1978 through

Figure 5 . All exonerations and exonerations with False or Misleading Forensic Evidence contribution by year of conviction (n=3087). Dashed lines indicate likely incomplete data because of lag between conviction and exoneration. National Registry of Exonerations snapshot, May 4, 2022. The data table for this figure is available at <https://n2t.net/ark:/88112/x2bg8f>.

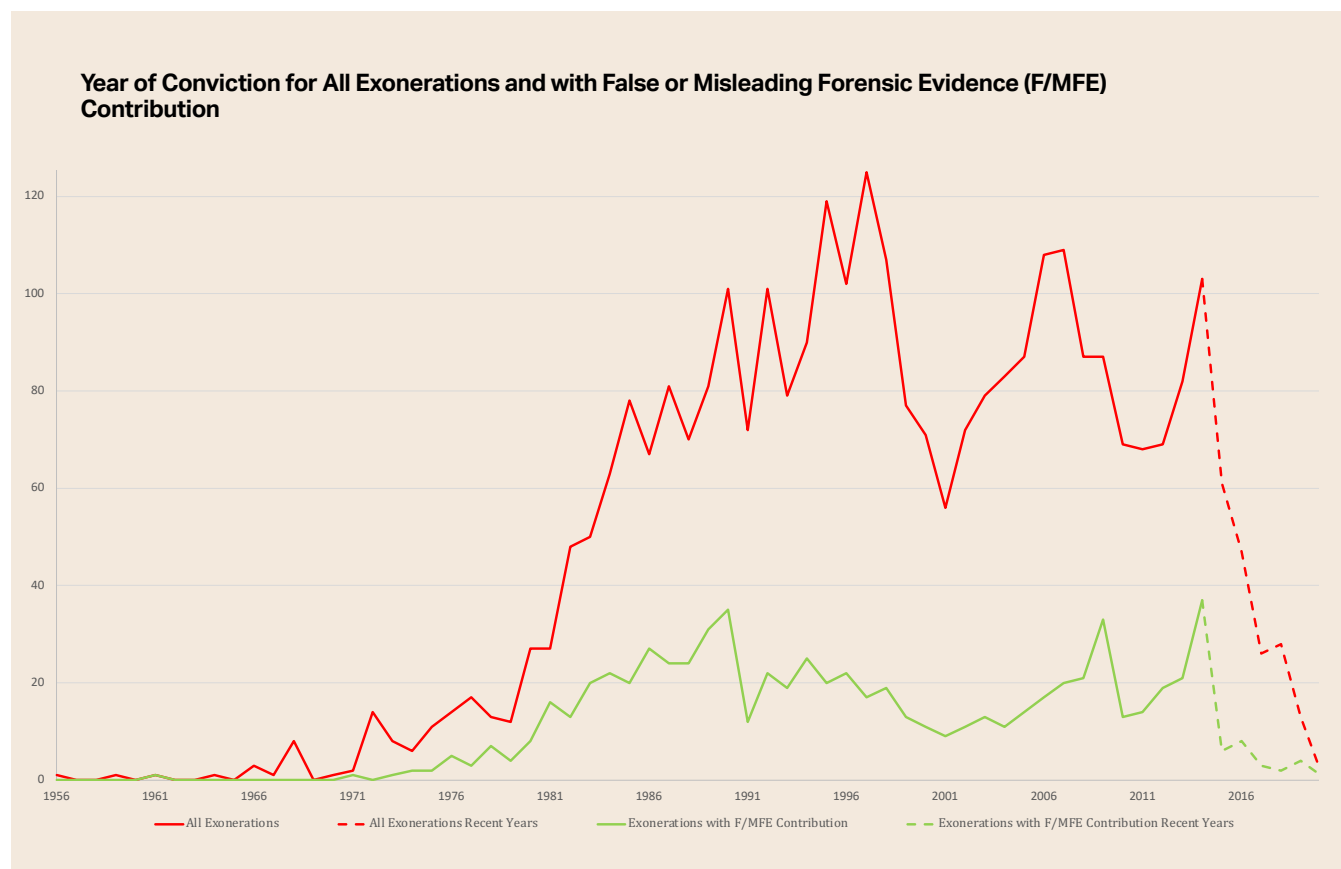
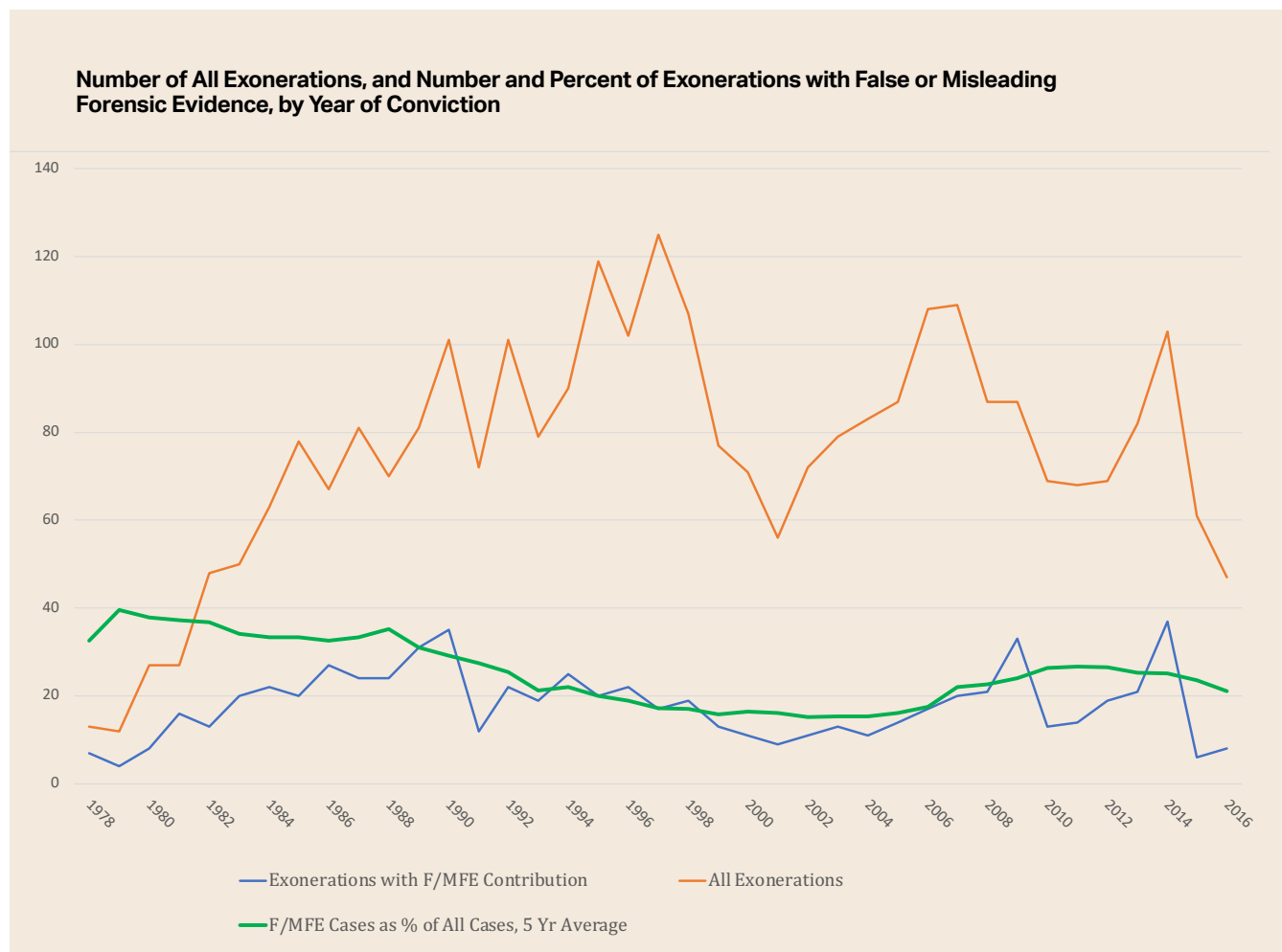


Figure 6 . Number of All Exonerations, and Number and Percent of Exonerations with False or Misleading Forensic Evidence, by Year of Conviction. The data table for this figure is available at <https://n2t.net/ark:/88112/x2bg8f>.



2016, the years in which there were more than 5 exonerations with F/MFE; the blue line displays all forensic-contributed exonerations for those years; and the green line displays a five-year running average of the percentage of all exonerations that include F/MFE.²³ The percentage of exonerations with F/MFE — the blue line — has certainly not been decreasing since 2000; if anything, it seems to have increased.

To be sure, the mix of forensic disciplines implicated has changed over time. For example, the spike in 2013-14 represents a batch of exonerations from Harris County, Texas in which presumptive field drug tests were implicated. Some problems with forensic evidence will probably be addressed and new problems may emerge, but there is no reason to believe that the overall problems with expert evidence will simply disappear. Some forensic techniques may improve,

some may be discontinued altogether, and others will be developed. These data may allow researchers to track these developments over time.

Future Research

This report primarily deals only with the narrow category of exoneration known as “DNA exonerations.” As noted below, “DNA exonerations” differ from all exonerations in important ways. A report on the role of forensic evidence in all exonerations is in progress and will provide insight into the role of forensic evidence in a broader array of cases.

LaPorte’s article raised a number of questions about the relationship between forensic evidence and wrongful convictions. These include which disciplines were responsible, temporal trends, and the co-occurrence of forensic science with other contributing factors. In the next stage of the NRE’s research project on forensic science, the NRE hopes to be able to address these questions and more.

Conclusion

This report has said little about what all of this means about the state of forensic science in the United States and how it can improve. On this subject, the authors can do no better than to refer the reader to LaPorte’s article that concludes with five statements about the relationship between forensic science and wrongful conviction:

1. Forensic misconduct is unacceptable
2. Forensic scientists should avoid ambiguous terminology in testimony and reports
3. Forensic scientists should be impartial and objective
4. Forensic errors are inevitable, and we should learn from them

5. Forensic scientists should remain within the limits of the science.

The NRE and the IP certainly agree with all of these points.

■ Appendix 1 Revisiting the Definition of False or Misleading Forensic Evidence (F/MFE)

This Appendix describes the NRE's coding rules for False or Misleading Forensic Evidence in greater detail. Although the NRE and IP agreed on many of the rules described below, the two definitions are still not completely aligned.

Purpose of the Forensic Contributing Factor

In trying to refine the NRE's definition, the NRE revisited the question of why contributor variables should be recorded in the first place. The NRE concluded that the primary reason to record contributor variables should not be to assign blame or responsibility for false convictions, although we do not deny that they are sometimes used that way in popular discourse. Rather the primary reason should be to alert stakeholders to problems so that those problems can be addressed. Therefore, the forensic contributing factor should not be understood as a count of cases in which forensic analysts, or forensic science, "did something wrong." Rather, it should be understood as a count of cases in which forensic evidence, for whatever reason, contributed to a false conviction. The goal is not to measure how "bad" forensic science is, but rather to understand how often forensic evidence, tragically, contributes to convictions of innocent people so that stakeholders can understand how it contributes. The purpose is not to "blame" someone for the out-come (although there are certainly cases in which blame is warranted), but to understand the mechanisms by which forensic evidence contributes to false convictions so that the forensic system can be improved.

Definitional Issues

Clarifying the NRE's definition raised a number of difficult questions. These included:

1. **Should the NRE include cases in which expert evidence was given, but the area of expertise would not necessarily be included in many common definitions of "forensic science" (examples include lie detection and "shoe rubber analysis," and canine evidence)?**

Yes. There are narrower and broader definitions of forensic science, and the NRE understands the impulse to construct a narrow definition around techniques that are somehow institutionally sanctioned. However, the NRE sees little justification for defining forensic science as anything narrower than expert evidence that is proffered in court to answer questions that are properly within the domain of science, where science is defined broadly as any inquiry about the natural world. Some may worry that by creating an undifferentiated category called "forensic evidence" we risk impugning strong forensic disciplines with the failings of weaker ones. But it is not for us, as researchers, to arbitrarily define the boundaries of "forensic science." Those boundaries are defined by the practice of police, lawyers, judges, and witnesses in the cases in which people are charged with and convicted of crimes. Our most useful contribution is to label cases by the relevant disciplines that participated in obtaining those convictions. The IP already made this possible for the smaller set of "DNA exonerations." The NRE is currently working on a project that will make this possible for all exonerations since 1989.

Second, the appropriate category in the NRE's view is really not "forensic" evidence but "expert" evidence. Any evidence offered through a legally qualified expert that contributes to false convictions, raises essentially the same concerns raised by the analogous use of "forensic" evidence.

Third, the question of whether something is a “scientific” matter, should focus on the question rather than the answer that is provided. For example, if the prosecution in a criminal case offers expert evidence that the person charged with the crime is lying, based entirely on physiological measures (e.g., blood pressure, respiration rate, galvanic skin response), that poses a scientific question: “Can one determine whether a speaker is lying using those measures?” That question is scientific, even if the answer — “Yes, we can do that with this polygraph device” — is not “scientific.” The party proffered an expert witness to answer a scientific question. The testimony of such experts is very much a part of the imperfect process of trying to answer scientific questions relevant to legal cases, even though their evidence may be weak or worthless. It may be bad science, but it is still used as scientific forensic evidence; in fact, that’s the core of the problem.

For example, while awaiting trial for child sex abuse in Ohio in early 1991, Robert McClendon took a polygraph examination on the condition that the results be admitted as evidence in court. A State Highway Patrol examiner found that his answers “could be a deliberate attempt at deception,” and this finding was admitted into evidence at McClendon’s trial. Whether we, or the forensic science establishment, believe that this constituted a scientific assessment of McClendon’s veracity is irrelevant to the NRE’s classification of that evidence. What matters is that the fact-finder (a judge in this case) was presented with what appeared to be a scientific instrument addressing a factual question: How likely is it that McClendon lied? Stakeholders interested in the contribution of “forensic science” to false convictions should certainly be interested in this case because evidence was presented in the guise of “forensic science” whether or not stakeholders consider it such. Again, the NRE understands the desire or utility of “breaking out” the discipline of lie detection from the category of forensic science, and, as discussed above and below, the NRE is working

on ways that will allow researchers to do just that.

2. Should the NRE include cases in which expert witnesses made statements that were literally true, but potentially highly misleading? The most common examples involve experts who testified to microscopic hair comparisons and reported that evidentiary hair was “consistent with” reference hair from a person of interest.

Yes. This was one of the most difficult questions the NRE faced. Such evidence is at once literally true and highly misleading. A good example, interestingly, derives from a very well-known DNA exoneration case: the (original) conviction of [Steven Avery](#) for the rape of Penny Beerntsen. In that case, Sherry Culhane gave the following testimony about the results of a microscopic hair comparison:

Culhane testified that a hair recovered from a shirt of Avery’s was “similar” and “consistent” with Beerntsen’s hair. She conceded that the hairs of many people are consistent with one another, that she could not give a probability that the hairs were from the same source, and that all she could say was “that it’s not impossible” the hairs were from the same source.

On the one hand, the forensic claim was not falsified. Culhane merely said the hair was consistent with Avery’s. We are now nearly certain that Avery was not the source of that hair, but that still does not falsify the claim that it was “consistent with” his hair. Culhane’s statement is literally true, not false.

True, but not harmless. The weakness of Culhane’s statement is now well understood by forensic scientists. It is that she neglected to add a crucial piece of information to her statement of consistency: the rarity of the thing found consistent. Yes, the hair was consistent with Avery’s. But with how many other people in the population would that hair be found consistent? One in a million? One in a thousand? A hundred? Ten? One in two? Any brown-haired person? Culhane doesn’t say.

In this information vacuum, the possibility that the fact-finder will ascribe more weight to the evidence than it deserves is unacceptably high.

None of this renders Culhane's testimony literally false. However, to say such evidence did not contribute to Avery's false conviction seems perverse. We therefore hold that all "consistent with" testimony counts as F/MFE, with the exception stated in the next section. We agree with the argument of Lyon and Koehler that "consistent with" evidence is only appropriate when "consistency" is found significantly more frequently in some conditions than in others.²⁴ Their discussion relates to evidence about signs of sexual abuse (which is also an issue in exonerations, but not generally in DNA exonerations). This principle applies to many other kinds of evidence as well, such as forensic pathology (e.g., "the nature of the injury is 'consistent with' the prosecution's theory of the crime").

3. Should the NRE include expert evidence that may have contributed to the conviction when the evidence was accompanied by an accurate and transparent number describing the rarity of the characteristic that was found consistent with the person of interest (examples would include a DNA inclusion accompanied by an accurate population frequency for the genetic characteristics in question)?

No. We make an exception to Rule 2 if the expert does provide information to the fact-finder about the rarity of the thing found consistent. If an expert testifies that the type A blood of the person charged with the crime was consistent with the type A blood found at the crime and states that type A blood is found in around 40% of the population, the NRE does not consider that evidence F/MFE, provided, of course, that the 40% figure is accurate and transparently derived.

An example is [Christopher Ochoa's](#) exoneration. An early, relatively undiscriminating, form of DNA

profiling, DQ Alpha, included Ochoa, along with 16% of the population as a potential contributor to the crime scene stain. More sophisticated DNA profiling carried out post-conviction excluded him as a contributor. We do not count the original DNA evidence as F/MFE because the expert gave accurate and transparently derived information about the discriminating power of the evidence. (However, the Ochoa case is counted as F/MFE because of misleading serology and microscopic hair comparison evidence.)

4. Should the NRE include cases in which the action involving expert evidence that contributed to the conviction was reported by someone other than a forensic scientist, such as a police officer or a prosecutor?

Yes. When a police officer or prosecutor presents forensic evidence to a fact-finder, the NRE does not overlook it simply because of occupational identity of the writer or speaker. For example, in the Kenneth Waters case the forensic analyst, John Balunias, correctly excluded Waters as the source of a fingerprint. However, police officer Nancy Taylor testified before the grand jury that no usable fingerprints were recovered from the crime scene. Relying on this false testimony, Waters's defense attorney failed to obtain and present the fingerprint exclusion evidence at trial. In this case, a fact-finder heard false forensic evidence. The fact that they heard it from a police officer with no known training in friction ridge analysis does not obscure that fact that what the grand jury believed was forensic evidence contributed to the false conviction. This case illustrates that F/MFE does not necessarily mean that a forensic scientist did anything wrong (or indeed, in some cases, anything at all).

For prosecutors, the most common form of F/MFE is overstating the value of the evidence in closing argument. We do not count routine rhetorical efforts to restate expert witnesses' testimony in the strongest possible terms. But, if a prosecutor assigns the evidence a probative value significantly higher than

was assigned by the expert, the NRE considers that F/MFE — by the prosecutor. For example, if a hair analyst testifies that a crime scene hair is “consistent with” the person convicted of the crime, but the prosecutor says the crime scene hair was “the same” as the hair of the person convicted of the crime, the NRE does not consider that F/MFE. Although “the same” might be considered rhetorically stronger than “consistent with,” the NRE thinks it is appropriate to give some allowance for characterizing expert evidence in lay language. Moreover, the prosecutor has not clearly changed the probative value of the evidence. If in the same case the prosecutor says the hair of the person convicted of the crime “was at the scene,” the NRE considers that F/MFE by the prosecutor. The prosecutor has changed the probative value of the evidence: whereas the expert said the person convicted of the crime was included in a pool of unknown size of possible contributors of the hair, the prosecutor said the person convicted of the crime was the sole occupant of the pool of potential contributors of the hair.

As discussed further below, the NRE does not count as F/MFE acts which are clearly police or prosecutorial misconduct but involve forensic evidence. Thus, the NRE does not count as F/MFE cases in which police conceal or destroy forensic evidence, and the NRE does not count cases in which prosecutors conceal forensic reports.

This is one area in which the NRE’s and IP’s approaches to categorizing forensic science problems differ. The IP does not count police officer or other non-scientist testimony as misapplied forensic science. For example, in [Damon Thibodeaux’s case](#), a police officer testified about his expectations about the presence/absence of semen on the victim’s body under certain conditions; the IP does not code this as misapplied forensic science.

5. Should the NRE include cases in which exculpatory expert evidence was concealed by an official actor, such as a prosecutor or police officer?

No. We are interested in cases in which forensic evidence contributed to a fact-finder determining an innocent person was guilty. Concealing forensic evidence that is favorable to the person charged with a crime may deprive that person of the opportunity to prove their innocence. We classify such behavior as police or prosecutorial misconduct, or both, depending on the facts. All the same, in that situation the factfinder did not rely on false or misleading forensic evidence to convict; it was denied the opportunity to consider accurate evidence that might have led it to acquit.

There’s an exception to this rule. If a forensic entity concealed exculpatory forensic evidence, the NRE considers that F/MFE. For example, if a forensic laboratory fails to turn over an exculpatory forensic report to the prosecutor, the NRE considers that F/MFE. Such cases (which are rare) are obviously included in what stakeholders understand by F/MFE. To not include such cases as F/MFE would be perverse and would deprive stakeholders of information about some of the most egregious cases of F/MFE.

For example, the NRE does not count as F/MFE the false convictions of [Kenneth Kagonyera](#), [Larry Williams, Jr.](#), [Robert Wilcoxson](#), [Teddy Isbell](#), and [Damian Mills](#). DNA testing had excluded all of them, and Kagonyera had requested the DNA results. However, the results were not turned over to any of the five suspects’ lawyers, all of whom pleaded guilty. We have no evidence that it was the laboratory, rather than the prosecutor, that concealed the exculpatory forensic evidence, so the NRE counts these cases as Official Misconduct by the prosecutor, but not F/MFE.

6. Should the NRE include cases in which a court, prosecutor, laboratory, or other entity denied a reasonable request for a forensic test?

No. We found a small number of cases in which exonerees asked for forensic tests prior to trial and were refused. Post-conviction, it turns out that those tests could have helped prevent their false conviction.

As with the preceding rule, this concerns evidence that the fact-finder did not hear and therefore could not have helped the fact-finder reach a guilty verdict, so the NRE does not consider these cases F/MFE.

The NRE makes the same exception it made for rule 5. If a forensic entity, rather than the police or a prosecutor, was responsible for denying the forensic test, the NRE considers that F/MFE. An example is the exoneration of [Larry Holdren](#) for sexual assault. Holdren requested DNA testing of the rape kit, but the hospital destroyed it within 3 months of collection! We're not alone in our perception of this as negligent; Holden sued and obtained a \$1 million settlement from the hospital. Because the evidence in question was a rape kit, the NRE considers the hospital to be a forensic entity.

7. Should the NRE include expert evidence that implicated another person charged with the same crime as the exoneree?

Yes. We count such evidence if it contributed to the exoneree's conviction. For example, if the prosecution's theory of the crime depends on the persons charged with the crime acting together, clearly expert evidence against one contributes to the conviction of the other. This rule applies to people who plead guilty if the NRE has information that they were aware of the forensic or expert evidence at the time of their plea.

For example, in the cases of the Exonerated Five,²⁵ who were convicted of assault and sexual assault of a jogger in Central Park in New York City, microscopic hair comparison analysis purported to find the hair of only one of the five, [Kevin Richardson](#), at the crime scene. Because the State's theory at both trials was that the five acted in concert, the forensic evidence against Richardson contributed to all five convictions and the NRE counts all five as F/MFE.

Appendix 2 DNA Exonerees with False or Misleading Forensic Evidence

List of DNA exonerees for whom False or Misleading Forensic Evidence, as defined by the NRE, contributed to the original conviction. Exonerees are

ordered by the colors assigned in Figures 1 and 2 and then alphabetically.

Last Name	First Name	State	Original 2017 Coding	Final Coding
Abdal	Warith Habib	NY	Both F/MFE	Yes
Adams	Kenneth	IL	Both F/MFE	Yes
Alejandro	Gilbert	TX	Both F/MFE	Yes
Atkins	Herman	CA	Both F/MFE	Yes
Barnes	Steven	NY	Both F/MFE	Yes
Barnhouse	William	IN	Both F/MFE	Yes
Bauer	Chester	MT	Both F/MFE	Yes
Bibbins	Gene	LA	Both F/MFE	Yes
Blair	Michael	TX	Both F/MFE	Yes
Bledsoe	Floyd	KS	Both F/MFE	Yes
Boquete	Orlando	FL	Both F/MFE	Yes
Bravo	Mark	CA	Both F/MFE	Yes
Brewer	Kennedy	MS	Both F/MFE	Yes
Briscoe	Johnny	MO	Both F/MFE	Yes
Brison	Dale	PA	Both F/MFE	Yes
Bromgard	Jimmy-Ray	MT	Both F/MFE	Yes
Brown	Dennis	LA	Both F/MFE	Yes
Brown	Roy	NY	Both F/MFE	Yes
Bryson	David	OK	Both F/MFE	Yes
Buntin	Harold	IN	Both F/MFE	Yes
Byrd	Kevin	TX	Both F/MFE	Yes
Cameron	Ronjon	MA	Both F/MFE	Yes
Charles	Clyde	LA	Both F/MFE	Yes
Charles	Ulysses Rodriguez	MA	Both F/MFE	Yes
Cole	Timothy B.	TX	Both F/MFE	Yes

Courtney	Sedrick	OK	Both F/MFE	Yes
Cowans	Stephan	MA	Both F/MFE	Yes
Criner	Roy	TX	Both F/MFE	Yes
Crotzer	Alan	FL	Both F/MFE	Yes
Dabbs	Charles	NY	Both F/MFE	Yes
Dail	Dwayne Allen	NC	Both F/MFE	Yes
Danziger	Richard	TX	Both F/MFE	Yes
Davidson	Willie	VA	Both F/MFE	Yes
Davis	Dewey	WV	Both F/MFE	Yes
Davis	Gerald	WV	Both F/MFE	Yes
Daye	Frederick Renee	CA	Both F/MFE	Yes
Dean	James	NE	Both F/MFE	Yes
Dedge	Wilton	FL	Both F/MFE	Yes
Diaz	Luis	FL	Both F/MFE	Yes
Dillon	William	FL	Both F/MFE	Yes
Dominguez	Alejandro	IL	Both F/MFE	Yes
Dotson	Gary	IL	Both F/MFE	Yes
Durham	Timonthy	OK	Both F/MFE	Yes
Erby	Lonnie	MO	Both F/MFE	Yes
Fain	Charles	ID	Both F/MFE	Yes
Fritz	Dennis	OK	Both F/MFE	Yes
Fuller	Larry	TX	Both F/MFE	Yes
Gates	Donald Eugene	DC	Both F/MFE	Yes
Gillard	Larry	IL	Both F/MFE	Yes
Gonzalez	Kathleen	NE	Both F/MFE	Yes
Good	Donald Wayne	TX	Both F/MFE	Yes
Gray	Paula	IL	Both F/MFE	Yes
Green	Anthony Michael	OH	Both F/MFE	Yes
Gregory	William	KY	Both F/MFE	Yes
Halstead	Dennis	NY	Both F/MFE	Yes
Harrell	Dion	NJ	Both F/MFE	Yes
Harris	William	WV	Both F/MFE	Yes
Harrison	Clarence	GA	Both F/MFE	Yes
Harward	Keith	VA	Both F/MFE	Yes
Hatchett	Nathaniel	MI	Both F/MFE	Yes
Heins	Chad	FL	Both F/MFE	Yes
Hicks	Anthony	WI	Both F/MFE	Yes
Holland	Dana	IL	Both F/MFE	Yes
Honaker	Edward	VA	Both F/MFE	Yes
Ireland	Kenneth	CT	Both F/MFE	Yes

Jackson	Dwayne	NV	Both F/MFE	Yes
Jackson	Willie	LA	Both F/MFE	Yes
Jimerson	Verneal	IL	Both F/MFE	Yes
Johnson	Anthony	LA	Both F/MFE	Yes
Johnson	Calvin	GA	Both F/MFE	Yes
Kogut	John	NY	Both F/MFE	Yes
Kordonowy	Paul D.	MT	Both F/MFE	Yes
Krone	Ray	AZ	Both F/MFE	Yes
Laughman	Barry	PA	Both F/MFE	Yes
Lavernia	Carlos Marcos	TX	Both F/MFE	Yes
Linscott	Steven	IL	Both F/MFE	Yes
Lowery	Eddie	KS	Both F/MFE	Yes
McCarty	Curtis	OK	Both F/MFE	Yes
McCray	Antron	NY	Both F/MFE	Yes
Miller	Neil	MA	Both F/MFE	Yes
Miller, Jr.	Robert Lee	OK	Both F/MFE	Yes
Mitchell	Marvin	MA	Both F/MFE	Yes
Mitchell	Perry	SC	Both F/MFE	Yes
Moon	Brandon	TX	Both F/MFE	Yes
Morton	Michael	TX	Both F/MFE	Yes
Ochoa	Christopher	TX	Both F/MFE	Yes
Odom	Kirk	DC	Both F/MFE	Yes
Ollins	Calvin	IL	Both F/MFE	Yes
Ollins	Larry	IL	Both F/MFE	Yes
Pendleton	Marlon	IL	Both F/MFE	Yes
Peterson	Larry	NJ	Both F/MFE	Yes
Pierce	Jeffrey Todd	OK	Both F/MFE	Yes
Pope	David Shawn	TX	Both F/MFE	Yes
Rainge	Willie	IL	Both F/MFE	Yes
Restivo	John	NY	Both F/MFE	Yes
Reynolds	Donald	IL	Both F/MFE	Yes
Richardson	Gerald	NJ	Both F/MFE	Yes
Richardson	Kevin	NY	Both F/MFE	Yes
Richardson, Jr.	James E.	WV	Both F/MFE	Yes
Rodriguez	George	TX	Both F/MFE	Yes
Rose	Peter	CA	Both F/MFE	Yes
Salaam	Yusef	NY	Both F/MFE	Yes
Santana	Raymond	NY	Both F/MFE	Yes
Saunders	Omar	IL	Both F/MFE	Yes
Scott	Calvin Lee	OK	Both F/MFE	Yes

Shelden	Debra	NE	Both F/MFE	Yes
Sledge	Joseph	NC	Both F/MFE	Yes
Starks	Bennie	IL	Both F/MFE	Yes
Stinson	Robert Lee	WI	Both F/MFE	Yes
Sutton	Robert Lee	WI	Both F/MFE	Yes
Taylor	Ada JoAnn	NE	Both F/MFE	Yes
Taylor	Ronald	TX	Both F/MFE	Yes
Tillman	James Calvin	CT	Both F/MFE	Yes
Tribble	Santae	DC	Both F/MFE	Yes
Vasquez	David	VA	Both F/MFE	Yes
Velasquez	Eduardo	MA	Both F/MFE	Yes
Wardell	Billy	IL	Both F/MFE	Yes
Washington	Calvin E.	TX	Both F/MFE	Yes
Washington	Earl	VA	Both F/MFE	Yes
Watkins	Jerry	IN	Both F/MFE	Yes
Webb	Troy	VA	Both F/MFE	Yes
Webb, III	Thomas	OK	Both F/MFE	Yes
Webster	Bernard	MD	Both F/MFE	Yes
White	John Jerome	GA	Both F/MFE	Yes
White	Joseph	NE	Both F/MFE	Yes
Williams	Dennis	IL	Both F/MFE	Yes
Williamson	Ronald Keith	OK	Both F/MFE	Yes
Willis	John	IL	Both F/MFE	Yes
Winslow	Thomas	NE	Both F/MFE	Yes
Wise	Korey	NY	Both F/MFE	Yes
Woodall	Glen	WV	Both F/MFE	Yes
Wyatt	Rickey Dale	TX	Both F/MFE	Yes
Brown, Jr.	Knolly	NC	Both No	Yes
Bryant	Malcom	MD	Both No	Yes
Caravella	Anthony	FL	Both No	Yes
Fappiano	Scott	NY	Both No	Yes
Mahan	Dale	AL	Both No	Yes
Mahan	Ronnie	AL	Both No	Yes
Rollins	Lafonso	IL	Both No	Yes
Waters	Kenneth	MA	Both No	Yes
Willis	Calvin	LA	Both No	Yes
Yarris	Nicholas	PA	Both No	Yes
Chatman	Charles	TX	Both No	Yes
Thibodeaux	Damon	LA	Both No	Yes*
Avery	Steven	WI	IP Yes/NRE No	Yes

Bain	James	FL	IP Yes/NRE No	Yes
Burnette	Victor	VA	IP Yes/NRE No	Yes
Cotton	Ronald	NC	IP Yes/NRE No	Yes
Cruz	Rolando	IL	IP Yes/NRE No	Yes
Cunningham	Calvin Wayne	VA	IP Yes/NRE No	Yes
Gray	David A.	IL	IP Yes/NRE No	Yes
Halsey	Byron	NJ	IP Yes/NRE No	Yes
Hernandez	Alejandro	IL	IP Yes/NRE No	Yes
Jones	Ronald	IL	IP Yes/NRE No	Yes
McClendon	Robert	OH	IP Yes/NRE No	Yes
McSherry	Leonard	CA	IP Yes/NRE No	Yes
Nesmith	Willie James	PA	IP Yes/NRE No	Yes
O'Donnell	James	NY	IP Yes/NRE No	Yes
Ochoa	James	NY	IP Yes/NRE No	Yes
Powell	Anthony	MA	IP Yes/NRE No	Yes
Rivera	Juan	IL	IP Yes/NRE No	Yes
Robinson	Anthony	TX	IP Yes/NRE No	Yes
Saecker	Frederic	WI	IP Yes/NRE No	Yes
Salazar	Ben	TX	IP Yes/NRE No	Yes
Towler	Raymond	OH	IP Yes/NRE No	Yes
Turner	Keith	TX	IP Yes/NRE No	Yes
Waller	James	TX	IP Yes/NRE No	Yes
Waller	Patrick	TX	IP Yes/NRE No	Yes
Warney	Douglas	NY	IP Yes/NRE No	Yes
Whitley	Drew	PA	IP Yes/NRE No	Yes
Williams	Willie	GA	IP Yes/NRE No	Yes
Woods	Anthony	MO	IP Yes/NRE No	Yes
Aguirre-Jarquin	Clemente	FL	New addition	Yes
Beranek	Richard	WI	New addition	Yes
Cifizzari	Gary	MA	New addition	Yes
Kussmaul	Richard	TX	New addition	Yes
Sonnier	Ernest	TX	New addition	Yes
Tall Bear	Johnny	OK	New addition	Yes
Alexander	Richard	IN	NRE Yes/IP No	Yes
Arledge	Randolph	TX	NRE Yes/IP No	Yes
Bradford	Marcellius	IL	NRE Yes/IP No	Yes
Diamond	Garry	VA	NRE Yes/IP No	Yes
Holdren	Larry	WV	NRE Yes/IP No	Yes
Karage	Entre Nax	TX	NRE Yes/IP No	Yes
Patterson	Maurice	IL	NRE Yes/IP No	Yes
Wilson	Sharrif	NY	NRE Yes/IP No	Yes
Yarbough	Anthony	NY	NRE Yes/IP No	Yes

* The IP codes Damon Thibodeaux as "No."

Endnotes

¹ Gerald M. LaPorte, *Wrongful Convictions and DNA Exonerations: Understanding the Role of Forensic Science*, 279 National Institute of Justice Journal (2017).

² John M. Collins & Jay Jarvis, *The Wrongful Conviction of Forensic Science*, 1 Forensic Science Policy and Management 17 (2009).

³ Edwin Borchard, *Convicting the Innocent: Errors of Criminal Justice* (1942); Richard A. Leo, *Rethinking the Study of Miscarriages of Justice: Developing a Criminology of Wrongful Conviction*, 21 Journal of Contemporary Criminal Justice 201 (2005).

⁴ Edward Connors *et al.*, *Convicted by Juries, Exonerated by Science: Case Studies in the Use of DNA Evidence to Establish Innocence After Trial*, Research Report, National Institute of Justice (June, 1996).

⁵ Hugo Bedau & Michael Radelet, *Miscarriages of Justice in Potentially Capital Cases*, 40 Stan. L. Rev. 21 (1987); Stephen Markman & Paul Cassell, *Protecting the Innocent: A Response to the Bedau-Radelet Study*, 41 id.121 (1988).

⁶ Barry Scheck *et al.*, *Actual Innocence: Five Days to Execution and Other Dispatches from the Wrongly Convicted* (2000); *Kansas v. Marsh*, 126 S.Ct. 2516 (U.S. 2006); *United States v. Quinones*, 196 F.Supp.2d 416 (S.D. N.Y. 2002).

⁷ To be sure, not every DNA exoneration satisfied all of these conditions. For example, in some DNA exonerations early generation DNA testing was conducted during the initial investigation [thus failing to satisfy condition (3)] but advanced DNA testing with greater sensitivity and specificity was conducted post-conviction and clearly exonerated the person.

⁸ Jessica S. Henry, *Smoke But No Fire: Convicting the Innocent of Crimes that Never Happened* (2020).

⁹ C. Ronald Huff *et al.*, *Convicted But Innocent: Wrongful Conviction and Public Policy* (1996); Michael Radelet *et al.*, *In Spite of*

Innocence: Erroneous Convictions in Capital Cases (1992); Hans Scherrer, *Justice Denied* available at <http://justicedenied.org/>.

¹⁰ Samuel R. Gross *et al.*, *Exonerations in the United States 1989 through 2003*, 95 Journal of Criminal Law and Criminology 523 (2005). Bedau & Radelet, *Miscarriages of Justice in Potentially Capital Cases. Convicting the Innocent: Where Criminal Prosecutions Go Wrong* (2011); Scherrer.

¹¹ Although the NRE includes all exonerations, not just DNA exonerations, the advent of post-conviction DNA testing was such a significant event that the NRE treats 1989, the date of the first DNA exoneration, as the beginning of the “modern” era with regard to exonerations.

¹² Which are not considered exonerations by the NRE. See above.

¹³ Note that “exoneree” and “client” are used as shorthand throughout this new webpage. The population being described is actually exonerated and freed people who were clients, or consults whose case involved substantial IP work. Additionally, the word “cause” is used for brevity, but from a scientific standpoint it would be more accurate to describe these things as “contributing factors” since, as the IP knows, correlation does not equal causation.

¹⁴ *Convicting the Innocent: DNA Exonerations Database* (2022), Duke University, available at <https://convictingtheinnocent.com>.

¹⁵ The IP dissents from the coding of Thibodeaux because the entomological testimony was given by a police officer, rather than a forensic scientist and does not code that case as Misapplied Forensic Science. As explained in Appendix 1, the NRE counts as F/MFE testimony by police officers if it appeared to the fact-finder to be expert, rather than fact, witness testimony.

¹⁶ Garrett, *Convicting the Innocent*.

¹⁷ Testimony about “consistency” between a crime scene trace and a known sample from the person convicted of the crime

is not considered FCF if it is accompanied by accurately and transparently derived information about its discriminating power. In this case, testimony that blood evidence was “consistent with” Snyder’s blood type was accompanied by accurately and transparently derived estimate of the frequency of that type in the overall population. See Appendix 1 for further discussion of this coding rule.

¹⁸ After closer study of the case, the IP and NRE now believe that the serology evidence did implicate Bradford directly and that Bradford knew about that evidence when he pled.

¹⁹ The laboratory redacted the names of individuals with whom blood on a knife was found consistent through DNA testing. Those names were the victim and a person later deemed to be the true attacker. At trial, a detective testified that the DNA found on the knife excluded Patterson and the victim--implying that the knife was unrelated to the victim’s murder.

²⁰ Holdren won a \$1 million settlement against the hospital.

²¹ Brandon L. Garrett, *Wrongful Convictions*, 3 *Annual Review of Criminology* 245 (2020) <https://doi.org/10.1146/annurev-criminol-011518-024739>; Catherine L. Bonventre, *Wrongful Convictions and Forensic Science*, *WIREs Forensic Science* e1406 (2020); Simon A. Cole, *More Than Zero: Accounting for Error in Latent Fingerprint Identification*, 95 *Journal of Criminal Law and Criminology* 985 (2005).

²² National Registry of Exonerations as of July 13, 2022 when it contained 3,182 exonerations.

²³ For each year, the five-year running average is the number of exonerations with FCFs for the year in question the two years before and the two years after, as a percentage of the all exonerations for those five years.

²⁴ Thomas D. Lyon & Jonathan J. Koehler, *Relevance Ratio: Evaluating the Probative Value of Expert Testimony in Child Sexual Abuse Cases*, 82 *Cornell L. Rev.* 43, 50 (1996-1997).