JUDICIAL RESPONSES TO SHIFTING SCIENTIFIC OPINION IN FORENSIC IDENTIFICATION EVIDENCE AND NEWLY DISCOVERED EVIDENCE CLAIMS IN THE UNITED STATES: THE INFLUENCE OF FINALITY AND LEGAL PROCESS THEORY

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ABSTRACT

There has been a historical availability of new trials based on newly discovered evidence in the United States. At present, the standards for granting relief based upon newly discovered evidence typically involve some combination of showings that (1) the new evidence could not have been discovered prior to trial; (2) the petitioner has exercised reasonable diligence in raising the new evidence; (3) the new evidence is relevant and beyond mere impeachment; and (4) the new evidence has verdict changing capacity. In 2009, the National Academy of Sciences officially criticized the accuracy of many forensic identification methods. Subsequently, petitioners have argued this criticism is newly discovered evidence. Appellate courts, however, routinely reject such claims. In doing so, the courts show fidelity to procedural fairness, finality and predictability, and consequently sideline competing ideals of substantive accuracy. By signalling that procedural regularity legitimizes decisions, the courts are applying classic tenets of legal process theory. This paper critically explores the institutional competence of appellate courts to address the legal questions that flow from the scientific uncertainty documented by the Academy. It concludes that courts are neither giving sufficient deference to shifting scientific opinion nor fully acknowledging their own constitutional position for addressing scientific uncertainty.

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I. INTRODUCTION

In *Herrera v. Collins*[1] the United States Supreme Court noted that although the United States Constitution was silent on the subject of new trials, there had been a "historical availability of new trials based on newly discovered evidence in the United States."[2] This availability can be traced back to 17th Century England[3] and up to the current Era of Innocence in America. Now, the precise standards for granting relief based upon newly discovered evidence varies from state-to-state (and federally), but usually involves "some combination of showings that the new evidence could not have been discovered prior to trial with the exercise of reasonable diligence; that the evidence is relevant and not cumulative or merely impeaching; and that the new evidence creates a sufficient probability of a different result at a new trial."[4] Newly discovered evidence claims arise in a "melange of direct and collateral remedies," including motions for a new trial, statutory procedures, court rules, applications for common law *coram nobis* relief, and habeas corpus petitions.[5]

According to the Innocence Project, as of August, 2015, 330 people had been exonerated by post-conviction DNA evidence in America.[6] All of these individuals were – eventually – able to present "new" DNA evidence to a court in order to secure post-conviction relief. Consequently, an inmate's ability to apply for a new trial (or evidentiary hearing) on the grounds of "newly discovered evidence" has become a crucial feature of his post-conviction arsenal. Professor Daniel Medwed considers that "more than ever... rules concerning newly discovered evidence, have the potential to operate as the principal engine driving [wrongful conviction] cases toward fair resolutions."[7]

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[1] 506 U.S. 390 (1993).

[2] *Id.*

[3] Daniel S. Medwed, *Up the River Without a Procedure: Innocent Prisoners and Newly Discovered Non-DNA Evidence in State Courts*, 47 ARIZ. L. REV. 655, 666 (2005).

[4] Keith Findley, *Defining Innocence*, 74 ALB. L. REV. 1157, 1197 (2011).

[5] Medwed, *supra* note 3, at 675.

[6] *See The Cases: DNA Exoneree Profiles*, INNOCENCE PROJECT, http://www.innocenceproject.org/cases-false-imprisonment (last visited Aug. 15, 2015).

[7] Medwed, *supra* note 3, at 718.

Nearly fifty-percent of the 330 DNA exonerations to date are attributable to invalidated and/or unreliable forensic evidence.[8] This is unsurprising. Recently, a number of popular forensic identification methods – including those involving the analysis of tool-marks, fingerprints, shoeprints, hairs and blood stain analysis – have been significantly criticized for engaging in "individualization," that is, the practice of connecting a suspect uniquely with inculpatory evidence.[9] In particular, the National Academy of Sciences (NAS) concluded in its landmark 2009 report – *Strengthening Forensic Science in the United States: A Path Forward* (NAS Report) – that "with the exception of DNA analysis... 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."[10] Soon after the report was published, the U.S. Supreme Court acknowledged that many forensic sciences are subject to "serious deficiencies."[11]

Medwed considers that the "same problems that led to the wrongful convictions of those innocent prisoners later freed through DNA" – such as invalidated and/or improper forensic evidence – "presumably appear in the scores of convictions procured without biological evidence."[12] This is supported by the fact that the National Registry of Exonerations presents a higher number of wrongful conviction cases impacted by faulty or misleading forensic evidence.[13] In such – non-DNA – cases inmates can present arguments that the forensic identification evidence that contributed to their wrongful conviction was unreliable and/or improper using newly discovered evidence procedures. Inmates can do this by arguing that the criticism (generally couched as shifting scientific opinion or contro-

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[8] *See Unvalidated or Improper Forensic Science*, INNOCENCE PROJECT, http://www.innocenceproject.org/understand/Unreliable-Limited-Science.php (last visited Aug. 15, 2015).

[9] Michael J. Saks, *Merlin and Solomon: Lessons from the Law's Encounters with Forensic Identification Science*, 49 HASTINGS L.J. 1069, 1082, 1119 (1998) (quoting another source).

[10] THE COMM. ON IDENTIFYING THE NEEDS OF THE FORENSIC SCI. CMTY., NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., STRENGTHENING THE FORENSIC SCIENCES IN THE UNITED STATES: A PATH FORWARD 7 (2009) [hereinafter NAS REPORT]. Although note that DNA evidence is not infallible. *See* Donald E. Shelton, *Twenty-First Century Forensic Science Challenges for Trial Judges in Criminal Cases: Where the "Polybutadiene" Meets the "Bitumen"*, 18 WIDENER L.J. 309, 320 (2009), at 323-24. Although DNA profiling is clearly scientifically superior to other forensic identification evidence, it is not— contrary to earlier pronouncements—infallible. DNA evidence and its underlying methodology are, of course, subject to human error. False positive DNA results have occurred and will undoubtedly continue to be part of the DNA testing landscape. Proffered evidence may still, as with other forensic science evidence, be the result of mistakes or contamination in its collection, testing, or interpretation. As the technology and methodology of DNA testing has progressed, it is the human errors that may present the biggest evidentiary challenges for trial judges.

[11] Melendez-Diaz v. Massachusetts, 129 S. Ct. 2527, 2537 (2009).

[12] Medwed, *supra* note 3, at 657.

[13] *See* A Project of the University of Michigan Law School, *About the Registry*, THE NATIONAL REGISTRY OF EXONERATIONS, http://www.law.umich.edu/special/exoneration/Pages/about.aspx (last visited Aug. 16th, 2015).

versy) levelled at these forensic identification methods is newly discovered evidence. Consequently, the ability of states' newly discovered evidence rules to effectively cater for such claims is crucial. At present, however, courts routinely reject that "shifting scientific opinion or the existence of new scientific controversy" is newly discovered evidence.[14] In particular, the shift contained in the NAS Report, in relation to a variety of forensic identification disciplines, seems to have made little impact on appellate courts. In fact, Professors Simon Cole and Gary Edmond in this Special Issue consider the NAS Report to be "a rather blunt and impotent "weapon of the weak.""[15]

This article presents this pattern in judicial decision-making within two theoretical frameworks: the theory of finality and legal process theory. Part II considers the interpretation and application of newly discovered evidence rules as vehicles for post-conviction relief in the United States. Part III outlines the role of forensic identification evidence both in the American criminal process generally, and, as more recently discovered, the conviction of the innocent. It then considers the impact of the 2009 NAS Report, as the most recent and quasi-official recognition of the fallibility of forensic identification evidence. Part IV summarizes the NAS Report's findings in relation to the forensic disciplines associated with toolmarks, fingerprints, shoe-prints, hairs and blood spatter and then explores the courts' routine rejection of newly discovered evidence claims based on arguments that these forensic identification methods are subject to shifting scientific opinion and/or controversy. The resulting doctrine demonstrates that appellate courts show a strong desire to follow precedent that largely rejects shifting scientific opinion as newly discovered evidence. By signalling that procedural regularity legitimizes court decisions, as opposed to substantive accuracy, the courts are applying classic tenets of legal process theory. Part V, therefore, critically considers how this pattern in judicial decision-making fits within legal process theory's central concept: the principle of institutional competence, by assessing the institutional strength of appellate courts to accurately assess indeterminacy. Part VI concludes that the current judicial approach is problematic given the documented role of unreliable and/or improper forensic evidence in convicting the innocent. The courts should no longer hide behind procedural regularity to the detriment of substantive accuracy, fill policy gaps with generalized finality interests, and neglect their own institutional competence for providing the most accurate assessment possible of newly discovered evidence claims based on shifting scientific opinion.

[14] *See* Part II and Part III of this article.

[15] Simon A. Cole & Gary Edmond, *Science Without Precedent: The Impact of the National Research Council Report on the Admissibility and Use of Forensic Science Evidence in the United States,* 4 BRIT. J. AM. LEGAL STUD. 585, 616 (2015); J.C. SCOTT, WEAPONS OF THE WEAK: EVERYDAY FORMS OF PEASANT RESISTANCE (1985).

II. The Interpretation and Application of Newly Discovered Evidence Rules in the United States

Post-conviction newly-discovered-evidence claims "surface in a melange of direct and collateral remedies."[16] These remedies include motions for a new trial, statutory procedures, court rules and common law rules with *coram nobis* characteristics, and habeas corpus petitions.[17] The notion that a petitioner should be able to obtain a new trial post-conviction can be traced back to late seventeenth century England, and, later, to the First United States Congress, which permitted new trials for "reasons for which new trials have usually been granted in courts of law."[18] The states soon followed this trend, leading to the current state of affairs whereby newly discovered evidence frameworks are considered "an integral part of the state court landscape for criminal defendants."[19] Through these procedures, petitioners may present a wrongful conviction claim based on newly-discovered non-DNA evidence, such as a claim based on shifting scientific opinion or controversy.

At present, every state provides for a motion for a new trial based on newly discovered evidence (largely viewed as direct remedies), and a number of states also allow newly discovered evidence as a ground for triggering collateral, post-conviction relief procedures.[20] Unlike traditional post-conviction remedies these collateral procedures are primarily "fact based,"[21] as opposed to being aimed at remedying egregious legal errors of either "jurisdictional or constitutional dimensions."[22] The standards for granting relief based on newly discovered evidence differs from state-to-state (and federally), but Professor Keith Findley summarizes that such standards usually,

> … involve some combination of showings that the new evidence could not have been discovered prior to trial with the exercise of reasonable diligence; that the evidence is relevant and not cumulative or merely impeaching; and that the new evidence creates a sufficient probability of a different result at a new trial.[23]

Newly discovered evidence standards impose onerous burdens on those seeking relief. This is particularly problematic for petitioners convicted in part or whole on the basis of erroneous forensic identification evidence. A basic deconstruction of Findley's generic formula of newly discovered evidence rules provides a good example of why this is commonly the case. First, the petitioner must present evidence that actually qualifies as newly discovered evidence, and 'shifting scientific opinion and controversy' tends not to qualify.[24] A specific example of

[16] Medwed, *supra* note 3, at 675.
[17] *Id.*
[18] *Id.* at 666.
[19] *Id.* at 665.
[20] *Id.*
[21] *Id.* at 664.
[22] *Id.*
[23] Keith Findley, *Defining Innocence,* 74 Alb. L. Rev. 1157 (2011).
[24] See Daniel G. Orenstein, *Shaken to the Core: Emerging Scientific Opinion and Post-Conviction Relief in Cases of Shaken Baby Syndrome,* 42 Ariz. St. L.J. 1305 (2010-11).

this is Shaken Baby Syndrome (SBS). The diagnostic triad used historically to diagnose SBS has, in recent years, been significantly criticized.[25] However, as one commentator reports, "…federal courts reviewing SBS-based convictions have been reticent to accept the argument that new scientific evidence meets the standard for federal habeas relief…",[26] noting this is attributable, in some way, to the "high bar" petitioners must 'jump' to trigger post-conviction relief.[27] The story is largely the same in state courts too, with many not inclined "to open the door to post-conviction relief on the basis of shifting scientific opinion or the existence of new scientific controversy."[28] Second, the petitioner must bring the new fact to the court within a reasonable time-frame after his conviction. However, shifts in scientific opinion or the rise of controversy in a scientific discipline can take decades to crystallize, as shown by the recent publication of the NAS Report in 2009, which criticized disciplines that have been employed in the criminal justice system for decades. The shifts in medical opinion with regards to SBS also demonstrate this slow burn effect.[29] Moreover, science is widely understood to be a methodology. The scientific method involves making observations, devising and empirically testing hypotheses to explain those observations, and revising or abandoning those hypotheses in a continual process. Consequently, a particular school of thought may never objectively constitute a 'scientific truth,' since it is always prone to replacement as the dominant theory following a shift in scientific opinion. In other words, the crystallization of a 'new' scientific opinion – which newly discovered evidence rules demand – is arguably a fiction. Third, the petitioner must prove that the shifting scientific opinion and/or controversy is relevant to his conviction in such a way that – if the jury had known about it – they would have changed their verdict. Although it's almost impossible to be certain about what would have materially impacted a jury's verdict, research shows that scientific evidence – and in particular evidence of individualization – has a highly persuasive impact on jurors.[30] However, despite this, appellate courts routinely find that the presentation of individualization evidence by forensic experts – although arguably inaccurate and misleading – is harmless error and would not have changed the jury's verdict.[31] Consequently, petitioners making such claims have a very steep mountain to climb.

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[25] See generally Deborah Tuerkheimer, *The Next Innocence Project: Shaken Baby Syndrome and the Criminal Courts,* 87 WASH. U. L. REV. 1 (2009).

[26] Orenstein, *supra* note 24, at 1316.

[27] *Id.*

[28] *Id.*

[29] Tuerkheimer, *supra* note 25.

[30] *See* J. Koehler & Michael J. Saks, *Individualization Claims in Forensic Science: Still Unwarranted,* 75 BROOK. L. REV. 1187, 1206 (2010); D. McQuiston-Surrett & M. Saks, *Communicating Opinion Evidence in the Forensic Identification Sciences: Accuracy and Impact,* 59 HASTINGS L.J. 1159 (2008); and Sarah Lucy Cooper, *Judicial Responses to Challenges to Firearms Identification Evidence: A Need for New Perspectives on Finality,* 31 T.M. COOLEY L. REV. 457 (2014).

[31] *See* Cooper, *supra* note 30; Sarah Lucy Cooper, *Challenges to Fingerprint Identification Evidence: Why the Courts Need a New Approach to Finality,* (forthcoming in WM. MITCHELL L. REV.) (copy on file with author).

High standards for relief are "hallmarks" of the doctrine of finality.[32] Newly discovered evidence standards are neither easy to satisfy nor broadly interpreted by the courts. As Medwed considers, "state courts have traditionally viewed newly discovered evidence claims with disdain, fearing the impact of such claims on the finality of judgments and the historic role of the jury as the true arbiter of fact, and harboring doubts about the underlying validity of new evidence."[33] The imposition of legal frameworks requiring such extraordinary showings has led to an "inappropriately restrictive limitation on the criminal justices system's "ability to correct injustices."[34] This is troublesome given that "More than ever…state post-conviction procedures comprise the most appropriate vehicle to rectify wrongful convictions and a subset of those procedures, the rules concerning newly discovered evidence, have the potential to operate as the principal engine driving cases toward fair resolutions."[35]

The restrictive interpretation of newly discovered evidence rules is particularly notable where petitioners argue that a shifting scientific opinion and/or controversy within a forensic identification discipline qualifies as newly discovered evidence. Part III, therefore, explores the historic role of forensic identification evidence in the criminal justice process, before highlighting how the weaknesses of such evidence have been exposed by recent DNA exonerations and the 2009 NAS Report, both of which petitioners have used to support newly discovered claims based on shifting scientific opinion.

III. The Role of Forensic Identification Evidence in the Criminal Justice Process, DNA Exonerations and the 2009 NAS Report.

Forensic identification evidence is a mainstay of the American criminal justice system;[36] however it is also linked to nearly fifty percent of the known post-conviction DNA testing exonerations to date.[37] The fallibility of various forensic science disciplines was most recently catalogued, by the National Academy of Sciences in its 2009 report: *Strengthening Forensic Science in the United States: A Path Forward*. This section considers the role of forensic identification evidence in the criminal justice process and in convicting the innocent, and the impact of the NAS Report.

[32] Sarah Lucy Cooper, *The State Clemency Power and Innocence Claims: The Influence of Finality and Its Implications for Innocents,* Charlotte L. Rev. (forthcoming 2016) (Copy on file with Author).
[33] Medwed, *supra* note 3.
[34] *Id*.
[35] Findley, *supra* note 23, at 1198.
[36] See Sarah Lucy Cooper, *The Collision of Law and Science: American Court Responses to Developments in Forensic Science,* 33 Pace L. Rev. 234 (2013).
[37] *See Unvalidated or Improper Forensic Science*, *supra* note 8.

A. *THE ROLE OF FORENSIC IDENTIFICATION EVIDENCE IN THE CRIMINAL JUSTICE PROCESS AND IN CONVICTING THE INNOCENT*

Forensic identification evidence has long played a role in the American criminal justice process. Throughout the 20th and 21st centuries, American courts have embraced the notion that a plethora of forensic identification disciplines (known as the soft sciences) can engage in individualization, i.e., identify a perpetrator to the "exclusion of all others." For instance, courts have routinely accepted that fingerprints can uniquely identify the perpetrator of a crime, suspect notes can be "matched" to a suspect's handwriting, bite-marks on a victim can be "matched" to a suspect's teeth, bullets from a suspect's gun can be "matched" to suspect ammunition, and a suspect's vehicle tyres, shoes and hairs can be "matched" to prints and hairs left at a crime scene respectively. At the close of the 20th Century, forensic identification evidence became even more pivotal, as the power of DNA[38] evidence to both 'catch' the guilty and exonerate the innocent was discovered.[39]

With the discovery of the power of DNA, came the birth of the American Innocence Movement. In 1992, Barry C. Scheck and Peter J. Neufeld formed The Innocence Project "to assist prisoners who could be proven innocent through DNA testing."[40] By the end of 1993, 135 people had been exonerated,[41] including 14 whose innocence had been conclusively proven by post-conviction DNA evidence. Over the last two decades, the number of DNA exonerations has continued to grow, along with an increased understanding of the propensity of the criminal justice system to generate factual errors. The concept of "innocence" is now a burgeoning feature of legal, social and political discourse,[42] with the Innocence Movement described as "the most dramatic development in the criminal justice world since the Warren Court's Due Process Revolution of the 1960s."[43]

As of August, 2015, 330 people had been exonerated by post-conviction DNA testing in America, and the capacity of DNA evidence to identify specific sources consistently, and with a high degree of certainty, has been rigorously tested.[44] DNA evidence has become a gold-standard, raising the bar for what is

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[38] Shelton, *supra* note 10, at 309: "DNA is the molecular structure in all living things that contains genetic information. DNA evidence is very durable and can be extracted from the smallest of remains many years after a crime. Equally significant is its "polymorphism," meaning that, depending on the method used for its extraction, it is unique among humans and can identify the donor of the specimen with overwhelming accuracy. DNA testing can be extremely precise and can often demonstrate that only one person in billions could have been the source of the specimen evidence.".

[39] Cooper, *supra* note 36.

[40] *About Us*, INNOCENCE PROJECT, http://www.innocenceproject.org/about-innocence-project (last visited Aug. 16, 2015).

[41] A Project of the University of Michigan Law School, *Browse the National Registry of Exonerations*, THE NAT'L REGISTRY OF EXONERATIONS, http://www.law.umich.edu/special/exoneration/Pages/browse.aspx (last visited Aug. 24, 2015).

[42] *See generally* CONTROVERSIES IN INNOCENCE CASES IN AMERICA (Sarah Lucy Cooper ed., 2014).

[43] Keith A. Findley, *Innocence Found: Thee New Revolution in American Criminal Justice in* CONTROVERSIES IN INNOCENCE CASES IN AMERICA 1 (Sarah Lucy Cooper ed., 2014).

[44] NAS REPORT, *supra* note 10, at 7.

scientifically acceptable for identifying a source to the exclusion of all others.[45] DNA technology has exposed the fallibility of numerous forensic disciplines, with forty-seven percent of the wrongful convictions that led to the known 330 DNA exonerations being attributed, in some way, to unreliable and/or improper forensic evidence.[46] Naturally, this has provoked significant concern about the ability of the soft sciences to engage in individualization. This concern was both solidified and stoked by the 2009 NAS Report.

B. Strengthening Forensic Science in the United States: A Path Forward

In 2005, recognizing the existence of concern about the reliability of forensic science and that significant improvements were required across the discipline, Congress commissioned the National Academy of Sciences– one of the world's premier sources of independent, expert advice on scientific issues – to report on the past, present, and future use of forensic science in America.[47] The Academy spent two years collaborating with legal and scientific scholars, practitioners and other professionals.[48] It heard over eighty witnesses during sixteen days of testimony,[49] and issued its final report in February, 2009. The report was billed as a "'blockbuster" that would overhaul the legal landscape relating to forensic evidence.[50] The report addressed a wide range of relevant topics including an overview of the forensic community and need for integrated governance, the methods and veracity of various forensic disciplines (including tool-marks, fingerprints, shoeprints, hair analysis and blood stain pattern analysis), the admission and interpretation of scientific data, methods for improvement, and education and training.[51]

The report made some important observations and impacts. First, the report concluded that the forensic science system had "serious problems,"[52] faced many

[45] *Id.* at 8.
[46] *See Unvalidated or Improper Forensic Science, supra* note 8.
[47] NAS Report, *supra* note 10, at xix (preface).
[48] *Id.* at xix – xx (preface).
[49] *Id.* at 2.
[50] Jacqueline McMurtrie, *Swirls and Whorls: Litigating Post-Conviction Claims of Fingerprint Misidentification after the NAS Report,* 2010 Utah L. Rev. 267, 267 (2010).
[51] *See generally* NAS Report, *supra* note 10.
[52] NAS Report, *supra* note 10 at xx (preface). ("In considering the testimony and evidence that was presented to the committee, what surprised us the most was the consistency of the message that we heard: The forensic science system, encompassing both research and practice, has serious problems that can only be addressed by a national commitment to overhaul the current structure that supports the forensic science community in this country. This can only be done with effective leadership at the highest levels of both federal and state governments, pursuant to national standards, and with a significant infusion of federal funds.").

challenges,[53] and was accountable for multiple, wrongful convictions.[54] On the basis of the evidence before it, the NAS concluded, *inter alia*, that (1) "with the exception of DNA analysis... 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;"[55] and (2) the existing legal framework governing the admissibility of forensic evidence in the United States was inadequate for resolving the problems identified.[56] The bottom line was simple: "In a number of forensic science disciplines, forensic science professionals have yet to establish either the validity of their approach or the accuracy of their conclusions, and the courts have been utterly ineffective in addressing this problem."[57]

Second, the report drew an unprecedented conclusion, namely that DNA was the only forensic method that had been rigorously shown to have the capacity to consistently, and with a high degree of certainty, engage in individualization; thereby casting a new and officially-stamped critical light onto the soft sciences[58] Third, the report provided a level of repose for exonerees convicted in whole or part by erroneous forensic evidence. It did this by acknowledging the deficiencies that had led to their wrongful convictions. For instance, exonerees like Kennedy Brewer and Dwayne Allen Dail (as well as relatives of victims who had suffered through the conviction of the wrong assailant) welcomed the report's findings and recommendations.[59] Fourth, for those engaging in innocence work, it was apparent the report could serve as a valuable resource for future, credible innocence claims based on erroneous forensic identification evidence. For instance, a press statement released by the Innocence Project stated "In a watershed development that could transform forensic science nationwide, the National Academy of Sciences today released a comprehensive report finding that

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[53]*Id.* at 4-5 (summary). These challenges range from the lack of mandatory standardization, certification, and accreditation to problems associated with the interpretation of forensic evidence, to the need for research to establish limits and measures of performance.

[54]*Id.* at 4 (summary). ("Those advances [DNA evidence testing], however, also have revealed that, in some cases, substantive information and testimony based on faulty forensic science analyses may have contributed to wrongful convictions of innocent people. This fact has demonstrated the potential danger of giving undue weight to evidence and testimony derived from imperfect testing and analysis. Moreover, imprecise or exaggerated expert testimony has sometimes contributed to the admission of erroneous or misleading evidence.").

[55]*Id.* at 7 (summary).

[56]*Id.* at 85. ("The report finds that the existing legal regime—including the rules governing the admissibility of forensic evidence, the applicable standards governing appellate review of trial court decisions, the limitations of the adversary process, and judges and lawyers who often lack the scientific expertise necessary to comprehend and evaluate forensic evidence—is inadequate to the task of curing the documented ills of the forensic science disciplines.").

[57] *Id.* at 53.

[58] *Id.* at 7.

[59]*Reactions to Groundbreaking National Academy of Sciences Report Urging Reform in U.S. Forensic Sciences,* INNOCENCE PROJECT, (Feb. 18, 2009, 12:00 AM), http://www.innocenceproject.org/Content/Reactions_to_Groundbreaking_National_Academy_of_Sciences_Report_Urging_Reform_in_US_Forensic_Sciences.php.

the forensic sciences need significantly strengthened oversight, research and support in order to play a more reliable role in identifying perpetrators of crime, protecting the wrongly accused and ensuring public safety."[60] Peter Neufeld, co-director of the Innocence Project commented "… forensic science professionals have not had the support or management needed to identify the real strengths and weaknesses of different assays and techniques…This report provides the roadmap for rectifying that problem, and we look forward to working with Congress and other key stakeholders to implement the report's recommendations."[61]

However, generally, the NAS Report (and other catalogued criticism of forensic identification evidence) has had limited impact. First, it has failed to turn the heads of the judiciary when it comes to the admissibility of forensic identification evidence. Despite the NAS Report's findings, trial judges continue to admit, often unreservedly, forensic identification evidence that engages with individualization.[62] Moreover, appellate judges continue to defer to such trial court decisions, and/ or find the admission of such forensic identification evidence was a "harmless error" or lawful due to the fact defense counsel had the opportunity to challenge it (whether or not they did so effectively).[63] Furthermore, the Report's findings and other such criticism has, on the whole, failed to persuade appellate judges that there has been a shift in scientific opinion or generation of controversy, within relevant forensic identification disciplines, which qualifies as "newly discovered evidence." Part III presents this pattern in judicial decision-making, and offers the findings of NAS Report, in relation to the forensic disciplines associated with tool-marks, fingerprints, hairs, shoe-prints and blood spatter, to provide a flavour of the basis upon which petitioners have made newly discovered evidence arguments that there has been a shift in scientific opinion.

IV. The Findings of the 2009 NAS Report and Judicial Responses to Newly Discovered Evidence Claims Based on Shifting Scientific Opinion and/or Controversy in Forensic Disciplines

The 2009 NAS Report was a watershed publication, subjecting both the previously known and unknown deficiencies of a variety of popular forensic identification methods to the condemnation of America's premier scientific organization. Moreover, for the first time, following an assessment of forensic science as a whole the NAS found "with the exception of DNA analysis... 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."[64] In other words, it cast, new significant doubt, on the

[60] *National Academny of Sciences Urges Comprehensive Reform of U.S. Forensic Sciences,* Innocence Project (Feb. 18, 2009 12:00 AM), http://www.innocenceproject.org/Content/National_Academy_of_Sciences_Urges_Comprehensive_Reform_of_US_Forensic_Sciences.php.

[61] *Id.*

[62] *See generally* Cooper, *supra* note 36.

[63] *See* Cooper, *supra* note 30; Cooper, *supra* note 31.

[64] NAS Report, *supra* note 10, at 7.

ability of many popular forensics identification methods to engage in individualization. Subsequently, the NAS Report has served as a basis for post-conviction newly discovered evidence claims, with defendants arguing that it represents shifting scientific opinion and/or controversy in a forensic discipline associated with their conviction.

This section explores judicial responses to such newly discovered evidence claims. My dataset comprises ten cases. I identified my dataset via a Westlaw search using the terms (and synonymous terms) "National Academy of Sciences," "newly discovered evidence," and "individualization" in a variety of combinations. The dates of my searches were restricted to cases occurring between 2009 and 2014 to coincide with the publication of the NAS Report. The ten cases have been divided into two categories: Category One comprises tool-mark (firearms) cases. This category includes standard tool-mark identification cases and Comparative Bullet Lead Analysis (CBLA) cases. Category Two comprises other forensic identification methods cases. This category includes cases involving newly discovered evidence claims based on criticisms of the methods involved in fingerprint analysis, hair analysis, shoe-print analysis and blood stain pattern analysis. Before exploring judicial responses in each category, sub-section (i) sets out some of the specific findings of the NAS Report in relation to each of these forensic disciplines, in order to provide a sense of a petitioner's perspective on the alleged "scientific shift and/or controversy" in each discipline.

A. THE 2009 NAS REPORT'S FINDINGS: TOOL-MARKS, FINGERPRINTS, MICROSCOPIC HAIR ANALYSIS, SHOE-PRINTS, AND BLOOD STAIN PATTERNS.

i. Firearms Identification – Tool-mark Analysis

The NAS Report found that class characteristics "can be useful in narrowing the pool of tools that may have left a distinctive mark,"[65] and that individual characteristics "might, in some cases, be distinctive enough to suggest one particular source."[66] However, overall, the report concluded that the "scientific knowledge base for tool mark and firearms analysis is fairly limited."[67] In order to make the process of individualization more precise and repeatable, the report concluded "additional studies should be performed."[68] It further concluded that the AFTE Protocol was not defined in a sufficiently precise way for examiners to follow, particularly in relation to when an examiner can "match" two samples.[69]

[65]*Id.* at 154.
[66]*Id.*
[67]*Id.* at 155.
[68]*Id.* at 154. Some studies have been performed to consider the degree of similarity that can be found between marks made by different tools and the variability in marks made by individual tool.
[69]*Id.* at 155. ("… AFTE has adopted a theory of identification, but it does not provide a specific protocol. It says that an examiner may offer an opinion that a specific tool or firearm was the source of a specific set of tool-marks..."sufficient agreement" exists in the pattern of two sets of marks. It defines agreement as significant "when it exceeds the best agreement demonstrated between tool marks known to have been produced by different tools and is consistent with the

The report berated the protocol, stating "This AFTE document, which is the best guidance available for the field of tool mark identification, does not even consider, let alone address, questions regarding variability, reliability, repeatability, or the number of correlations needed to achieve a given degree of confidence."[70]

ii. Fingerprint Identification - Friction Ridge Analysis

The NAS Report acknowledged that friction ridge analysis had long "served as a valuable tool, both to identify the guilty and exclude the innocent,"[71] and gave some support to the discipline's ability to engage in individualization. Due to the amount of detail available in friction ridges, the NAS opined that "it seems plausible that a careful comparison of two impressions can accurately discern whether or not they had a common source."[72] The report agreed that some scientific evidence supports the presumption that friction ridge patterns are unique and remain unchanged throughout a lifetime.[73]

However, the report also found that the discipline was not "properly" underpinned.[74] The NAS Report's criticism spanned four areas. First, the 'Analysis, Comparison, Evaluation and Verification' method (ACE-V) is not "specific" enough to qualify as a validated method because it "does not guard against bias; is too broad to ensure repeatability and transparency; and does not guarantee that two analysts following it will obtain the same results."[75] Thus, following ACE-V did not mean that one was "proceeding in a scientific manner or producing reliable results."[76] Second, examiners need to better document their analysis.[77] Third, claims of a zero error-rate are clearly "unrealistic."[78] Fourth, more research is needed into ridge patterns and distribution, discriminating values and items that affect the quality of latent prints.[79]

iii. Microscopic Hair Analysis

The NAS Report acknowledged that because human and animal hairs are routinely shed, it makes it possible for hairs to be transferred from an individual

agreement demonstrated by tool marks known to have been produced by the same tool." The meaning of "exceeds the best agreement" and "consistent with" are not specified, and the examiner is expected to draw on his or her own experience.").

[70]*Id.*

[71]*Id.* at 142.

[72]*Id.*

[73]*Id.* at 143-44.

[74]*Id.* at 144.

[75]*Id.* at 142.

[76]*Id.*

[77]*Id.* at 143. ("Better documentation is needed of each step in the ACE-V process or its equivalent. At the very least, sufficient documentation is needed to reconstruct the analysis, if necessary.")

[78]*Id.*

[79]*Id.* at 144-45. (The NAS Report acknowledged that "Some research has recently begun to into ridge flow and crease pattern distribution on the hands and feet and research into the discriminating value of the various ridge formations and clusters of ridge formations.").

to a crime scene.[80] The report noted that examiners can generally recognize various physical characteristics of hairs, which are sufficiently different among individuals, to allow people to be included or excluded from having donated them.[81] However, the NAS Report concluded that no scientifically accepted statistics exist about the frequency with which particular characteristics of hair are distributed in the population.[82] Moreover, the report found that there are seemingly no uniform standards on the number of features on which hairs must agree before an examiner may declare a "match" between a suspect hair and a suspect; finding that the categorization of hair features depends heavily on an examiner's proficiency and practical experience.[83] Ultimately, the NAS Report concluded that there was "no scientific support for the use of hair comparisons for individualization in the absence of nuclear DNA."[84]

iv. Impression Evidence – Shoeprints

The NAS Report noted that the scientific basis for the evaluation of impression evidence is that mass-produced items (such as shoes and tyres) pick up features of wear that, over time, individualize them.[85] However, because these features continue to change as the items are used, elapsed time after a crime can undercut a forensic scientist's certainty.[86] Class characteristics (amongst a particular batch of shoes, for example) can be identified, but there is no consensus about how many individual characteristics are required to make a "match" between a batch item and a suspect one. The NAS Report found that necessary research into validity, reliability, variables, and population studies was absent, and that even the most experienced examiners should avoid biases in experience-based judgments, especially in the absence of a feedback mechanism to correct an erroneous judgment.[87]

v. Blood Stain Pattern Analysis

The NAS Report found that some scientific studies "support some aspects of bloodstain pattern analysis."[88] For instance, the report accepted that it can be known whether blood was spattered quickly or slowly.[89] However, the report also stated that some experts "extrapolate far beyond what can be supported."[90] The NAS concluded that given the complexity of assessments involved in such analysis, great care must be taken about how such expert testimony is presented

[80] *Id.* at 155.
[81] *Id.* at 156.
[82] *Id.* at 160.
[83] *Id.*
[84] *Id.*
[85] *Id.* at 149.
[86] *Id.*
[87] *Id.*
[88] *Id.* at 178.
[89] *Id.*
[90] *Id.*

in court.[91] The report concluded, however, that at present "The uncertainties associated with blood stain pattern analysis are enormous."[92]

B. *Judicial Responses to Newly Discovered vidence Claims Based on Shifting Scientific Opinion and/or Controversy in Forensic Identification Disciplines*

i. Category One: Firearms Identification Cases

It is unsurprising that the majority of the cases identified involve newly discovered claims related to the veracity of firearms identification evidence. This is because firearms identification evidence has been the subject of the most notable shift in judicial opinion. Since 2005 there has been a trend, by some courts, to direct expert testimony away from claims of individualization i.e., away from allowing experts to testify to a "match" between a specific firearm and suspect ammunition.[93] These courts have, overall, taken such an approach because of concerns about the subjectivity of firearms identification and its lack of empirical underpinnings for claims of individualization.[94] The cases in this category can be divided into two sub-categories: (1) standard tool-mark cases; and (2) CBLA cases.

a. Standard Tool-mark Cases

The courts have been generally reluctant to accept that shifting scientific opinion and/or controversy in the field of firearms identification qualifies as newly discovered evidence. For instance, in the 2011 case of *Rues v Denney*,[95] Denney argued that the NAS Report constituted newly discovered evidence, which would extend his limitations period. Denney argued, *inter alia*, that the NAS Report called into question the processes for comparing bunter marks from firearm shells to other, unfired shells: a method of analysis that had led to evidence contributing to his conviction. The Eighth Circuit Court of Appeals affirmed the U.S. District Court's finding that the report was not "new evidence," accepting the lower court's reasoning that the criticism contained in the NAS Report was not "new." This was because the criticisms had been raised previously in academic journals. As such, the criticisms were discoverable prior to 2009. As such, the appellate court found that the NAS Report did not "constitute a new fact," because it did not "raise any new issues." [96]

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[91] *Id.* at 179.
[92] *Id.*
[93] *See* United States v. Green, 405 F. Supp. 2d 104 (D. Mass. 2005); United States v. Monteiro, 407 F. Supp. 2d 351 (D. Mass. 2006); United States v. Glynn, 578 F. Supp. 2d 567 (S.D.N.Y. 2008).
[94] Cooper, *supra* note 36.
[95] 643 F.3d 618 (8th Cir. 2011).
[96] *Id.* at 622.

In *Foster v Florida*,[97] the Supreme Court of Florida also rejected the argument that the findings contained in the NAS Report were newly discovered evidence. The court found that Foster had failed to meet the required standards for newly discovered evidence, namely that he needed to "allege sufficient facts showing that the evidence was unknown by the trial court, the party, or his counsel, and that his counsel could not have known of it by use of due diligence",[98] and "if the evidence is newly discovered, it must be such that on retrial the defendant would probably be acquitted."[99] The court applied precedent (*Johnston v State* discussed *infra*) where it had rejected a similar claim on the basis that (1) the NAS Report cited to existing publications before the crime was committed and others that were published during the time that the petitioner was seeking post-conviction relief; and (2) the report lacked specificity "that would justify a conclusion that it provides a basis to find the forensic evidence admitted at trial to be infirm or faulty.... Nothing in the report renders the forensic techniques used in this case unreliable…"[100] The Florida Supreme Court found the same reasoning applied to Foster, citing additional precedents where research studies had failed to qualify as sources of newly discovered evidence,[101] and noting that Foster had failed to identify how the relevant research "would demonstrate, in any specific way, that the testing methods or opinions in his case were deficient."[102]

Similarly, in the 2011 case of *Arizona v Rodriguez*[103] the petitioner argued, *inter alia*, that the NAS Report constituted newly discovered evidence that would have challenged the testimony of the state's ballistics expert, and changed the outcome of his trial. In a memorandum opinion, the Arizona Court of Appeals (Division 2) rejected Rodriguez's claim, finding the trial court did not abuse its discretion in denying post-conviction relief. The court described the trial court's decision as "thorough"[104] and offered no further reasoning for the rejection of the claim. Notably, however, the same Arizona court did provide a form of relief in the 2014 case of *Arizona v Celaya*.[105] In that case, Celaya argued that his trial court erred when it denied him an evidentiary hearing on his claim that the NAS Report's findings "debunking the certainty of firearms comparison analysis"[106] constituted newly discovered evidence. At Celaya's trial, two state experts had testified that there was "no doubt"[107] that a bullet found in Celaya's truck was fired by the same gun that killed the victims. In other words, the experts had claimed individualization. The appellate court determined that the trial court abused its discretion by failing to have an evidentiary hearing, but refused to

[97] 132 So.3d 40 (Fla. 2013).
[98] *Id.* at 71.
[99] *Id.* at 72.
[100] *Id.*
[101] *Id.*
[102] *Id.*
[103] Not Reported in P.3d, 2011 WL 6916543 (Ariz. App. Div. 2).
[104] *Id.* at 2.
[105] Not Reported in P.3d, 2014 WL 4244049 (Ariz. App. Div. 2).
[106] *Id.* at 5.
[107] *Id.*

comment of whether the NAS report was in fact newly discovered evidence (without such a hearing). The court remanded for an evidentiary hearing, rejecting the state's claim that one was unnecessary.[108]

Despite signalling that the review of such issues must occur, the decision in *Celeya* fed into the conservative trend by appellate courts to (1) defer to lower court decisions regarding the qualification of newly discovered evidence; and (2) not label the findings of the NAS Report (including the unprecedented finding that individualization was not proper in forensic disciplines such as firearms identification) as newly discovered evidence. As it stands, the cases in this sub-section show that the shift in scientific opinion contained in the NAS, with regards to firearms identification evidence, fails to qualify as newly discovered evidence. This is largely because courts take the view it presents no "new" facts given that it cites to older research and lacks specificity to individual cases. With regard to specificity, Cole and Edmond have noted how the judiciary's "intense focus on the case, the particular witness, their opinion and its relation to facts in issue…"[109] has made it difficult for petitioners to apply general concerns from the NAS Report to "…specific case-based evidence relevant to prosecutions and appeals."[110] As Cole and Edmond point out, "Courts are interested in relevant—that is, probative—evidence bearing on facts in issue in the *specific* proceedings."[111] This view is palpable in the cases explored in this sub-section (and throughout Part III). As it stands, petitioners are failing to bridge the gap between the NAS Report's findings and the impact they have on the evidence in their cases. This failure tends to be fatal for the "verdict changing capacity" requirement of newly discovered evidence rules.

b. CBLA Cases

The use of CBLA evidence was discontinued in 2004, after a report questioning its validity was published by the National Academy of Sciences (CBLA NAS Report).[112] Historically, CBLA evidence had been used to show that "bullets came from the same box, the same manufacturer, were related in time or geography, or generally linked the defendant to the crime in some unspecified manner."[113] Since 2004, some defendants have used this shift in scientific opinion as

[108] *Id.* at 6.
[109] Cole & Edmond, *supra* note 15 at 595.
[110] *Id.*
[111] *Id.* at 597
[112] NAT'L RESEARCH COUNCIL OF THE NAT'L ACADEMIES, REPORT IN BRIEF, FORENSIC ANALYSIS: WEIGHING BULLET LEAD EVIDENCE 1 (2004).
[113] *Id.* ("The FBI commissioned the National Research Council ("NRC") to evaluate its use of CBLA and, following the Council's 2004 report, discontinued its use of CBLA at trials. The NRC report demonstrates that the problem with CBLA is not that the *method* used to *compare* the contents of two bullets is unreliable in some abstract sense, but that it is unreliable to conclude that a CBLA "match" supports *further specific factual assertions put forth at trial.* Most often, these assertions are that matching bullets came from the same box, the same manufacturer, were related in time or geography, or generally linked the defendant to the crime in some unspecified manner. Crucially, these conclusions rested on assumptions unsupported by scientific and statistical testing of the general bullet *manufacturing* process. *See* Nat'l Res. Council at 112–13.

a basis for newly discovered evidence claims. Unlike the claims identified in subsection (a) above, however, these claims have generally triggered judicial intervention in favor of the petitioner.

For example, in *Zamarippa v Florida*,[114] Zamarippa based his newly discovered evidence claim on a 2007 Washington Post article that detailed the controversy surrounding CBLA, including a reference to the CBLA NAS Report.[115] Applying the earlier decision of *Murphy v State*,[116] in which the same court had held that the CBLA NAS Report might qualify as newly discovered evidence, the court held that the petitioner was entitled to an evidentiary hearing to determine, *inter alia*, whether newly discovered evidence on CBLA would probably produce acquittal on retrial. The ruling overturned that of the lower court, and continued the idea that there was some judicial acceptance that the shift in scientific opinion with regards to CBLA evidence qualified as newly discovered evidence.

In the 2010 case of *Smith v Florida*,[117] a Florida court labelled the shift in scientific opinion with regards to CBLA evidence as newly discovered evidence. In that case, Smith alleged that the CBLA method, which had been used by an FBI analyst who testified at his murder trials in 1989 and 1990, had been subsequently discredited by scientific research and abandoned by the FBI as unreliable. Smith cited the November 2007 joint-investigation by *The Washington Post* and CBS News in its "60 Minutes" feature and the CBLA NAS Report, which concluded that CBLA could not reliably support testimony that a bullet came from a particular box of ammunition.[118] The District Court of Appeal held that Smith had sufficiently alleged that evidence that CBLA had been discredited and abandoned was unknown at the time of his trials, and could not have been discovered by the use of due diligence and provided relief. In so holding, the court cited precedents that CBLA had been held inadmissible on the basis that they were scientifically unreliable.[119]

However, firing a shot across the bows of lawyers who were minded to interpret the *Smith* decision as a liberal shift in judicial thought on newly discovered

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First, the NRC found that a CBLA match supports the inference that two bullets came from the same "source" when taken to mean a compositionally indistinguishable volume of lead ("CIVL"). But there was no generally reliable evidence that a CBLA match corresponded to a match among any other type of "source," such as a specific manufacturer, box, time, location, etc. *See id.* at 106–07. Thus, it remained in many cases a distinct possibility that while bullets from the same "source" match each other, they also match bullets from any number of "sources." Second, there was no general knowledge of the probability that manufacturing variations would result in two different lead sources randomly producing matching bullets, producing what is known as a "false positive." *Id.* at 107 ("Although it has been demonstrated that there are a large number of different [CIVL's], there is evidence that bullets from different CIVL[']s can sometimes coincidentally be analytically indistinguishable.") (quoting: Kulbicki v. State of Maryland, 207 Md. App. 412, 53 A.3d 361 at 439-40).

[114] 100 So.3d 746 (Fla. App. 2 Dist., 2012).

[115] *Id.* at 747.

[116] 24 So.3d 1220 (Fla. App. 2 Dist., 2009).

[117] 23 So.3d 1277 (Fla. App. 2 Dist., 2010).

[118] *Id.* at 1278.

[119] *Id.*

claims involving a shift in scientific opinion, in a special concurring judgment, Judge Altenbernd stated that,

> …a change in scientific opinion within a relevant scientific community-a change that occurred almost twenty years after the trial in this case-may require a different postconviction analysis than the typical claim of newly discovered evidence.[120]

The judge went on to explain his view that when a defendant is arguing that evidence properly admitted would no longer be admissible due to advances in scientific knowledge or theory, he "should have a heavy burden to establish that the admitted evidence was critical to the conviction."[121] This was largely because such advancements in 'soft science' forensic disciplines, like CBLA, were not comparable to those in DNA testing. The judge explained,

> CBLA normally allowed for testimony that a bullet involved in a crime was consistent with other bullets in the possession of the defendant, but those bullets may have come from a manufacturing batch that may have contained thousands of additional comparable bullets. In other words, CBLA allowed for circumstantial evidence suggesting a connection between the defendant and the bullet involved in the crime. Thus, the recent shift in scientific thought may reduce the amount of circumstantial evidence connecting the defendant to the offense, but it should not result in any affirmative evidence exonerating the convicted defendant.[122]

As such, Judge Altenbernd was not "completely convinced" that the normal test used for newly discovered evidence, i.e. that it would probably change the result, should be the test controlling this post-conviction issue.[123] When the change in scientific thought occurs many years after the conviction, the judge was inclined to "believe that the defendant should be required to establish a higher degree of certainty that the change in evidence would have altered the jury's verdict."[124]

The cases in sub-section (b) suggest that courts have treated shifts in scientific opinion about CBLA evidence more favourably, allowing such claims to qualify as newly discovered evidence. Concerns about the 'newness' of the criticism aimed at CBLA evidence and how probative that criticism is to a particular case (given it comes from sources detached from the specific case at hand) have seemingly been side-lined. The difference between how courts have treated newly discovered evidence claims related to standard tool-mark analysis and those involving CBLA evidence raises a question about how the 2009 NAS Report differs from the CBLA NAS Report. Cole and Edmond point out that,

> *Strengthening* can be distinguished from earlier NRC reports in both its breadth and implications. The earlier NRC reports provided recommendations that were more constrained. They could be more readily identified, understood

[120] *Id.* at 1279 (Altenbernd, J., concurring).
[121] *Id.* at 1280.
[122] *Id.*
[123] *Id.*
[124] *Id.*

> and acted upon. Their recommendations applied to a small set of issues or cases, although DNA profiling was in the process of rapid expansion. Conversely, many of the concerns in *Strengthening* are diffuse: applicable to a very large number of current and legacy cases. In the absence of clear guidance and in the face of daunting logistical complexity, it is perhaps not surprising that courts have been cautious in their response to a report with incredibly disruptive potential.[125]

In addition, the changes promulgated by the 2004 CBLA NAS Report also had the rubber stamp of the FBI. The FBI forced the discontinuance of CBLA evidence in 2004, whereas the forensic disciplines criticized for making claims of individualization by the NAS Report 2009 have continued routinely to make such claims post-2009.[126] This difference might be related to the different roles (and perhaps perceived importance by the judiciary) of the FBI and NAS. The FBI is the premier criminal investigation and law enforcement agency in America, and therefore has a great deal of weight when it comes to changing practices that effect criminal investigations. By contrast, the NAS is a self-described "non-profit society of distinguished scholars."[127] The NAS simply doesn't undertake the same practically potent role as the FBI. Unlike the FBI, the NAS has considerable distance from the routine grind of criminal investigations, including the application of the forensic identification methods such investigations involve.

ii. Category Two: Other Forensic Identification Methods Cases

This category includes newly discovered evidence claims based on shifting scientific opinion with regards to the methods involved in fingerprint analysis, microscopic hair analysis, shoe-print analysis and blood stain pattern analysis. Overall, the courts have been reluctant to find that any of the conclusions of the NAS Report (relevant to these disciplines) are a scientific shift and/or controversy that qualifies as newly discovered evidence.

In the 2010 case of *Johnston v State*,[128] the petitioner argued that the NAS Report constituted newly discovered evidence that proved he was convicted on "infirm forensic evidence."[129] The forensic evidence in his case involved fingerprints, shoeprints and blood stain patterns. The appellate court rejected his claim, affirming the lower court's decision. The appellate court's decision that the NAS Report did not qualify as newly discovered evidence was two-fold. First, the court found, the NAS Report cited to existing publications, which negated any argument that its findings were "new."[130] Second, the report lacked the specificity

[125] Cole & Edmond, *supra* note 15 at 614.
[126] *See generally* Cooper, *supra* note 36.
[127] *NAS Mission*, THE NATIONAL ACADEMY OF SCIENCES, http://www.nasonline.org/about-nas/mission/ (last visited Aug. 25, 2015).
[128] 27 So.3d 11 (Fla. 2010).
[129] *Id.* at 16.
[130] *Id.* at 21.

that would justify a conclusion that it provides a basis to find the forensic evidence admitted at trial to be infirm or faulty.[131] In so holding, the court found that one statement in the NAS Report was "particularly telling,"[132] namely that:

> The committee decided early in its work that it would not be feasible to develop a detailed evaluation of each discipline in terms of its scientific underpinning, level of development, and ability to provide evidence to address the major types of questions raised in criminal prosecutions and civil litigation.[133]

One of these "major types" of questions clearly related to the admissibility of forensic identification evidence in criminal proceedings. As Judge Harry Edwards, the Co-Chair of the NAS Report Committee, stated to a Congressional committee: "whether forensic evidence in a particular case is admissible under applicable law is not coterminous with the question whether there are studies confirming the scientific validity and reliability of a forensic science discipline."[134] This particular statement has been used to support claims that the NAS Report's findings should neither render inadmissible the forensic identification methods criticized in the NAS Report, nor should the criticism represent a shift in scientific opinion that undermines all convictions these disciplines have contributed to securing. Judge Edwards has since rejected such conclusions.[135] Cole and Edmond agree that the NAS Report did not advize on admissibility specifically, but suggest it would "…be misleading to suggest that it is not relevant to admissibility determinations."[136]

Nonetheless, the *Johnston* court persisted with the idea that the NAS Report did not "establish that any particular test, test result, or specific testimony presented at Mr. Johnston's trial was faulty or otherwise subject to challenge"[137] and was merely "a new or updated discussion of issues regarding developments in forensic testing."[138] As such, it did not constitute evidence that was not known at trial and could not have been ascertained through due diligence. Moreover, Johnston had not demonstrated how, in any specific way, the testing methods or opinions in his case were deficient.

In the 2014 case of *Enderle v Iowa*,[139] the petitioner claimed that the NAS Report constituted newly discovered evidence that undermined his conviction on the basis that it challenged the validity of fingerprint evidence against him. The Iowa court questioned whether the report was "evidence" within the meaning of the state's newly discovered evidence rule. However, even if it was, because

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[131] *Id.*
[132] *Id.*
[133] *Id.* at 21.
[134] Statement of Judge Harry T. Edwards, Co–Chair, Committee on Identifying the Needs of the Forensic Science Community , before the United States Senate Committee on the Judiciary, March 18, 2009. Statement can be accessed at:
http://www.latent-prints.com/images/NAS%20Congressional%20Testimony%20Mar09.pdf.
[135] Cole & Edmond, *supra* note 15 at 591-92.
[136] *Id.* at 592
[137] Johnston, *supra* note 128, at 20.
[138] *Id.* at 21.
[139] 847 N.W.2d 235 (Table), 2014 WL 956018 (Iowa App.).

Enderle admitted similar articles (containing such criticism about fingerprint evidence) appeared before his trial, his concession was "dispositive of the issue."[140] Without further exploration, the court found the NAS Report was not newly discovered evidence.

Similarly, in the 2013 case of *Pennsylvania v Edmiston*,[141] hairs in Edmiston's truck had been "matched" to a murder victim. The court found that the NAS Report's findings about the imprecision of microscopic hair analysis did not provide a basis for applying a newly discovered facts exception to timeliness requirements for filing a petition for post-conviction relief. In so holding, the appellate court ruled that the analysis of the scientific principles supporting hair comparison analysis and the facts compiled in the NAS Report were not new, but existed in various sources prior to the publication of the NAS Report. The lower court had found that "to the extent the NAS Report contained a specific examination of the scientific support for various methodologies of hair analysis, it qualified as new information."[142] However, the lower court also observed that the deficiencies of forensic science were "nothing new, and commonly form the basis for attacks on expert testimony in the court room."[143] What was new, in the lower court's view, however, was that these deficiencies had been "collected, investigated, and studied in a report bearing the imprimatur of the NAS."[144] The lower court rejected Edmiston's claim on the merits, however. This was on the basis that the expert testimony in his case did not individualize the hair found in his truck to the victim, and, therefore, was not inconsistent with the NAS Report.[145] It further commented that the newly discovered information in the NAS Report would be useful only for impeachment and, moreover, would not have changed the outcome of the trial.[146] The appellate court did not interfere with this finding.

The appellate court did, however, expand on the issue of what constituted a newly discovered fact, finding that the claim was untimely. The court stated that,

> to constitute facts which were unknown to a petitioner and could not have been ascertained by the exercise of due diligence, the information must not be of public record and must not be facts that were previously known but are now presented through a newly discovered source. The "fact" Appellant relies upon as newly discovered is not the publication of the NAS Report, but the analysis of the scientific principles supporting hair comparison analysis. His argument is that the Commonwealth's evidence, specifically the testimony of Mr. Tackett, is unreliable based on the information recited in the NAS Report. It is when the underlying information was available to Appellant in the public domain that we must examine.

[140] *Id.* at 9.
[141] 619 Pa. 549, 65 A.3d 339 (Pa. 2013).
[142] *Id.* at 569.
[143] *Id.*
[144] *Id.*
[145] *Id.*
[146] *Id.*

> In this case, the Commonwealth is correct that the facts compiled in the NAS Report were not new, and existed in various sources prior to the publication of that report. Specifically, the NAS Report refers to various studies and reports published in the public domain as early as 1974 and as recently as 2007.[147]

Justice Todd disagreed with this finding in a separate concurring opinion. He believed the claim was timely. Justice Todd thought that because the NAS was "unlike other scientific bodies"[148] and arguably the nation's "most prestigious scientific organization,"[149] the NAS Report was significant. Moreover, NAS had compiled the report at the request of Congress and "heard testimony from experts in government, law enforcement, law, academia, and elsewhere; reviewed published materials, studies, and reports related to forensic science; and conducted independent research."[150] Justice Todd found that, in particular, the NAS Report's conclusion that there is "no scientific support for the use of hair comparisons for individualization in the absence of nuclear DNA"[151] was new. Justice Todd thought it significant that, in relation to that specific conclusion "the Report cites no [earlier or other] sources."[152] As such, he reasoned, "these are not merely the regurgitated conclusions from previously published studies, or from a prior Academy report, which Appellant could have uncovered previously with some diligence."[153] Justice Todd found that these were,

> novel conclusions concerning the deficiencies in the analysis of hair evidence from the leading science advisory body in the Nation, after being charged under federal law to make these very assessments, and following its own investigation and research. No amount of prior diligence by Appellant, no amount of combing through the *Journal of Forensic Sciences, Forensic Science Review, Forensic Science Communications,* or any of the other studies or publications the Academy reviewed from the last 40 years, could have produced such findings. Such findings bear the unique imprimatur of the Academy.[154]

Again, cases like *Johnston*, *Tucker*, *Enderle*, *Edmiston* demonstrate that, generally, there is a judicial resistance towards allowing claims that shifting scientific opinion about various forensic identification methods (contained in the NAS Report) qualify as newly discovered evidence. These rulings reflect the trend identified in the category one, subsection (a) cases. In so holding, the courts (1) defer to lower court decisions regarding the qualification of newly discovered evidence; and (2) do not label the findings of the NAS Report – including the unprecedented finding that individualization was not proper in any other discipline other than DNA analysis – as newly discovered evidence. As it stands, the cases in category two show that the shift in scientific opinions contained in the NAS Report fail to qualify as newly discovered evidence. This is largely because

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[147] *Id.* at 570-71.
[148] *Id.* at 583. (Todd, J., concurring).
[149] *Id.* (Todd, J., concurring).
[150] *Id.* (Todd, J., concurring).
[151] *Id.* at 584. (Todd, J., concurring).
[152] *Id.* (Todd, J., concurring).
[153] *Id.* (Todd, J., concurring).
[154] *Id.* (Todd, J., concurring).

courts take the view that the NAS Report presents no "new" facts given that it cites to older research and lacks specificity to individual cases, albeit there is at least one recorded negative judicial reaction to this assessment in *Edmiston*. Again, the courts' demand for probative evidence that bears on the specific facts at issue in the single case before them is fatal for newly discovered evidence claims. In other words, the *sui generis* nature of adversarial legal proceedings has been used to limit the use of the NAS Report to support newly discovered evidence claims based on shifting scientific opinion and/or controversy in various forensic identification disciplines.[155]

* * *

A crucial question, therefore, is *why* are appellate courts so reluctant to accept that even the unprecedented findings of the NAS Report qualify as newly discovered evidence? Further *why* are they so keen to defer to both precedent and lower court findings, but unwilling to defer to the expert findings of the NAS in relation to forensic science? These questions require an exposition of two theoretical frameworks: the theory of finality and legal process theory. The courts' restriction of post-conviction review by narrowly interpreting the high thresholds for relief contained in newly discovered evidence rules, is symptomatic of an institution that favours finality over substantive accuracy. Moreover, the appellate courts' routine deference to precedent and lower court findings is indicative of an institution that supports the notion that procedural regularity legitimizes outcomes, as opposed to substantive accuracy. As such, this pattern in judicial decision-making raises important questions about the courts' institutional competence to address indeterminacy when shifting scientific opinion raises "new" legal questions. Institutional competence is, of course, a classic tenet of legal process theory. Part V, therefore, further explores the influence of the doctrine of finality and legal process theory in this context.

V. The Influence of the Doctrine of Finality and the Appellate Courts' Institutional Competence for Assessing Indeterminacy

The foreclosing of post-conviction relief claims, judicial deference to procedural regularity and institutional competence are concepts related to the theory of finality and legal process theory. This section explores these two theoretical frameworks, and how they relate to the examples of judicial decision-making presented in Part IV.

A. Finality, Post-Conviction Relief and Newly Discovered Evidence Rules

The obvious theoretical reason for why courts reject any post-conviction challenges is finality. The doctrine of finality developed out of a taxonomy de-

[155] This point goes beyond claims associated with forensic identification methods.

tailed by Professor Paul M. Bator in his landmark 1963 article, *Finality in Criminal Law and Federal Habeas Corpus for State Prisoners*.[156] Bator's article "… laid the intellectual groundwork for the Supreme Court's post-trial review jurisprudence and has been cited in hundreds of law review articles and court opinions."[157] Bator argued that the finality of criminal judgments serves important interests that are harmed by expansions of post-conviction rights,[158] and proposed that because we can never be 100% certain that no error of law or fact was made during trial (or appellate) proceedings, "we must impose an end to litigation at some point or else the case could conceivably go on *ad infinitum*."[159]

Bator argued that endless litigation led to numerous, negative consequences. These included undermining public confidence in the criminal justice system, allowing prisoners to escape corrective sanctions, and negative impacts on the effective enforcement of the law. Finality, Bator argued, was needed to prevent and/or minimize these consequences.[160] Fifty years later, the criminal justice system is very familiar with the notion that finality is not a singular "consequence" but rather "shorthand for a collection of interests scholars assume are furthered by any restrictions on review."[161] These interests include ensuring respect for criminal judgments and victims' rights, conserving state resources, furthering the efficiency and deterrent and educational functions of the criminal law, satisfying the human need for closure, incentivizing defense counsel to "get it right first time" and preventing a flood of non-controversial claims from masking the fewer, credible ones.[162] Proponents of finality consider that providing defendants with broader post-conviction rights harms these –society desired– interests.[163] Consequently, when considering appeals, judges must balance society's interests in finality against the constitutional rights of defendants.[164] Of course, finality does serve the interests of defendants too, including their interests not to be subject to repetitive trials, to be able to move on in their lives, and not to be 'caught' by repetitive state attempts at trying a case (and its luck) that wear down the resources and stamina of the defendant.[165] At present, however, the scales are not commonly tipped in favour of defendants, with finality often being used as a

[156] Paul M. Bator, *Finality in Criminal Law and Federal Habeas Corpus for State Prisoners,* 76 HARV. L. REV. 441 (1963).
[157] Andrew Chongseh Kim, *Beyond Finality: How Making Criminal Judgements Less Final Can Further the "Interests of Finality"* 2013 UTAH L. REV. 561, 563 (2013).
[158] Bator, *supra* note 156.
[159] Sigmund G. Popko, *Putting Finality in Perspective: Collateral Review of Criminal Judgments in the DNA Era,* 1 L.J. SOC. JUST. 75, 76 (2011).
[160] *Id.* at 78.
[161] Kim, *supra* note 157, at 568.
[162] *See generally* Kim, *supra* note 157; Bator, *supra* note 156; Henry J. Friendly, *Is Innocence Irrelevant? Collateral Attack on Criminal Judgments,* 38 U. CHI. L. REV 142 (1970); Carrie Sperling, *When Finality and Innocence Collide in* CONTROVERSIES IN INNOCENCE CASES IN AMERICA 139 (Sarah Lucy Cooper ed., 2014).
[163] Kim, *supra* note 157, at 573.
[164] *Id.* at 566.
[165] Laurie L. Levenson, *Searching for Injustice: The Challenge of PostConviction Discovery, Investigation, and Litigation,* 87 S. CAL. L. REV. 545, 552-53 (2014).

"trump card that presumptively outranks defendants' interests…"[166]As Professor Laurie Levenson states "The criminal justice system is obsessed with finality. While it professes to focus on obtaining fair and accurate results, the goal of finality is never far away." [167]

The criminal justice system's obsession with finality is visible in the vast majority of post-conviction relief frameworks because these procedures "…grow out of a strong tradition that values the finality of criminal convictions."[168] These procedures, Professor Carrie Sperling states, form a "shockingly confusing web…" for petitioners. [169] Newly discovered evidence rules form part of this web. This is because – as explained in Part II – newly discovered evidence proceedings typically employ high thresholds for relief, such as requiring petitioners to prove that: the new fact was undiscoverable before trial; is beyond mere impeachment and cumulative evidence; has been raised with reasonable diligence; and has verdict-changing capacity. [170] Such thresholds are a hallmark of finality. It is widely accepted that high thresholds for relief work to alleviate judicial concerns about finality.[171] As one commentator notes, "Naturally, a state has an interest in maintaining the finality of its judgments. Thus, respect for the finality of judgments is a concern in any habeas analysis. A legal standard that provides a realistic opportunity for state prisoners to obtain habeas relief is arguably harmful to the state's interest in finality because it increases the likelihood that some judgments will be overturned."[172]

Newly discovered evidence rules reflect the criminal justice system's general allegiance to finality. For instance, they can even work to foreclose relief by way of DNA testing, which is a common component of newly discovered evidence claims. The onerous standards involved in post-conviction statutes, like newly discovered evidence rules, allow courts to deny access to DNA testing that could providing compelling evidence of innocence. Those statutes, Professor Brandon Garrett argues, "appear to provide mere window-dressing for post-conviction

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[166] Kim, *supra* note 157, at 563. (referencing Erwin Chemerinsky, *Thinking about Habeas Corpus*, 37 CASE W. RES. L. REV. 748, 772–75 (1987); Popko, *supra* note 159, at 75).
[167] Levenson, *supra* note 165, at 551.
[168] Sperling, *supra* note 162.
[169] Sperling, *supra* note 162; Barry Friedman, *A Tale of Two Habeas*, 73 MINN. L. REV. 247, 253 (1988) ("[T]he rules governing access to habeas review have become hopelessly confusing and confused."); Stephanie Roberts Hartung, *Missing the Forest for the Trees: Federal Habeas Corpus and the Piecemeal Problem in Actual Innocence Cases*, 10 STAN. J. CIV. RTS. & CIV. LIBERTIES 101 (2013) (discussing the confusing procedures an innocent inmate faces when asserting a post-conviction challenge and suggesting reforms).
[170] Findley, *supra* note 4, at 1161.
[171] Kathleen Callahan, *In Limbo: In Re Davis and the Future of Herrera Innocence Claims in Federal Habeas Proceedings*, 53 ARIZ. L. REV. 629, 655 (2011) ("Furthermore, steps can be taken to minimize the detrimental impact on comity and federalism. For example, requiring a high requisite evidentiary showing and a standard of review deferential to state court findings would help to ensure that federal habeas review of Herrera claims does not trample states' rights. These procedural standards would also help to alleviate concerns regarding finality, judicial efficiency, and frivolous claims.").
[172] Theresa Hsu Schriever, *In Our Own Backyard: Why California Should Care About Habeas Corpus*, 45 MCGEORGE L. REV. 763, 790 (2014).

systems determined to deny access to proof of innocence and to deny relief to meritorious claims of innocence."[173] Notably, concerns about finality have led to the United States Supreme Court denying relief in this context. In the case of *District Attorney's Office for the Third Judicial District v. Osborne*,[174] the U.S. Supreme Court determined that due process does not entitle a prisoner to access evidence in order to run additional tests (in this case more sophisticated DNA testing) that were not available at the time of trial. Finality concerns underpinned the U.S. Supreme Court's decision in *Osborne*. As Professor Kim explains, in *Osborne*, the Court denied relief "based in part on fears that allowing the test would do unspecified damage to the "traditional [interest in] finality."[175] In his dissent, Justice Stevens conceded that allowing the test would harm finality, but such interests must take a back-seat in light of the power of DNA evidence to prove innocence.[176] However, although it was generally agreed amongst the Justices that granting relief would harm the interests of finality, no attempt was made to explain how those interests would be harmed by allowing the defendant to pay to test the DNA evidence in his case. [177]

Professor Daniel Medwed confirms newly discovered evidence rules are protective of finality interests in non-DNA cases too, such as where a petitioner claims that there has been a shift in scientific opinion and/or the development of scientific controversy in relation to the forensic evidence used against him. Medwed argues that the inherent difficulty in litigating claims predicated on newly discovered non-DNA evidence is "exacerbated by the structural design of most state post-conviction regimes: in effect, the path to proving one's innocence through new evidence has become virtually impassable due to procedural roadblocks."[178] In addition, state courts have traditionally viewed newly discovered evidence claims with "disdain, fearing the impact of such claims on the finality of judgments…"[179]

Finality has come to have a significant influence on legal discourse, with judges (and scholars) routinely asserting that restricting defendants' post-conviction arsenal benefits society. Scholars have criticized the courts for not expanding on *how* finality benefits society, with some even arguing that such restrictions can even "harm the very interests increased finality is presumed to protect."[180]

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[173] Brandon L. Garrett, *Claiming Innocence*, 92 MINN. L. REV. 1629, 1684 (2008).
[174] 557 U.S. 52 (2009).
[175] Kim, *supra* note 157 at 574.
[176] *Osborne*, 557 U.S. at 99 (Stevens, J dissenting).
[177] Kim, *supra* note 157 at 574.
[178] Medwed, *supra* note 3, at 658.
[179] *Id*. at 664.
[180] Kim, *supra* note 157, at 620, 621. ("This Article argues, however, that restrictions on defendants' rights in posttrial review can often harm the very interests increased finality is presumed to protect. Limiting defendants' rights to obtain relief from improper convictions or excessively lengthy sentences also limits the state's ability to identify and remedy wrongful incarceration. Although restrictions on posttrial review invariably help conserve judicial and prosecutorial time, they often impose net costs on the state as a whole. Arguments that restrictions on relief from errors after trial encourage defense counsel to take greater care in representation are theoretically appealing, but falsely assume that trial attorneys have the capability to provide

Judges are supposed to weigh these interests singularly and not view finality as a "monolithic interest of presumptive importance."[181] Often this is not the case, however, with many courts supporting their judgments with a simple reference to a general societal interest in finality, and some courts making no mention of the concept at all.

This latter judicial practice is evident in cases presented in Part IV. The courts routinely reject newly discovered evidence claims that argue the findings of the 2009 NAS Report (and other critical sources), with regard to the fallibility of various forensic identification methods, represent a shift in scientific opinion or the existence of scientific controversy. The courts do not mention finality, but interpret the high thresholds comprised in newly discovered evidence rules narrowly to reject these claims. For instance, courts reason that such criticism was discoverable prior to the publication of the report, and that the NAS Report has no bearing on the case at hand and therefore does not have verdict changing capacity. As such, the judiciary apply the law in a way that silently favours finality interests over substantive accuracy.

Applying the law is a fundamental, institutional function of the courts. The cases in Part IV show the courts to be carrying out this function (in the context of this article) in an arguably consistent manner, which is "rationally adapted to the task."[182] Accordingly, it would be Bator's view that "in the absence of institutional or functional reasons to the contrary we should accept a presumption against mere repetition of the process on the alleged ground that, after all, error could have occurred."[183] This view embodies the principle of institutional settlement, a classic tenet of legal process theory. How this principle relates to the pattern presented in Part IV is explored next.

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a higher quality of representation with the same limited resources. The traditional arguments that limiting defendants' rights to appeal increases the deterrent value of criminal law are unpersuasive in light of modern research on rehabilitation and the miniscule effect posttrial review has on the punishment criminals can expect to receive. On the other hand, providing defendants with fair opportunities to seek relief from claimed errors can increase the subjective legitimacy of the system, thereby encouraging defendants to obey the law in the future. Conversely, restricting posttrial relief in ways that defendants see as arbitrary or unfair may well increase recidivism. Courts and scholars treat finality as either a thumb on the scale or a hefty interest that weighs in the favor of restrictions on posttrial review. A close analysis reveals, however, that it is often neither. Rather, restrictions on posttrial review that make criminal judgments more "final" often harm the very interests finality presumes to protect. Moving beyond the language of finality and towards a more critical analysis of the costs and benefits of posttrial review may allow society to craft more efficient and equitable systems of criminal justice.").

[181] *Id.* at 578.

[182] Bator, *supra* note 156, at 454.

[183] *Id.*

B. Legal Process Theory: The Principle of Institutional Settlement and the Competence of Appellate Courts to Address Indeterminacy When Shifting Scientific Opinion Raises New Legal Questions

This sub-section first explains how the principle of institutional settlement relates to the pattern of judicial decision-making presented in Part IV. It then critically explores the institutional competence of the appellate courts to address indeterminacy when shifting scientific opinion raises new legal questions.

i. The Principle of Institutional Settlement

Hart and Saks – the fathers of Legal Process Theory – conceived the principle of institutional settlement.[184] The principle of institutional settlement expresses the view that when competent institutions produce decisions that have been arrived at as a result of "duly established procedures", those decisions "ought to be accepted as binding upon the whole society unless and until they [the procedures] are duly changed."[185] In other words, the principle theorizes that it is procedural regularity in the decision-making process of a competent institution that legitimizes the institution's decisions, not whether its decisions are substantively accurate. Procedure is "critically important"[186] because it, *inter alia*, provides important practical benefits. Procedure provides an effective way of obtaining "good" decisions, facilitating the collaboration of institutions in an interconnected institutional system (like the criminal justice system), and enhances the legitimacy of the law by generating consistency.[187] In the context of this article, the legal process vision suggests that the judicial decision-making pattern identified in Part IV is good, institutionally appropriate, and legitimate.

However, the competence of appellate courts to address indeterminacy when shifting scientific opinion raises new legal questions is open to critical analysis. The following sub-section critically considers the preparedness of the appellate courts to rationally and accurately assess scientific uncertainty, like that presented by newly discovered evidence claims grounded on the alleged indeterminacy present across various forensic identification disciplines. It is presently undeniable that (despite the use of rational procedures and decision-making) the criminal justice system makes factual errors. As Professor David Wolitz points out, the power of new evidence like DNA to cast legitimate doubt on a trial verdict quite apart from procedural defect is something "Professor Bator failed to acknowledge or foresee in his argument."[188] While procedural regularity may provide levels of consistency and certainty, it "also raises the possibility that the

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[184] Henry M. Hart, Jr. & Albert M. Sacks, THE LEGAL PROCESS: BASIC PROBLEMS IN THE MAKING AND APPLICATION OF LAW (William N. Eskridge, Jr. & Philip P. Frickey eds., 4th ed. 1994).
[185] *Id.*
[186] William N. Eskridge, Jr. & Gary Peller, *The New Public Law Movement: Moderation as a Postmodern Cultural Form*, 89 MICH. L. REV. 707, 721 (1991).
[187] *Id.*
[188] David Wolitz, *Innocence Commissions and the Future of Post-Conviction Review*, 52 ARIZ. L. REV. 1027, 1060 (2010).

importance people attach to procedural justice may distract them from the failure of the legal system to provide substantively accurate outcomes."[189] In the Era of Innocence judges must have a closer eye on substance; concerns about accuracy must take on a more prominent role in their decision-making.

ii. The Competence of Appellate Courts to Address Indeterminacy When Shifting Scientific Opinion Raises New Legal Questions

The NAS Report presents the criminal justice system – and in particular appellate judges – with scientific uncertainty. As D. Michael Risinger explains,

> Much of the NAS/NRC Report concentrates on what might be described as the problem children of forensic science. These are, in general, forensic techniques that were developed more or less at the dawn of forensic science, such as fingerprint identification, handwriting identification, firearms and toolmark identification, etc. They mostly deal with "source attributions," that is, determining the source item that left a trace in some relevant place, such as a crime scene. The principles relied upon by such techniques are not the products of science, as that term is currently understood, but rather the product of a kind of commonsense generalization derived from experience with the subject matter under examination. Neither the generalizations so derived nor the accuracy of the results arrived at by practitioners of these disciplines have ever been subject to the kind of systematic testing that has come to be expected as a part of anything calling itself "science." This does not mean that the results arrived at are necessarily always in error, but simply that we have no very good evidence about when they are likely to be in error and when they are likely to be accurate.[190]

This catalogue, coupled with the NAS Report's unprecedented conclusions about the consistency and certainty of DNA analysis, the fact it was commissioned by Congress and authored by a distinguished committee that was not a "hotbed of card-carrying forensic science skeptics,"[191] cast a new, quasi-official,[192] critical light on a plethora of forensic identification disciplines. As Risinger puts it, "As a well-documented catalogue of the problems of forensic science by a highly credentialed body, this report is hugely important."[193]

The NAS Report made it "untenable to treat criticisms [of forensic science] as simply the cavils of uninformed academics with nothing better to do."[194] For instance, the report posed many new legal questions about admissibility: Does forensic identification evidence post the findings of the NAS Report satisfy *Daubert*? Should forensic examiners curtail their testimony? If so, what should that testimony be? In the context of newly discovered evidence rules, the NAS Report has driven questions such as: are the findings of the NAS Report new? And, if so,

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[189] Jenny S. Martinez, *Process and Substance in the "War on Terror"*, 108 COLUM. L. REV. 1013, 1027 (2008).
[190] D. Michael Risinger, *The NAS/NRC Report on Forensic Science: A Path Forward Fraught with Pitfalls*, 2010 UTAH L. REV. 225, 230-231 (2010).
[191] *Id.* at 229.
[192] Cole & Edmond, *supra* note 15 at 588.
[193] Risinger, *supra* note 190, at 226.
[194] *Id.*

do those findings have verdict changing capacity? These questions are problematic for appellate courts because they stem from, and encompass, scientific uncertainty. As Professor Emily Hammond Meazell explains, "unresolved (and perhaps unresolvable) scientific uncertainty places scientific and legal-system values in greatest tension."[195] This is because science and law embody different cultures: ""[s]cience progresses while law builds slowly on precedent. Science assumes that humankind is determined by some combination of nature and nurture, while law assumes that humankind can transcend these influences and exercise free will. Science is a cooperative endeavor, while most legal institutions operate on an adversary model."[196]

These tensions have led appellate courts largely to avoid a detailed examination of the questions raised in the context of newly discovered evidence claims when a petitioner argues, with regards to forensic identification evidence, that there has been a shift in scientific opinion post the NAS Report. This is demonstrated by the vast majority of judicial decision-making presented in Part IV. In rejecting claims, the courts have sided with ideals such as procedural fairness, finality and predictability (i.e., precedent) over substantive accuracy. This is unsurprising, as the "The law is rarely concerned solely with factual truth in the scientific sense because that is rarely society's sole concern."[197] In addition, appellate courts suffer from a number of institutional deficiencies when it comes to accurately assessing newly discovered claims based upon uncertainty created by shifting scientific opinion. These include the appellate courts' discomfort with fact-based assessments and non-binary questions, the shortcomings of the adversarial system, and judges' lack of scientific expertise. Each of these issues are considered below, along with suggestions for what institutional strengths appellate courts have when it comes to making assessments concerning scientific uncertainty.

a. Problems with Factual Assessments

Appellate courts are used to (and therefore generally good at) assessing legal error, as opposed to factual error. Most post-conviction relief procedures are law based; aimed at remedying egregious legal errors related to jurisdiction or constitutionality.[198] By contrast, newly discovered evidence procedures are primarily "fact based"[199] and require a factual assessment of the qualification, timing, quality, relevance and impact of new facts. Consequently, they require courts to step outside of their comfort zone, particularly in the context of assessments relating to scientific uncertainty. This is because there is "a natural judicial tendency to avoid any deep confrontations with science."[200]

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[195] Emily Hammond Meazell, *Scientific Avoidance: Toward More Principled Judicial Review of Legislative Science*, 84 IND. L.J. 239, 244 (2009).
[196] DAVID L. FAIGMAN, LEGAL ALCHEMY: THE USE AND MISUSE OF SCIENCE IN THE LAW 26, 56 (1999).
[197] Meazell, *supra* note 195, at 250.
[198] Medwed, *supra* note 3, at 664.
[199] *Id.*
[200] Emily Hammond Meazell, *Super Deference, the Science Obsession, and Judicial Review as Translation of Agency Science*, 109 MICH. L. REV. 733, 734 (2011).

The fact-based assessments associated with newly discovered evidence can be onerous and ill-suited for comity and efficiency based institutional agendas, and, indeed, the expertise of judges. The onerous nature of the assessment stems, in part, from the fact newly discovered evidence rules comprise multiple elements.

Generally newly discovered evidence rules "involve some combination of showings that the new evidence could not have been discovered prior to trial with the exercise of reasonable diligence; that the evidence is relevant and not cumulative or merely impeaching; and that the new evidence creates a sufficient probability of a different result at a new trial."[201] Using this definition as a benchmark, it can be said newly discovered evidence rules typically require at least five factual assessments: Is the evidence a new fact? Was the new fact discoverable before trial? Did the petitioner exercise reasonable diligence in discovering and presenting the new fact? Is the new fact relevant and probative? And, does the new fact have verdict changing capacity? Each element comprises a challenging fact-based assessment that will often (especially in non-DNA cases) be (1) different in each case; (2) without a clear answer; and (3) outside the expertise of the judge. For instance, diligence must be measured along a continuum. Diligence might be satisfied if a new witness is found within ten weeks of becoming known to the petitioner, but diligence in discovering (or, indeed, waiting for) the crystallization of a new scientific theory might reasonably take ten years or an infinite amount of time. Moreover, when can a scientific theory be said to have crystallized, if ever? And, how is it determined if the new scientific theory would have been understood by and therefore persuaded a jury to deliver a different verdict? The nonbinary nature of these questions presents further problems for the courts, as explored in the next section. Moreover, there is evidence of inconsistent interpretations of these elements, which limits the courts' ability to correct error. [202]

Concepts associated with newly discovered evidence rules also have problematic definitions. For instance, the concept of "innocence," which petitioners commonly attempt to prove through newly discovered evidence procedures, "has no real legal meaning in most jurisdictions."[203] As Findley describes "In a legal system that presumes innocence unless and until guilt is established beyond a reasonable doubt, and generally permits or requires no corresponding finding or judgment of "innocent," it can be a vexing problem to determine when a person previously found "guilty" is entitled to relief from an unsound conviction as opposed to when a person may justifiably claim to be "innocent" and to have been "exonerated.""[204] Even in DNA cases, there is "no such thing as absolute proof of guilt."[205] This problem is compounded in non-DNA cases, like those where petitioners are attempting to show a shift in scientific opinion in relation to the forensic identification evidence used against them. This is because there is an "inherent difficulty and ambiguity in trying to prove a negative."[206] For instance,

[201] Findley, *supra* note 4, at 1161.
[202] *Id.*
[203] *Id.* at 1160.
[204] *Id.* at 1161.
[205] *Id.*
[206] *Id.*

Alex is convicted of a homicide offence largely on the basis that a firearms examiner testified that his gun shot the fatal bullets "to the exclusion of all other guns in the world." Alex is subsequently able to use the findings of the NAS Report regarding tool-mark evidence to significantly undermine the prosecution's case and obtain relief via a newly discovered evidence procedure. In that instance, can Alex claim to be innocent? As Findley puts it in relation to a similar hypothetical, "…while the new evidence may provide new grounds for challenging the prosecution's proof of guilt, it does not necessarily conclusively prove the opposite: that the defendant did not commit the crime charged."[207]

Collectively, these issues make the assessment of newly discovered evidence claims, based upon uncertainty created by shifting scientific opinion, difficult for the appellate courts to accurately resolve. This is exacerbated by the non-binary nature of the questions presented by newly discovered evidence claims.

b. The Non-Binary Nature of Questions Stemming from Newly Discovered Evidence Rules and Scientific Uncertainty

The NAS Report presents appellate courts with scientific uncertainty. Amongst other things, the report identified vacuums in scientific knowledge with regards to various forensic disciplines. For instance it found there was a lack of research about the variability, reliability, and repeatability of tool-marks; that there was a dearth of scientific underpinning for individualization based on hair comparisons; and there was a need to conduct research into validity, reliability, variables, and population studies in the field of shoe print analysis. These vacuums pose (currently) unresolvable questions, such as: can a firearms examiner ever scientifically conclude there is a "match" between a suspect weapon and suspect bullets? Will any (soft science) forensic method ever be as reliable as DNA evidence? These gaps are either due to a lack of appropriate research, evolving research and/or under-developed research. Some forensic science communities have made significant strides post-NAS,[208] but many questions remain unanswered. Moreover, due to the evolutive nature of scientific enquiry, any answers will likely be a moving target. After all, scientific truth is something of a fiction: "Although [science's] goal is to approach true explanations as closely as possible, its investigators claim no final or permanent explanatory truths. Science changes. It evolves…""[209]

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[207] *Id.* at 1162.

[208] *See, e.g.,* United States v. Love, No. 10-cr-2418 (MMM), 2011 WL 2173644 (S.D. Cal. June 1, 2011). In this case a United States District Court in California recognized that there was evidence that the forensic science community has generally started to take appropriate steps to respond to criticism aimed at its methodologies. *See also* Sarah Lucy Cooper, *Challenges to Fingerprint Identification Evidence: Why the Courts Need a New Approach to Finality* (forthcoming in WM. MITCHELL L. REV.) (copy on file with author).

[209] *See generally* ALFRED NORTH WHITEHEAD, SCIENCE AND THE MODERN WORLD (1925); *see also* Panel on Scientific Responsibility and the Conduct of Research: Committee on Science, Engineering, and Public Policy, 1 RESPONSIBLE SCIENCE: ENSURING THE INTEGRITY OF THE RESEARCH PROCESS 38 (1992) ("Although its goal is to approach true explanations as closely as possible, science's investigators claim no final or permanent explanatory truths. Science changes. It evolves.").

Meazell labels the questions in the paragraph above as "qualitative or non-binary"[210], and suggests courts are institutionally weak to handle the scientific uncertainty to which these questions relate. This is because "When a court is asked to resolve a question science itself has not resolved, it is simply unequipped to do so because legal values--and more particularly, the judicial process--do not employ the scientific method."[211] Conversely, courts have "significant institutional strength"[212] in answering binary questions. Binary questions, Meazell explains, are when "the scientific issue relates to "certain," or positive science--such as a judicially noticeable scientific fact--no additional scientific methodology needs to be employed. Instead, usual legal-system values easily discern a binary answer in a way indistinct from courts' other fact-finding methods."[213] Examples of such binary questions, in the context of forensic science would be: has there been criticism of the ability of tool-mark, fingerprint and hair examiners to engage in individualization? Has the NAS recommended reforms in the area of forensic science? As Meazell explains, "Courts are very good at reaching binary decisions relatively quickly."[214]

Newly discovered evidence rules demand that appellate courts answer questions such as: Is the evidence a new fact? Was the new fact discoverable before trial? Did the petitioner exercise reasonable diligence in discovering and presenting the new fact? Is the new fact relevant and probative? And, does the new fact have verdict changing capacity? In some cases these questions might be binary in nature. For example, it would be simple for a court to qualify DNA evidence (related to a 1974 case) extracted by modern testing methods only available from 2014, as "new" without the need for further exploration. However, more often, the questions posed to courts are non-binary in nature, especially in non-DNA cases involving a shift in scientific opinion. Consider the following example:

Jack is charged with murder in 1990. At his trial in 1991, the prosecution allege Jack set fire to a liquor store, killing three people inside. A state fire analyst testifies that the crime scene presented numerous "hallmarks of arson", including brown stains on the floors, "V" shaped soot marks and spider-webbed glass. The state also presents evidence that, when stopped for jay walking near to the liquor store, Jack was found in possession of an accelerant. In 2015, the State Justice Project (on behalf of Jack) files a newly discovered evidence claim based on the "new" fact that the hallmarks of arson have been discredited i.e., there has been a shift in scientific opinion that undermines the conviction. In fact, the project alleges the new evidence – in the form of an expert affidavit -- proves there was no arson at all, and the fire was an accident. The project's interest in Jack's case was triggered in 2009 by the NAS Report, which found that conclusions by fire investigators that a particular fire was arson, on the basis of rules of thumb, are not well founded.[215] Judge Wilson assesses Jack's claim in appellate court.

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[210] *See generally* Meazell, *supra* note 195.
[211] *Id.* at 256.
[212] *Id.*
[213] *Id.*
[214] *Id.*
[215] NAS REPORT, *supra* note 10, at 173.

In assessing the claim, Judge Wilson must determine whether the criticism of arson hallmarks is new; whether that criticism was discoverable before trial; whether Jack has exercised reasonable diligence in presenting it to court; whether the criticism is relevant and probative; and whether the criticism has verdict changing capacity? These questions are non-binary in nature and, therefore, difficult for the judge to address. This is partly because some of the questions relate to scientific uncertainty. For instance, whether the criticism of arson indicators qualifies as new and was not discoverable before trial requires an exploration of when the hallmarks were first criticized, and whether scientific uncertainty remains in the field. The answer to the first question may be found in 1990 when the Lime Street Fire Experiment was conducted,[216] although the NAS Report lent support to the argument in 2009.[217] Given Jack was tried in 1991, evidence of this experiment was arguably discoverable before trial, but given the trial was so soon after the experiment it is questionable whether the findings of the experiment were available to Jack's lawyer and of sufficient weight to challenge the prosecution's case at that time. Moreover, the NAS Report cites to research related to the experiment, reducing its weight as "new" in the eyes of the court, as per the rationales employed in cases like *Foster* and *Johnson infra*. In addition, given hallmarks of arson continue to be used as indicators of arson,[218] scientific uncertainty remains in the discipline. In the end, to make an accurate assessment of whether Jack has brought a "new" fact to the court that was not discoverable before his trial, the judge must engage in the near impossible task of resolving the remaining scientific uncertainty himself.

The judge's task would be much easier if he tasked with accurately determining binary questions, such as: Has there been criticism of the hallmarks of arson? Or is evidence that non-arson fires present evidence such as spider-web glass and brown stains? Faced with these binary questions, the judge could no doubt make an accurate determination without great difficulty.

As it stands, however, Judge Wilson's task is fraught with difficulty, right from the first factual assessment he faces. The main problem is that there is scientific uncertainty in relation to the veracity of arson indicators and the assessment of arson fires, and the judge must attempt to resolve that uncertainty when determining the newly discovered evidence claim. This is a near impossible challenge for the judge, not in the sense that he can't make the relevant decision fairly and rationally – but in the sense that he will struggle to make it accurately. Arguably, given the fidelity that post-conviction procedures and judicial decision-making in this domain confer on the legal process vision, the judge's inability to make accurate assessments is somewhat irrelevant. However, in the Era of Innocence, hiding behind process – particularly as a default position – is concerning.

The judge's struggle is not only attributable to the framing of the questions he is required to answer, but other institutional weaknesses too. For instance, it is also likely that Judge Wilson would lack scientific expertise, and be presented with a trial record that presents a "battle of the experts." These two issues relate

[216] John J. Lentini, *The Lime Street Fire: Another Perspective,* 43 FIRE & ARSON INVESTIGATOR 52, 52 (1992).
[217] NAS REPORT, *supra* note 10, at 172- 73.
[218] *Id.*

to the dearth of scientific expertise amongst legal professionals, including judges, and the limitations of the adversarial model respectively. These issues are considered next.

c. The Shortcomings of the Adversarial System and a Lack of Scientific Expertise amongst Judges

The adversarial model generally prevents a full consideration of scientific issues, because it encourages parties to "produce evidence favorable to their respective sides, regardless of the quality of that science."[219] This leads to a "battle of the experts."[220] Judges (and jurors at trial level) are not presented with the full picture. Instead, they "hear highly practiced alternative stories that only roughly approximate what might be termed reality."[221] In terms of expert testimony, because of the adversarial model, "information that reaches the legal system…does not represent the scientific field more generally."[222] Very often, courts are presented with experts at the "margins of their disciplines"[223] who are "chosen…because they are willing to be more certain in their conclusions."[224] Consequently, "the adversarial process will not necessarily produce a full spectrum of scientific research on a particular topic, making it very different from the formal and informal consensus-building methods that science itself uses."[225] The nature of the adversarial process therefore makes it difficult for judges to resolve scientific uncertainty accurately, which, as explored above, judges already have difficulty doing because of the non-binary nature of the questions asked of them and the vacuums in, and evolving nature of, relevant scientific knowledge.

On top of this, judges generally lack scientific expertise and technical training.[226] Some scholars argue that judges "do not think like scientists"[227] and therefore do not have the capacity to make accurate assessments about science. As Professor Michael J. Saks notes, "Just as legal training teaches one the intellectual skills to analyze legal problems, scientific training teaches one how to analyze empirical questions and proposed answers. This places judges in a weak position to know what questions need to be asked in order to test an empirical claim or how to evaluate the data offered in answer."[228] Professor Frederic I. Lederer further notes that lawyers' educational deficiency (when it comes to scientific knowledge) "… often places lawyers at a disadvantage when confronted with scientific evidence…lawyers often fail to ask the right questions and uncritically

[219] Meazell, *supra* note 195, at 255.
[220] *Id.*
[221] Faigman, *supra* note 196, at 65.
[222] *Id.*
[223] *Id.* at 54.
[224] *Id.*
[225] Meazell, *supra* note 195, at 255.
[226] Faigman, *supra* note 196.
[227] Saks, *supra* note 9, at 1136.
[228] *Id.*

accept scientific assertions."[229] The NAS Report recognized this was a significant issue too, stating, eleven times, that "lawyers and judges often have insufficient training and background in scientific methodology, and they often fail to fully comprehend the approaches employed by different forensic science disciplines and the reliability of forensic science evidence..."[230] This deficiency is often attributed to a science and math "black hole" in legal education – "a black hole that becomes harder to close the more removed it is from law school."[231] Consequently, as Professor Jessica D. Gabel states, "As lawyers, we are ill-equipped to speak the language of science."[232]

Collectively, these institutional weaknesses engender an appellate court system that has great difficulty in accurately assessing newly discovered evidence claims based on indeterminacy. This is because these claims require judges to conduct a fact-based assessment to resolve scientific uncertainty, which is presented to them largely in the form of non-binary questions, and conducted within an adversarial model that limits the quality of evidence before them, and which they do not commonly have the expertise to accurately assess. These issues, Meazell argues, "speak to the courts' limited ability to deal with scientific uncertainty."[233]

d. Institutional Strengths

Despite the deficiencies detailed above, the appellate courts do have some institutional strengths when it comes to accurately engaging in assessments concerning indeterminacy. First, appellate courts have the competence to address these science-related factual questions,[234] as it is their constitutional role to review the law. Moreover, addressing indeterminacy is "mostly an issue for appellate courts."[235] Addressing uncertainty is a crucial part of the appellate judiciary's day job. Appellate courts, therefore, have the institutional power to develop and engage in appropriate decision-making procedures to suit the task at hand. In other words, they have the strength to evolve towards decision-making that is more sensitive to notions of accuracy. As per the legal process vision, a "distinctive comparative advantage of the judiciary"[236] is its ability to use "the defining tools of legal craft--to render decisions according to principle rather than discretion or subjective policy judgment."[237] The judiciary can, as part of their craft, strive for decision-making that accords with principles of accuracy. Moreover, they courts can do this and be loyal to notions of procedural regularity. An important facet

[229] Frederic I. Lederer, *Scientific Evidence--An Introduction*, 25 WM. & MARY L. REV. 517, 519-20 (1984).
[230] See Jessica D. Gabel, *Forensiphilia: Is Public Fascination with Forensic Science a Love Affair or a Fatal Attraction?*, 36 NEW ENG. J ON. CRIM. & CIV. CONFINEMENT 233, 258 (2010).
[231] *Id.* at 257-58.
[232] *Id.* at 258.
[233] Meazell, *supra* note 195, at 252.
[234] *Id.* at 283.
[235] Michael C. Dorf, *Legal Indeterminacy and Institutional Design*, 78 N.Y.U. L. REV. 875, 940 (2003).
[236] *Id.* at 920.
[237] *Id.*

of process thinking is the ability of an institution to provide "mechanisms for systemic self-correction, an important virtue under the relativist theory of democracy."[238] In other words, institutional procedure has an inbuilt corrective function. To bolster this strength, the courts can utilize a variety of pre-existing institutional mechanisms. For example, judges can use procedures to narrow the disputed scientific issues; conduct hearings where the court can examine potential experts; and appoint independent experts, special masters, and specially trained law clerks.[239] Courts also have a convening power, namely the ability to bring together the various actors needed to craft effective solutions to multi-dimensional problems,[240] like, for example, scientific uncertainty.

Second, with the emergence of the Innocence Movement in particular, appellate courts have also been thrust into conducting more newly discovered evidence based fact assessments. As Findley recalls, "The innocence movement got its initial momentum from using new evidence--primarily DNA evidence--to prove factual, as opposed to "legal," innocence."[241] With the ever-increasing rhetoric of innocence across the criminal justice system,[242] and the role scientific evidence plays in that movement, judges should become more familiar with science orientated fact assessments. This increased familiarity should serve to improve their fact based assessments and engagement with non-binary questions in the domain of newly discovered evidence. As aforementioned, courts also have great institutional strength in making binary decisions, of which some newly discovered evidence claims will encompass. The courts should apply this skill in favour of accuracy-focused assessments when it is appropriate to do so.

Third, judges can engage in further scientific and technical training. After all, given judges are prime consumers of scientific evidence, they should "learn to evaluate what they are getting for their dollar."[243] Moreover, judges are intelligent people with the capacity to engage accurately with technical issues. The courts' institutional strength is also furthered by the judiciary's (at least perceived) neutral position and prestige.[244] The courts' lack of a direct stake in the outcome of a case and the respect they command, should enable them to engage in objective, accurate and thorough fact-finding, unburdened by "subjective policy judgment."[245]

In light of these institutional strengths, there is reason to be optimistic about the courts' ability to engage accurately in the indeterminacy raised in newly discovered evidence claims based on shifting scientific opinion. Moreover, they can do this and remain true to key tenets of the legal process vision.

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[238] Eskridge & Peller, *supra* note 186, at 721.
[239] Gen. Elec. Co. v. Joiner, 522 U.S. 136, 149-50 (1997). *See also* Cooper, *supra* note 36, at 243.
[240] Dorf, *supra* note 235, at 945.
[241] Findley, *supra* note 4, at 1160.
[242] *See generally* CONTROVERSIES, *supra* note 42.
[243] Faigman, *supra* note 196, at 64.
[244] Dorf, *supra* note 235, at 945.
[245] *Id.* at 920.

VI. Conclusion

Newly discovered evidence rules are an important feature of a defendant's post-conviction arsenal. In particular, the ability of these rules to effectively handle claims based on shifting scientific opinion in relation to forensic identification evidence is crucial. This is because, in recent years, the ability of various, popular forensic disciplines to engage in source attribution (especially individualization) – a function the criminal justice system has (almost) unreservedly relied on these disciplines to undertake for decades – has been significantly criticized. The 2009 NAS Report was a landmark event in this context, rubber stamping such criticism with the imprimatur of the National Academies.

Since 2009, petitioners have argued that the criticism levelled at these forensic identification methods is newly discovered evidence; contending that the criticism represents a shift in the scientific opinion that was used to convict them. The appellate courts, however, routinely reject these claims. In doing so, the courts (1) defer to lower court decisions regarding the qualification of newly discovered evidence; and (2) do not label the findings of the NAS Report – including the unprecedented finding that individualization was not proper in any other discipline other than DNA analysis – as newly discovered evidence. Appellate courts tend to take the view that the NAS Report presents no "new" facts given that it cites to older research, and lacks verdict changing capacity because its findings are not specific to individual cases.

This pattern in judicial decision-making shows the courts to be favoring finality interests and procedural regularity over substantive accuracy. The obvious theoretical reason for why courts foreclose post-conviction review is finality, as concerns about comity, resource and preventing a flood of trivial claims are crucial facets of the appellate courts' institutional agendas. The relevant case law also presents the courts as an institution that is loyal to notions of procedure and predictability, and therefore faithful to the legal process vision. At the heart of that vision is the principle of institutional settlement, which theorizes that it is procedural regularity in the decision-making process of a competent institution that legitimizes the institution's decisions, not whether its decisions are substantively accurate.

The side-lining of substantive accuracy is problematic for newly discovered evidence claims because they are fact-based remedies. Furthermore, when it comes to scientific uncertainty, such as that present within many forensic identification disciplines at present, the appellate courts are institutionally weak to make accurate determinations. This is because appellate courts tend to avoid confrontations with science, are generally uncomfortable (and inexperienced) with fact-based assessments and non-binary questions (like those presented by newly discovered evidence rules), and must confront the challenges presented by the adversarial model and their own lack of scientific expertise. These deficiencies combine to make it very difficult for appellate courts to address scientific uncertainty accurately.

However, there is reason to be optimistic. The appellate courts do have competence to address factual questions and indeterminacy. In fact, it a crucial function of their docket. As such, they have the institutional strength to evolve towards decision-making that is more sensitive to notions of accuracy. In addition,

appellate courts are engaging with fact-assessments related to scientific evidence more frequently, can address binary questions with skill and speed, and have the neutrality and professional 'clout' to engage in accurate fact-finding. Judges also can avail themselves of further technical training and assistance. These institutional strengths should be harnessed.

In light of the fact that nearly 50% of DNA exonerations to date are attributable, in some way, to unreliable and/or improper forensic evidence, the appellate courts must have a closer eye on eye on accuracy with regards to relevant forensic disciplines. The problem of wrongful conviction on the basis of erroneous science is unlikely to go away soon. The courts must begin to remedy their institutional weaknesses, and seek to harness and apply their institutional strengths in favour of accurate assessments when faced with newly discovered evidence claims concerning scientific uncertainty.

Judges should take a more proactive role in remedying factual error caused by erroneous science. Science will always "encompass some quantum of uncertainty, there will always be a policy gap for our legal institutions to fill."[246] Courts cannot – and should not – be expected to conclusively resolve scientific uncertainty; however they should no longer – as a default position – hide behind procedural regularity to the detriment of substantive accuracy. Courts should not fill policy gaps with generalized finality interests, and neglect their own institutional competence for providing the most accurate possible assessment of newly discovered evidence claims raising questions related to scientific uncertainty.

[246] Meazell, *supra* note 195, at 250.