Remapping the Path Forward: Toward a Systemic View of Forensic Science Reform and Oversight

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The 2009 Report of the National Academy of Sciences (NAS) on the state of forensic science in the American criminal justice system has fundamentally altered the landscape for scientific evidence in the criminal process, and is now setting the terms for the future of forensic science reform and practice. But the accomplishments of the Report must not obscure the vast terrain that remains untouched by the path of reform that it charts. This Article aims to illuminate a critical and currently neglected feature of that territory: namely, the manner in which police and prosecutors, as upstream users of forensic science, select priorities, initiate investigations, collect and submit evidence, choose investigative techniques, and charge and plead cases in ways that have critical and systematic, though poorly understood, influences on the accuracy of forensic analysis and the integrity of its application in criminal cases. By broadening our understanding of how forensic science is created and used in criminal cases—by adopting a systemic perspective—the Article points to a raft of yet unaddressed issues concerning the meaning of scientific integrity and reliability in the context of investigative decisions that are by and large committed to the discretion of decidedly unscientific actors. Critically, the Article demonstrates that systemic dynamics affecting upstream use of forensic science might well undermine the reliability-enhancing goals of the reforms advocated by the National Academy Report. As the NAS Report begins to set the agenda for active conversations around legislative and executive action to reform forensic science, it is critical to consider these questions. Moreover, the Article suggests that the embrace of science as a unique evidentiary contributor within the criminal justice system problematizes some of the bedrock assumptions of American criminal procedure that have, to date, prevented more robust doctrinal intervention in the investigative stages and decisions that the Article explores.

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Introduction
Over the course of the last half century, science has moved from the periphery to a place of prominence in the investigation and prosecution of crime. Analysis of physical evidence, particularly with recent scientific and technological advances in the arena of DNA, has been embraced as advancing the fundamental epistemic goals of the criminal justice system by enhancing society’s ability to connect the guilty with their misdeeds and, even more powerfully, enabling exculpation of the innocent. As the reliability of more traditional investigative tools such as eyewitness identifications and confessions has been increasingly scrutinized, the comparative accuracy of scientific evidence has been hailed. Yet at the same time, news headlines continually reveal laboratory- or analyst-level breakdowns, and many of the hundreds of exonerations seen in recent decades—through DNA testing or otherwise—have exposed error or outright

fraud committed under the guise of “scientific” opinion. A significant body of critical academic commentary on the forensic science field strongly suggests structural rather than individual causes of these ills: the surprisingly thin research base for many forensic methodologies; systematic compromises to the quality of crime laboratory output due to under-resourcing and the undue influence of police and prosecutorial agendas on scientific analysis; poor access to, and use of, expert resources by defense counsel; and lax scrutiny of scientific evidence by courts.

2. See Browse Cases, Nat’l Registry Exonerations, http://www.law.umich.edu/special/exoneration/Pages/browse.aspx (showing 1,060 total exonerations since 1989 and 239 in cases involving false or misleading science as of January 28, 2013). DNA exonerations that reveal the error of previous expert opinion provide the most dramatic demonstration of erroneous science. See Brandon L. Garrett, Convicting the Innocent: When Criminal Prosecutions Go Wrong 89–90 (2011) (reporting that 61% of trials in DNA exonerations featured invalid conclusions drawn from the evidence); Michael J. Saks & Jonathan J. Koehler, The Coming Paradigm Shift in Forensic Identification Science, 309 Science 892, 892–95 (2005) (arguing that a model for scientifically sound identification science, changing legal admissibility standards for expert testimony, high error rates across forensic science, and the discovery of wrongful convictions are all driving a paradigm shift in forensic identification science); Jonathan Saltzman & Mac Daniel, Man Freed in 1997 Shooting of Officer, Bos. Globe, Jan. 24, 2004, http://www.boston.com/news/local/articles/2004/01/24/man_freed_in_1997_shooting_of_officer/?page=full (reporting on a case of a fingerprint “match” disproved through DNA exoneration). But equally important, albeit far more challenging and contested, questions have been raised in cases of scientific opinion that has evolved over time to a point of rejecting the theory or application on which the conviction was premised. See, e.g., Ex parte Henderson, 384 S.W.3d 833, 833–34 (Tex. Crim. App. 2012) (affirming a grant of habeas corpus relief for a death row inmate based on “new developments in the science of biomechanics” causing scientific experts at the initial trial to change conclusions regarding the cause of death).


4. Paul C. Giannelli, The Abuse of Scientific Evidence in Criminal Cases: The Need for Independent Crime Laboratories, 4 Va. J. Soc. Pol’y & L. 439, 441 (1997) (noting that while scientific evidence is superior to other types of evidence, there have been a number of abuses of scientific evidence, “including perjury by expert witnesses, faked laboratory reports, and testimony based on unproven techniques,” and that too many experts have a police–prosecution bias); Randolph N. Jonakait, Forensic Science: The Need for Regulation, 4 Harv. J.L. & Tech. 109, 191 (1991) (concluding that “[a]ll available information indicates that forensic science laboratories perform poorly,” and arguing for increased regulation of crime laboratories).


Thus, forensic evidence is both special and mundane. It is special in its potential to identify and exclude with a degree of reliability that sets it apart from more traditional forms of proof in criminal investigations (eyewitness identification, confessions, informants, and the like). But it is also, like all evidence produced by humans in the crucible of the criminal justice system, susceptible to error, bias, manipulation, rationing, and other dynamics that compromise its reliability both in theory and in practice.

For at least three decades, academic observers (largely legal scholars, joined by a handful of social scientists and a smattering of commentators within the tiny community of academic forensic science) were nearly alone in grappling with this vexing duality. But with the release of the 2009 Report of the National Academy of Sciences (NAS), *Strengthening Forensic Science in the United States: A Path Forward* (the NAS Report), these critiques have been nudged from the margins into the policy mainstream. In three hundred pages, the NAS Report criticized the absence of validation for virtually every forensic methodology; pointed to widespread deficiencies in funding, training, and standard setting in forensic science; and laid further blame at the feet of courts for “continu[ing] to rely on forensic evidence without fully understanding and addressing the limitations of different forensic science disciplines.” Importantly, however, the thrust of the NAS Report was not ultimately pessimistic, but rather, as the title implies, forward-looking: its prestigious authors clearly viewed the future of criminal justice as bound up with the future of forensic science. Toward that end, the NAS Report proffered thirteen recommendations for comprehensive reform of the forensic science field, which, in sum, call for broader training and standardization of laboratory work, an ambitious program for expanding research and education directed at improving forensic science, and most controversially, institutional independence of laboratories from law enforcement institutions and the formation of a new federal agency, the National Institute of Forensic Science (NIFS), charged with funding and agenda setting in the forensic sciences.

The NAS Report has been widely heralded as a watershed, and its analysis and recommendations look to be setting the terms of academic and

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8. *Id.* at 183–239.
9. *Id.* at 85–110.
10. See *id.* at 4–5 (discussing the impact of advances in forensic science on criminal justice).
11. See *id.* at 19–33 (summarizing all thirteen recommendations).
policy debates concerning forensic science for the foreseeable future. But academic and policy agendas tethered to the NAS Report will be deficient in a critical respect. Like the overwhelming majority of the scholarship and criticism that so heavily influenced it, the light shined by the Report is focused almost exclusively on the primary site of forensic science production—the laboratory—as the relevant site of reform. But this ignores a critical set of dynamics affecting forensic science: namely, the manner in which upstream users of forensic science—police and prosecutors, to be precise—will select priorities, initiate investigations, collect and submit evidence, choose investigative techniques, and charge and plead cases in ways that have critical and systematic, though poorly understood, influences on the accuracy of forensic analysis and the integrity of its application in criminal cases.

These dynamics have featured (albeit often below the surface) in many known and even more unknown cases in which forensic science has failed to live up to, or even frustrated, the truth-facilitating function it is deployed to serve. Consider, for example, the fact that both cases in which the Supreme Court has taken on the question of postconviction access to (putatively exonerative) DNA testing feature challenges not to shoddy science but rather to incomplete science: both William Osborne and Hank Skinner have argued that prosecutors and police in their original investigations opted not to test available and potentially exculpatory evidence and relied in convicting them on less than the best available scientific evidence. Consider, similarly, the


13. See Brief for the Respondent at 8–9 & n.3, Dist. Attorney’s Office for the Third Judicial Dist. v. Osborne, 129 S. Ct. 2308 (2009) (No. 08-6) (discussing the State’s decision to not conduct
fact that in a recent study of the first 250 DNA exonerations in the United States, analysis of investigative documents and trial transcripts revealed that at least 34 defendants were initially tried for their crimes despite the known contemporaneous existence of arguably exculpatory forensic evidence.14

The reform agenda of the NAS Report has little to say about the critical questions raised by these cases, which center not on laboratory-based practices, but rather on the exercise of upstream discretion by other law enforcement actors. These actors exercise a range of discretion in selecting, submitting, and utilizing scientific evidence in criminal cases, and they do so within professional, organizational, and legal contexts that create particular incentives and, at times, pathologies in regard to these tasks. Critically, not only do these dynamics at times play a dispositive role in determining the impact of science in an investigation—as illustrated by the Osborne and Skinner examples above—but they also, perhaps more commonly, play a contributory role by reacting and adjusting, perhaps unexpectedly and perhaps perversely, to the work of laboratory actors. Accounting for these dynamics thus requires a broader view—a systemic view—than is afforded by a laboratory-centric lens.

Injection of a systemic view is the aim of this Article. It proceeds as follows. Part I describes the NAS Report and identifies two premises that gird its view of forensic science and contribution to the field: (1) that more good science as early as possible in the life cycle of criminal investigations will further the goal of enhancing the substantive quality of criminal justice; and (2) that greater monetary resources and more independence for laboratories are necessary and sufficient conditions to achieve premise (1). Part I further aims to situate the NAS Report’s adoption of these (implicit) premises in a particular historical, intellectual, and political context to suggest that the relative narrowness of the path forward that it charted was, though understandable and valuable in its own right, far from inevitable. Part II problematizes the premises identified in Part I by illuminating upstream dynamics driven not by laboratory-based practitioners, but rather

RFLP testing and to rely upon microscopic examination of hairs—an analysis which is no longer accepted as a valid basis for identification standing alone); Appellant’s Opening Brief at 31–33, Skinner v. State, No. AP-76,675 (Tex. Crim. App. Feb. 2, 2012), 2012 WL 591289, *31–33 (discussing facts); see also Skinner v. Switzer, 131 S. Ct. 1289, 1298 (2011) (holding that a convicted state prisoner seeking DNA testing of evidence may assert that claim in a civil rights action); Osborne, 129 S. Ct. at 2323 (declining to recognize a freestanding constitutional right of access to DNA testing).

14. This is based on a conservative count of the publicly available data from Professor Brandon Garrett’s study. See BRANDON L. GARRETT, CONVICTING THE INNOCENT: WHEN CRIMINAL PROSECUTIONS GO WRONG app. (2011) [hereinafter GARRETT, APPENDIX TO CONVICTING THE INNOCENT], available at http://www.law.virginia.edu/pdf/faculty/garrett/convicting_the_innocent/garrett_forensics_appendix.pdf (providing a table of characteristics of forensic evidence used at trial from a list of 250 later-exonerated convicts); see also GARRETT, supra note 2, 6–11 (discussing the reasons behind the wrongful convictions of the first 250 people to be exonerated by DNA evidence). Interestingly, in only three of those cases were the exculpatory results not disclosed to defense counsel. See GARRETT, APPENDIX TO CONVICTING THE INNOCENT, supra.
by police and prosecutors.\textsuperscript{15} Focusing on evidence gathering, the decision to obtain forensic testing, and the investigative response to forensic analysis, the discussion aims to demonstrate that, currently, decisions committed almost entirely to the discretion of police and prosecutors are marked both by underutilization—with surprisingly little physical evidence being collected, analyzed, and relied upon in investigations—and qualitatively suboptimal utilization—marked by mutually reinforcing dynamics of late-in-time testing, less-than-thorough follow-up investigation in response, and systematic discounting of exculpatory science. Of course, these pathologies do not infect every case, and even where they do, the impact varies tremendously. But to the extent their causes are structural and systemic—as Part II argues—there is reason for concern both that laboratory-centric reform will not alone meaningfully enhance the quality of forensic science in the criminal justice system, and that dynamics of usage might frustrate or be frustrated by some of the NAS Report’s recommendations. The NAS Report’s recommendations to preserve and even expand the (properly circumscribed) use of non-DNA forensic techniques of individualization through comparison and to create “independent” crime laboratories are held out, somewhat speculatively, as examples of reform proposals that might well spur unintended and undesirable consequences when upstream actors are included in the mix. Ultimately, though, many of the questions raised in Part II are empirical and not answerable on the current record of knowledge. Hence, expanded and refocused research is a major area of reform embraced by this Article.

While the primary goal of the Article is diagnostic, Part III provisionally outlines some proposals for widening the NAS Report’s path forward by adopting a more systemic vision for forensic science oversight and reform. In part, the aim is to capitalize on the current momentum for reform\textsuperscript{16} by offering a series of possible complements to the existing agenda outlined by the NAS Report: the Report’s research and standard-setting proposals should encompass police and prosecution practices such as evidence gathering, testing decisions, and disclosure regimes; the Report’s “independence” recommendation should be reflected upon in light of the concerns raised in Part II; and policy makers should prioritize state-level oversight as a complement, or alternative, to proposed national oversight of the field. But Part III reaches beyond the NAS Report blueprint as well. An additional part of the forward-looking agenda is to address a pervasive inattention to forensic science within criminal procedure scholarship. This field has recently featured innovative work emphasizing the complex interactions among criminal justice actors, the institutions in which they operate, and the legal strictures that guide them, prompting something of an upstream turn in

\textsuperscript{15} For reasons explained below, the analysis is confined to state and local, nonfederal actors, although it will be generalizable to a certain extent. See infra Part II.

\textsuperscript{16} See supra note 12.
As Part II reveals, these dynamics are quite relevant in considering the role of scientific evidence in criminal cases, and yet criminal procedure scholars, in contrast to evidence scholars, have not for the most part given sustained attention to the forensic science field. Thus, Part III concludes with a preliminary sketch of how the goals of enhancing forensic science integrity challenge some of the foundations of criminal procedure doctrine in ways not previously considered, particularly by problematizing the enormous degree of discretion granted to police and prosecutors in pursuing investigations and building cases.

I. The NAS Report’s View

A. A Brief History of a Path Forward

The NAS Report was the fruit of an unprecedented congressional charge to the National Academy of Sciences to conduct a comprehensive examination of the entire field of forensic science across all disciplines. Its undertaking represented a shift from an attitude of near-total relative governmental neglect with regard to the forensic sciences, despite the steadily increasing centrality of scientific evidence to the criminal justice system over several decades. It also, relatedly, represented a concerted challenge (the magnitude of which remains to be seen) to a tradition of top-to-bottom law enforcement control of the forensic sciences. This Part examines these dynamics in turn.


1. A History of Neglect.—President Lyndon Johnson’s Commission on Law Enforcement and Administration of Justice made the development of scientific and technological capacity in the criminal justice system a federal priority, and hence the 1970s saw the first federal grant money to develop scientific capacity for state and local law enforcement agencies. But expanding the production of and demand for scientific evidence only further pressed on the existing lack of institutionalized commitment to funding or overseeing the quality of scientific evidence within law enforcement organizations. Oversight of crime laboratories eventually developed, but only from within the field, primarily via the wholly voluntary accreditation program developed by the American Society of Crime Lab Directors Laboratory Accreditation Board (ASCLD/LAB). Many forensic subfields eventually promulgated standards of practice through Scientific Working Groups (SWGs) comprised of practitioners of specific forensic science techniques. But protocols developed through those efforts were typically little more than nonbinding guidelines, rarely institutionalized as policies within laboratories and often rooted in little more than the accumulated


22. See, e.g., Nat'l Advisory Comm'n on Criminal Justice Standards & Goals, Report on Police 304–05 (1973) (observing that “[t]oo many police crime laboratories have been set up on budgets that preclude the recruitment of qualified, professional personnel,” and that “[t]oo often the laboratory is not considered a primary budget item and is one of the first units to suffer when budgets are trimmed”); Peterson & Leggett, supra note 20, at 623–25 (noting that “[w]hile the growth [of crime-laboratory services] was necessary, it was unregulated and without clear guidance from, or adherence to, national standards. Thus, . . . some of the underlying problems of quality assurance and minimum scientific standards simply multiplied.”).

23. See About ASCLD/LAB, Am. Soc’y of Crime Laboratory Directors/Laboratory Accreditation Board, http://www.ascld-lab.org/about_us/aboutoverview.html (“ASCLD/LAB has been accrediting crime laboratories since 1982 and currently accredits most of the federal, state and local crime laboratories in the United States plus forensic laboratories in six countries outside of the United States.”). Even today only nine states require that crime laboratories be accredited, although approximately 83% of publicly funded laboratories have pursued accreditation nonetheless. Matthew R. Durose et al., Bureau of Justice Statistics, U.S. Dep’t of Justice, NCJ 238252, Census of Publicly Funded Forensic Crime Laboratories, 2009, at 7 (2012), available at http://www.bjs.gov/content/pub/pdf/cpffc09.pdf; Nat'l Conference of State Legislatures, DNA Laws Database tbl.6 (2010), available at http://www.ncsl.org/portals/1/Documents/cj/Table6AccredLaboratories.pdf; see also Donald Kennedy, Forensic Science: Oxymoron?, 302 Science 1625, 1625 (2003) (asserting that “despite repeated calls for accreditation and oversight, many government crime labs continue to lack either one”). While ASCLD/LAB has filled a much-needed oversight gap and occasionally placed itself on the forefront of investigating scientific fraud, it has nevertheless been widely criticized as far too insular and uncritical of the forensic science field to perform meaningful oversight. See Ryan M. Goldstein, Note, Improving Forensic Science Through State Oversight, 90 Texas L. Rev. 225, 238–39 & n.114 (2011) (reviewing some of the criticisms).

24. See Mnookin et al., supra note 3, at 771–72 (describing how SWGs are formed and what they ought to look like); see also About Scientific Working Groups, SWGFAST, http://www.swgfast.org/AboutSWGs.htm (last modified Feb. 2011) (“Since the early 1990s, American and International forensic science laboratories and practitioners have collaborated in Scientific Working Groups . . . to improve discipline practices and build consensus standards.”).
wisdom of practitioners. Indeed, this reality reflected the fact that forensic science methodologies were themselves an incredible grab bag from the standpoint of their theoretical or experimental basis and reliability of results. Some, such as blood analysis, possessed a set of theories and techniques rooted in nonforensic scientific research; others, such as fingerprint comparison and a range of other comparison techniques such as hair microscopy or firearms analysis, were guided by an experientially generated set of protocols, developed and passed down wholly in the context of law enforcement applications.

Development of forensic DNA applications in the 1980s was thus a watershed not simply from the standpoint of what the technology itself offered, but more systemically because of the scientific paradigm that it injected into the field. It is well beyond the scope of this Article (and a feat already accomplished by others) to offer a detailed account of the path from DNA’s vanguard appearance in American courtrooms in the mid-1980s to its transformation of criminal investigations and prosecutions and ascendance to the status of “gold standard” for scientific evidence. But that journey, along a trail marked by a series of pitched legal, scientific, and political

25. See, e.g., GARRETT, supra note 2, at 105–06 (describing the scientifically invalid recommendation of the Scientific Working Group on Shoeprint and Tire Tread Evidence that the shoe print comparison method allows “definite conclusion of identity”); Harry T. Edwards, The National Academy of Sciences Report on Forensic Sciences: What It Means for the Bench and Bar, 51 JURIMETRICS 1, 11 (2010) (asserting that SWGs were of “questionable value” due, among other reasons, to lack of enforcement, lack of empirical measurement of effectiveness, and excessive vagueness); Mnookin et al., supra note 3, at 772–73 (describing how SWGs “despite the scientific label in the name . . . have a rather tenuous relationship with research science,” and concluding that while “practitioner-led SWGs may often reach appropriate, thoughtful, and perhaps even research-based conclusions, . . . they also risk being guided by and influenced by populist practitioner pressures”); see also State v. Dominguez, No. 01-10-00428-CR, 2011 WL 3207766, at *5–8 (Tex. App.—Houston [1st Dist.] July 28, 2011, pet. ref’d.) (not designated for publication) (recounting testimony in a capital case of the founding director of the Scientific Working Group on Dog Scent and Orthogonal Detector Guidelines, who identified departures from dog scent lineup best practices but contended that the procedure in the case was still reliable).


battles that have come to be known as “the DNA wars,” was marked by three features of particular relevance to the present account.

First, in contrast to all forensic science techniques that preceded DNA analysis—what Erin Murphy helpfully categorizes as “first-generation” forensic science—DNA came to the criminal justice system as a tool developed by research scientists and used in a range of nonforensic applications—features that did not guarantee reliability, but stood in contrast to the law enforcement and otherwise nonscience origins of many precursor techniques. Second, forensic DNA analysis retained much of the technical and theoretical standardization that characterized its home base of research science when it entered the criminal justice system, and also was met by a level of judicial, political, and ultimately regulatory scrutiny that immediately and significantly outpaced that which had attached to first-generation forensic science. The DNA Identification Act of 1994 (which established, among other things, a national system of DNA databases and a national DNA Advisory Board) as well as regular and substantial congressional funding of the field are only two of many examples of the exceptional level of formal, external regulation of forensic DNA.

But these features prompted a third dynamic that presaged a theme that resurfaced in the 2009 NAS Report: that the hotly contested process of erecting a legal infrastructure for oversight of forensic DNA was closely bound up with questions of the proper demarcation of the law–science divide in the forensic sciences more broadly. While a community of researchers and defense advocates aimed to situate forensic DNA and oversight of it squarely within the province of the “pure” scientific field that gave birth to it, another powerful bloc, led by the FBI, contended that forensic DNA was a unique field amenable to regulation only from within, i.e., from within the


31. See, e.g., Murphy, supra note 27, at 9–11 (summarizing the history and noting the implementation of regulation and standardization in forensic science).

law-enforcement-based forensic science community. 33 A tug and pull between these perspectives shaped the earliest congressional foray into DNA oversight: the establishment of the national system of DNA databases and of a DNA Advisory Board comprised in part of independent scientists appointed with the approval of the FBI Director. 34 It also shaped early efforts by the National Academy’s National Research Council (the same body responsible for the 2009 NAS Report) to develop standards for DNA typing—efforts that prompted the drawing of battle lines between the “forensic DNA as ‘pure’ science” and “forensic DNA as ‘forensic’ science” camps, and that ultimately by many accounts featured significant technical and regulatory concessions to the second camp. 35 The point for present purposes is not a scientific one but a political one: efforts at external, governmental involvement in the field of forensic science has historically been bound up with (and by) questions of law enforcement discretion and territorialism. Indeed, efforts to launch the sort of broad-based review eventually undertaken by the NAS in 2009 were stymied for years by infighting among law enforcement and defense leaders, forensic practitioners, and policy makers about whether a congressionally authorized assessment of the field should be undertaken by the National Institute of Justice (NIJ), an arm of the Department of Justice (DOJ), or by a scientific authority like the National Academy. 36

In any event, governmental interest in, and funding and regulation of, DNA did not spill over to other forensic science techniques, despite the fact that these non-DNA applications dominated (as they continue to dominate) the caseloads of crime laboratories. 37 Indeed, the greatest impact of forensic DNA was undoubtedly to highlight the absence of oversight with regard to most other forensic techniques, as well as the enormous and increasingly glaring gap between the promise of scientific reliability and the increasingly exposed reality of forensic practice. 38 Reports of laboratory breakdowns

33. See, e.g., ARONSON, supra note 29, at 147 (arguing that the FBI “sought to maintain the apparent boundary between scientific and legal issues”).

34. Id. at 152–53.


36. Murphy, supra note 27, at 13–14 & n.50.

37. See Durose et al., supra note 23, at 4 tbl.5 (reporting that in 2009, 66% of requests for analysis to laboratories were for nonbiological evidence); NAS REPORT, supra note 7, at 41 (stating that DNA analysis comprises only about 10% of laboratory caseloads).

38. See ARONSON, supra note 29, at 3 (“As the history of DNA profiling demonstrates, [forensic] technologies have limitations that only become apparent when they are applied in practice and are challenged by people who have a vested interest in pointing out their shortcomings.”); Michael J. Saks & Jonathan J. Koehler, What DNA “Fingerprinting” Can Teach the Law About the
from Houston to North Carolina to Detroit pointed to a litany of similar structural roots: a history of competition with other police divisions for limited resources; failure to hire, train, and retain qualified analysts; and caseload pressures that exacerbated other organizational deficiencies to further cause slipshod work and enhance analysts’ vulnerability to pressure from police and prosecutors. 39 Indeed, these were circumstances that were compromising the integrity of results even in the new “gold standard.” 40

But if similar themes were emerging from the accelerating reports of scandal and mismanagement, the particular institutional contexts from which these themes were distilled varied enormously. Just as forensic science encompasses a wide array of disciplines, so too do the institutional settings in which forensic science is produced exhibit significant variation. Organizations approximating the CSI-fueled public imagination of a freestanding crime laboratory, replete with microscopes and staffed by dedicated forensic analysts, are where much of forensic science is produced; but a significant number of forensic science tasks are actually traditionally and still conducted within police organizations in nonlaboratory settings—including, depending upon the particular jurisdiction, crime scene work and fingerprint and other comparative and interpretative analyses (e.g., blood spatter, photographic analysis, handwriting comparison). 41 Among the former category of crime laboratories, the vast majority are under the control of a law enforcement entity at some level of government, some are publicly run yet institutionally independent, and a significant amount of forensic analysis is done as well by private, for-profit labs. 42 Among public laboratories, jurisdiction might encompass an entire state, a particular region, a specific local jurisdiction, or as in the case of the FBI laboratory, a hybrid arrangement with a primary customer (federal law enforcement) as well as a

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40. See, e.g., BROMWICH, supra note 39, at 116–50 (detailing numerous problems with the Houston crime lab’s DNA testing).

41. See NAS REPORT, supra note 7, at 38–39 (discussing how some forensic disciplines are conducted by scientists while others are conducted by nonscientists); Randall A. Childs et al., Survey of Forensic Science Providers, 1 FORENSIC SCI. POL’Y & MGMT. 49, 54–56 & tbl.9 (2009) (examining forensic functions performed by city police and sheriff departments).

42. See NAS REPORT, supra note 7, at 57–64 (discussing various configurations of crime laboratories).
mandate to perform casework on request from other jurisdictions. This tremendous fragmentation in the field creates both an oversight vacuum and an oversight challenge, particularly from the standpoint of centralized (read, federal governmental) authorities.

In sum, Congress’s call to the NAS in 2006 was an important and long-overdue measure to address a near-total failure within policy circles to address what the accompanying Senate Report described as an “absence of data”—or what might be more accurately described as a preliminary diagnosis of failure—with respect to the national infrastructure for the production of forensic science. Moreover, it presented the NAS Report drafters with a task of immense factual and political complexity. In ultimately committing the project to the National Academy of Sciences, widely viewed as the government’s preeminent scientific authority, Congress for its part appeared to call for a striking and deliberate turn toward recapturing the scientific bona fides of the field. But the history of DNA oversight was no doubt in the minds of many participants in the review process. And, notwithstanding a general consensus that the forensic sciences required, at least, greater funding and infrastructural improvement, by undertaking a broad-based review of forensic disciplines that had long been wholly the province of law enforcement, the NAS’s effort was likely to engender even more controversy. In any event, Congress’s precommitment that the NAS Report would be an endeavor generated quite truly by the “scientific” “academy” and not law enforcement or even the broader criminal justice community did not relieve the Report’s drafters of the heavy burden of history and criminal justice politics.

2. The “Independence” Question.—The notion of scientific and law enforcement entanglement, lurking as it did somewhat below the surface of

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43. See id.
44. See id. at 77 (discussing the challenges of fragmentation).
45. S. REP. NO. 109-88, at 46 (2005) (“The results of these studies are indicative of a larger problem within the forensic science and legal community: the absence of data. While a great deal of analysis exists of the requirements in the discipline of DNA, there exists little to no analysis of the remaining needs of the community outside of the area of DNA.”).
46. Cf. Murphy, supra note 27, at 16 (arguing that the availability of DNA typing helped foster a political push for the NAS Report).
the quiet seas of governmental (non)involvement in forensic science, loomed large in the increasingly pitched academic criticisms of the forensic science field—including those advanced by prominent scholars whose perspectives would emerge prominently in the NAS Report. An overriding concern in the literature was the lack of institutional independence among the overwhelming majority of crime laboratories. Organizational, crime laboratories are by and large under the administrative control of police and prosecutorial agencies. But critics have noted that the entanglement of science and law enforcement (or, to some, dominance of the latter over the former) is more foundational as well.

The attention and funds of the federal government brought to bear on forensic science—DNA and non-DNA methodologies alike—have emanated largely from the priorities and professional infrastructure of law enforcement, and, putting aside DNA testing and toxicology analysis, were divorced from both the theoretical underpinnings and the professional culture of the sciences, a feature that critics bemoaned as suppressing scientific rigor or, worse, infecting science-based claims in the field with intolerable bias. Overwhelmingly, the empirical bases for the expert claims made by forensic practitioners—assertions, for example, of “matches” between fingerprints or between bullets and weapons or between shed hairs—lay in the accumulated observation of examiners rather than in a scientific theory developed and tested in a neutral laboratory setting. To the extent that data exists to substantiate the scientific claims made by forensic experts, government agencies in possession of that data have been reluctant to open it to scrutiny, complicating meaningful efforts at verification and undermining the scientific hallmarks of collaboration and replicability. And to the extent that the federal government sponsors independent research in forensic science, priorities are generally set and funds disseminated by the Department of Justice’s research arm, the National Institute of Justice, whose grant administration has been heavily criticized for its lack of independence from the DOJ’s own law enforcement agenda. The SWGs that had taken

48. See, e.g., Giannelli, supra note 4, at 469–76 (proposing a solution to the problems stemming from crime laboratories’ lack of institutional independence from police departments).

49. See Giannelli, supra note 47, at 88–90 (advocating for more rigorous research conducted by scientists independent from law enforcement); Mnookin et al., supra note 3, at 765–67 (describing how situating forensic laboratories within law enforcement agencies created a “divide between research values and forensic practice”).

50. See, e.g., Mnookin et al., supra note 3, at 737–40 (stating that there is insufficient scientific research to empirically ascertain the accuracy of various forensic techniques).

51. See Roger Koppl, How to Improve Forensic Science, 20 EUR. J.I. & ECON. 255, 257 (2005) (discussing several features of the organization of forensic science that lower the quality of scientists’ work); Saks & Faigman, supra note 3, at 152–53 (characterizing the approach of law enforcement toward novel forensic technologies as “bureaucratic” and empirically unsound).

52. See, e.g., Craig M. Cooley & Gabriel S. Oberfield, Increasing Forensic Evidence’s Reliability and Minimizing Wrongful Convictions: Applying Daubert Isn’t the Only Problem, 43
the lead in developing what standards of practice did exist for non-DNA methodologies were funded by the Department of Justice and administered under the auspices of the FBI, NIJ, and Drug Enforcement Agency.\footnote{TULSA L. REV. 285, 375 (2007) (describing allegations of NIJ ineffectiveness in grant oversight); Giannelli, supra note 47, at 88 (detailing reports of NIJ bias).}

Thus, a majority (perhaps even consensus)\footnote{53. See Mnookin et al., supra note 3, at 771–73 (noting that many forensic practice standards were developed by SWGs that are funded by the DOJ and operate under the auspices of the FBI laboratory); Scientific Working Groups, NAT’L INST. JUST., http://www.nij.gov/topics/forensics/lab-operations/standards/scientific-working-groups.htm (last modified July 25, 2012) (listing funding sources for various SWGs).} view of academic observers was that the forensic science field was grossly underperforming in relation to its claims of scientific validity and reliability, and that a crucial causal factor in that underperformance was the field’s lack of structural, professional, indeed epistemological independence from its law enforcement consumers. These scholarly views would come to be enormously influential in the NAS Report’s conclusions, as many of the leading proponents of this view either served on or testified before the blue ribbon panel charged with creating the NAS Report.\footnote{54. See generally Mnookin et al., supra note 3 (presenting these critiques as the consensus view).}

But if professional identity has played a formative role in the creation of knowledge within the forensic sciences, so too has it shaped critique of the field. Significantly (and unsurprisingly), the overwhelming majority of legal academic commentary in regard to forensic science has emerged from the realm of evidence scholarship, a fact that has focused critiques on the nature of forensic evidence itself and courtroom regulation of it. By contrast (and perhaps more surprisingly), criminal procedure scholars, whose gaze more commonly extends outside the courtroom to the work of police and prosecutors, have given little sustained attention to forensic science.\footnote{55. See NAS REPORT, supra note 7, at v, xi–xii (listing evidence scholar Margaret Berger as a member of the Committee, and noting testimony by Professors Giannelli, Kaye, Mnookin, Risinger, and Saks).}

However valuable the academic contributions in this area have been—all the more so for standing as a rare example of dramatic scholarly synergy with real-world reform—the disciplinary orientation of the dominant view has left unilluminated existing, and pressing, concerns that emerge when the forensic sciences are viewed as one facet of the broader criminal justice system.

B. The NAS Report’s (More and Less Implicit) Premises

Armed with an important but challenging mandate, the NAS formed a blue ribbon Committee on Identifying the Needs of the Forensic Science Community to conduct the study. Its congressional charge specified that the Committee was to be “independent” and broadly representative of interests
within the “forensics community”\(^57\): the sixteen-member Committee included leading research scientists, forensic scientists, a criminal defense attorney, a former federal prosecutor, legal academics, and a federal judge.\(^58\) No non-forensic-practitioner police officers (or sitting prosecutors), however, were among its ranks—a fact not lost on those constituencies.\(^59\) Over the course of two years, the Committee heard hundreds of hours of testimony from stakeholders in the field—practicing forensic scientists, social scientists, academics, prosecutors and defense attorneys, and federal, state, and local law enforcement officials\(^60\)—and “engaged in independent research.”\(^61\)

The factual findings of the Committee contained in its three-hundred-page report largely confirm the most pessimistic accounts of the forensic sciences that have been circulating in academic and, to some extent, professional quarters.\(^62\) Underfunding, unvalidated methodologies, and untrained and unregulated analysts are described as, if not the norm, a disturbingly pervasive reality among the nearly 400 public crime laboratories in the United States.\(^63\) Techniques long relied on by law enforcement and accepted by courts—pattern identification analysis ranging from fingerprints to shoe prints to ballistics, hair and fiber analysis, and questioned document analysis, among other disciplines—are called out as never having been systematically and scientifically validated.\(^64\) The Report’s thirteen recommendations for reform are no less sweeping. It calls for large-scale reform of crime laboratory practices, from development of standardized protocols for conducting and documenting particular forensic tests to development of a national code of ethics and greater proficiency oversight.\(^65\) It outlines an ambitious agenda for expanding research and education directed at improving laboratory practice at its foundation, calling for

\(^57\) S. REP. NO. 109-88, at 46 (2005) (directing the formation of “an independent Forensic Science Committee” to include “members . . . representing operational crime laboratories, medical examiners, and coroners; legal experts; and other scientists as determined appropriate”).

\(^58\) NAS REPORT, supra note 7, app. A at 287–302 (listing members and biographies).

\(^59\) See id. (chronicling the biographical information of each committee member); see also Strengthening Forensic Science in the United States: Hearing Before the S. Comm. on the Judiciary, 111th Cong. 15 (2009) (statement of Barry Matson, Deputy Director, Alabama District Attorneys Association) (responding to the NAS Report and noting that “[t]he absence of prosecutors on the National Academy of Sciences Committee on Forensic Sciences has not been lost on those of us serving every day in the trenches of America’s courtrooms”); Meredith Mays, Forensic Science Reform Continues, POLICE CHIEF (Nov. 2009), http://www.policechiefmagazine.org/magazine/index.cfm?fuseaction=display&article_id=1938&issue_id=112009 (noting the objection of the International Association of Chiefs of Police that “the report was developed without input from law enforcement practitioners and recommend[ing] their input be sought”).

\(^60\) NAS REPORT, supra note 7, app. B at 303–14 (listing committee meeting agendas).

\(^61\) Id. at 2.

\(^62\) See supra notes 3–6 and accompanying text (discussing deficiencies in the forensic sciences).

\(^63\) See DUROSE ET AL., supra note 23, at 1–10 (describing significant backlogs and gaps in accreditation, funding, and training at federal, state, and municipal crime labs).

\(^64\) NAS REPORT, supra note 7, at 127–82.

\(^65\) Id. at 22–26.
independent research into the “accuracy, reliability, and validity in the forensic science disciplines” as well as “observer bias” on the part of analysts;66 development of graduate education programs in the forensic sciences;67 encouragement of continuing legal education in forensic science for law students, practitioners, and judges;68 and enhancement of two specific applications of forensic science: fingerprint and AFIS 69 and homeland security.70 Finally, two specific proposals are advanced as foundational to all of the above: establishing a new federal agency, the National Institute of Forensic Science, charged with funding and agenda setting in the forensic sciences, including carrying out the Report’s laboratory and research recommendations, and restructuring crime laboratories to make them “independent” from law enforcement organizations.71

While the recommendations themselves are detailed and the factual findings animating them clear, the path forward sketched by the Report is premised on several far more implicit assumptions concerning the relationship of forensic science to the criminal justice system more generally. Two are key for present purposes: (1) that more good science will enhance the quality of criminal justice; and (2) that a better-resourced and more independent forensic community will achieve premise (1). Part II will demonstrate that a fuller accounting for the use of forensic science in the criminal justice system complicates the coherence of these premises. First, however, it is worth reflecting on the presence and significance of these assumptions embedded within the NAS Report.

1. The Science–Justice Link.—The NAS Report paints a discomforting picture of the current state of forensic science.72 Against this bleak backdrop, it is striking that the tenor and prescriptive thrust of the NAS Report is a commitment to promote the expansion of forensic science and a belief that more forensic science, so long as it is good, will advance the ends of justice in the criminal law.73 The view is of a field failing to live up to its potential, and the solution for this failure is to address the multiple facets of “underresourc[ing]” in forensic science, not to reconsider the primacy placed on scientific evidence in criminal investigations and prosecutions.74 In this

66. Id. at 22, 24.
67. Id. at 27–28.
68. Id. at 28.
69. Id. at 31–32.
70. Id. at 32–33.
71. Id. at 19–21.
72. See supra notes 57–71 and accompanying text.
73. See NAS REPORT, supra note 7, at 20 (lauding the benefits that will obtain from strengthening forensic science).
74. See id. at 14–15 (“Being underresourced also means that the tools of forensic science . . . are not as strong as they could be, thus hindering the ability of the forensic science disciplines to excel at informing investigations, providing strong evidence, and avoiding errors in important ways.”).
regard, the NAS Report echoes concerns expressed both by law enforcement and defense-minded communities that “the investigative capabilities of forensic science are not being realized,”

75 inhibiting both detection and correction in criminal cases.

The NAS Report’s premise that maximizing science will in turn maximize the reliability of outcomes in the criminal justice system might be problematized from at least three angles.76 First, while the notion that forensic science holds the dual promise of convicting the guilty and freeing the innocent has become something of a requisite incantation in the literature, it is not without important critics. Scholars of science, including several who have been engaged in the forensic science debates, have problematized faith in science, particularly as a tool of inclusion rather than exclusion in the criminal justice system. Sheila Jasanoff has cautioned that the always imperfect process of scientific production is bound to be systematically less reliable when wielded in the service of catching and convicting criminals (a goal already girded by motivational and cognitive biases) rather than exonerating them.77 More pointedly, Professor Jasanoff has observed, “The issue . . . is not whether DNA profiling can in theory provide unambiguous proofs of identity, but whether society is capable of generating DNA

75. Kevin J. Strom & Matthew J. Hickman, Unanalyzed Evidence in Law-Enforcement Agencies: A National Examination of Forensic Processing in Police Departments, 9 CRIMINOLOGY & PUB. POL’y 381, 391–93 (2010); see also CAL. TASK FORCE ON FORENSIC SERVS., FORCE REPORT 68 (2003), available at oag.ca.gov/sites/all/files/pdfs/publications/bfs_bookmarks.pdf (“Unfortunately, the rules by which investigators currently prioritize cases and evidence for examination by resource-constrained laboratories mitigate against the use of [new forensic tools to identify suspects] for cases that are not the very most serious or highest profile.”); JEREMIAH GOULKA ET AL., RAND, TOWARD A COMPARISON OF DNA PROFILING AND DATABASES IN THE UNITED STATES AND ENGLAND 1 (2010), available at http://www.rand.org/content/dam/rand/pubs/technical_reports/2010/RAND_TR918.pdf (noting the U.S. law enforcement community’s envy of the United Kingdom’s broader and more accelerated use of forensic DNA in investigations); KEVIN STROM ET AL., THE 2007 SURVEY OF LAW ENFORCEMENT FORENSIC EVIDENCE PROCESSING: FINAL REPORT 4–4 (2009), available at https://www.ncjrs.gov/pdffiles1/nij/grants/228415.pdf (“[S]ome U.S. law enforcement agencies continue to have only a limited understanding of the full benefits of forensic evidence and a mindset that forensic evidence is beneficial mainly for prosecuting crimes, not for developing new leads in investigations.”); Nancy Petro, Early DNA Testing Could Prevent Nightmare of Wrongful Charges, WRONGFUL CONVICTIONS BLOG (Aug. 20, 2012), http://wrongfulconvictionsblog.org/2012/08/20/early-dna-testing-could-prevent-nightmare-of-wrongful-charges/ (suggesting that DNA testing should be utilized as quickly as possible to protect wrongfully charged innocents).

76. This Article puts to the side concerns about the privacy and other civil liberties consequences of expanding law enforcement use of scientific evidence and the question of whether losses on those scores are outweighed by or even commensurate to gains in accuracy of criminal justice outcomes, taking up only an internal critique of the link between scientific production and criminal justice accuracy. For one recent example of a comprehensive treatment of the civil liberties debate, see SHELDON KRIEMSKY & TANIA SIMONCELLI, GENETIC JUSTICE: DNA DATA BANKS, CRIMINAL INVESTIGATIONS, AND CIVIL LIBERTIES 225–320 (2011) (exploring privacy, civil liberties, and civil rights concerns from expanded exploitation of DNA).

evidence that is free from bias and error.” 78 Simon Cole and Jennifer Mnookin, among others, have made similar points in regard to fingerprint comparison.79 All three scholars likely had in mind the issue of whether a forensic analyst could validly and reliably make comparisons among, as it were, profiles or prints, as an issue distinct from whether profiles or prints were in theory individualizable. But the same question could be asked of whether other members of society—say investigators or prosecutors—inject bias or error into the process of obtaining or using scientific evidence. Indeed, Professors Cole and Lynch have made this point in challenging the widely presumed objectivity and reliability of DNA and other “second-generation” forensic technologies that are now trusted by law enforcement (and the NAS Report) to not only confirm but also develop suspects in the first instance, noting the crucial role of police and prosecutors in deploying science in a case.80 Thus, the notion that more good science leads fairly inexorably to more good criminal justice outcomes disregards or at least downplays the dynamic features of the relationships among scientific production, scientific usage, and the attainment of epistemological goals in the criminal justice system.

Second, the NAS Report’s confidence in the future of forensic science is methodologically agnostic and thereby rejects any notion that DNA and other second-generation forensics would largely supplant, or at least significantly marginalize, their more traditional cousins. Rather, traditional techniques must, but can, learn from DNA—and the government should support this aim through funding for validation research and laboratory resources.81 While conceding that the “scientific foundation” of these disciplines “is currently limited” and that some might have limited prospects for validation to support claims of individualization that are currently made in courtrooms, the Report contends that they “might have the capacity (or the potential) to provide probative information to advance a criminal investigation.”82 The view that some forensic methods might not offer sufficiently reliable or discrete information for a jury’s assessment, but can be reliably wielded by law

78. Id. at 331.
80. See Simon A. Cole & Michael Lynch, The Social and Legal Construction of Suspects, 2 ANN. REV. L. & SOC. SCI. 39, 56 (2006) (concluding that new data-mining technologies used to develop and prosecute suspects “reproduce many of the racial and other forms of discrimination that characterize discretionary criminal justice practices”); Murphy, supra note 28, at 725 (“[T]he very characteristics that instill such confidence in the second generation—their technical complexity, reliance on databasing, and breadth of application—in fact aggravate the conditions that ultimately caused widespread failures in the first generation.”).
81. See NAS REPORT, supra note 7, at 133 (“The probative power of these [traditional] methods can be high . . . . [and] can be improved by strengthening the methods’ scientific foundations and practice, as has occurred with forensic DNA analysis.”).
82. Id. at 127.
enforcement to generate or exclude suspects, is plausible but far from intuitively correct. More to the point, it effectively commits significant discretion to investigators and prosecutors to select among scientific tools to aid in investigations.

A third and final point to be made concerning the NAS Report’s presumed tie between science and reliable criminal justice outcomes is that it is almost entirely focused on a single producer–user path—namely, from the laboratory to the courtroom. To be sure, the Report understands that police (and to some extent, prosecutors) will utilize the results of forensic analysis to make decisions in the course of criminal cases long before arrest, much less trial. Nevertheless, the overriding emphasis of the Report’s recommendations concerning both research and standard setting—recommendations that form the heart of its reliability-enhancing project—are proposed with an eye to trial-oriented decisions such as the admissibility of evidence and the form and integrity of testimony presented to judges and juries. Indeed, it is against the backdrop of a view that “the courts have been utterly ineffective in addressing” the problem of invalid or unverified science that the Report concludes that the forensic science profession itself must shore up its inputs to adjudication.

Of course, the overwhelming majority of charged criminal cases never see the light of trial (and its attendant admissibility hearings), since some 95% terminate in a guilty plea. More to the point, the overwhelming majority of physical evidence never sees the fluorescent light of a laboratory, and much of what a laboratory could produce is never actually generated for use in criminal cases. The reasons for this aspect of the “underutilization” question are complex, and to be sure are at least partly related to laboratory-centered circumstances—in particular, as the NAS Report noted, work backlogs that might discourage utilization. But, as the next Part discusses in detail, an array of decisions made outside a laboratory by police and prosecutors deciding what evidence to collect, what evidence to submit for testing, and how (if at all) to act upon analysis that a laboratory can or does perform are undoubtedly factors to be considered in the equation. The fact that, for all of these reasons, police and prosecutors are themselves playing

84. NAS REPORT, supra note 7, at 127.
85. See id. at 53 (adding that “judicial review, by itself, is not the answer” (emphasis added)).
86. HindeLang Criminal Justice Research Ctr., Univ. at Albany, Sourcebook of Criminal Justice Statistics Online tbl.5.46.2002 [hereinafter Sourcebook of Criminal Justice Statistics Online], available at http://www.albany.edu/sourcebook/pdf/t5462002.pdf. Plea rates are lower, though still quite high, for rapes, murders, and other violent crimes. Id.
87. See infra Part II.
88. NAS REPORT, supra note 7, at 37.
critical and frequently dispositive roles in “adjudicating” the significance of scientific evidence in a particular case is a reality that the NAS Report does not engage.

2. Funds and Firewalls.—If the NAS Report hitched the wagon of criminal justice to the star of forensic science, it understood resource constraints and professional infrastructure as the primary, and interconnected, barriers on the path forward. As the previous section discussed, the Committee identified at the outset that the greatest concern raised by its investigation was “underresourcing” in the forensic sciences: inadequate resources devoted to foundational research to validate forensic methodologies and inadequate laboratory resources to support consistent, reliable, and expeditious work. At the same time, the Committee concluded that a necessary condition for harnessing the justice-advancing potential of the forensic science field is the severance of its administrative and, critically, professional ties to the law enforcement institutions that utilize its product. This view is reflected in many of the Report’s recommendations, but perhaps most clearly in the controversial proposals to remove public forensic laboratories “from the administrative control of law enforcement,” and to establish a new national oversight body housed outside the Department of Justice. The goal for the field should be professionalization: “[F]ull adoption of [the] scientific culture,” which is viewed as entailing commitments that are distinct from the law (and criminal law in particular), and which in turn give scientific evidence a special claim to validity within legal culture. The NAS Report calls for NIFS to superintend the development of all the hallmarks of professional solidification: educational pathways, technical standards of practice, ethical norms, and centralized

89. See Rachel E. Barkow, Institutional Design and the Policing of Prosecutors: Lessons from Administrative Law, 61 STAN. L. REV. 869, 871 (2009) (discussing the adjudicative role that prosecutors play in light of plea rates); Lynch, supra note 17, at 2149 (“[P]rosecutors, in their discretionary charging and plea bargaining decisions, are acting largely as administrative, quasi-judicial decision-makers . . . .”).

90. NAS REPORT, supra note 7, at 77.

91. See id. at 23 (“The best science is conducted in a scientific setting as opposed to a law enforcement setting.”).

92. Id. at 24, 80–81; see also id. at 18 (“In sum, the committee concluded that advancing science in the forensic science enterprise is not likely to be achieved within the confines of DOJ.”).

93. Id. at 111, 125; see also id. at 111 (quoting Sir Isaac Newton’s description of the scientific method).

94. See generally, e.g., PROFESSIONALIZATION (Howard M. Vollmer & Donald L. Mills eds., 1966) (chronicling the processes and consequences of professionalization across a number of different occupations); Richard H. Hall, Professionalization and Bureaucratization, 33 AM. SOC. REV. 92, 93 (1968) (discussing “structural and attitudinal” attributes of professionalism).

95. NAS REPORT, supra note 7, at 218–21.

96. Id. at 194 (“Standards and best practices create a professional environment that allows organizations and professions to create quality systems, policies, and procedures and maintain autonomy from vested interest groups.”).
certification and accreditation of practitioners.\textsuperscript{98} Research and educational programs are to reflect greater connectivity with the broader scientific community, and the Committee repeatedly draws on examples from other technical and scientific professions as models for a professional infrastructure for forensic science.\textsuperscript{99}

But critically, in the view of the NAS Report, a direct relationship existed among the three aims of enhancing the quality of criminal justice, addressing underutilization, and achieving forensic science independence and professionalization. Professionalization would contribute directly to reliability of outcomes by addressing issues of bias, both motivational and cognitive, in forensic analysis. Motivationally, the Committee credited the concerns from academia and the defense community (substantiated at least anecdotally by the forensic science scandals of the last decade) that forensic analysts view themselves as aligned with the interests of law enforcement, and that “[b]ecause forensic scientists often are driven in their work by a need to answer a particular question related to the issues of a particular case, they sometimes face pressure to sacrifice appropriate methodology for the sake of expediency.”\textsuperscript{100} Cognitively, the Committee was moved by the burgeoning social science literature—as well as the spectacular failure of fingerprint analysis in the FBI’s investigation of Brandon Mayfield in connection with the 2005 Madrid subway bombing—demonstrating that information often made available to forensic analysts by the law enforcement officials with whom they work (about the identities of suspects, or about the general strength of the state’s case, for example) can unconsciously and unintentionally lead to false conclusions systematically skewed in the state’s favor.\textsuperscript{101}

Also, however, professionalization is viewed as making a more indirect contribution to reliability by addressing the problem of underresourcing. In a world of limited budgets, the Committee concluded that crime laboratory administrators were systematically disadvantaged in competing against other priorities in a police organization to obtain the budgetary capacity necessary to generate reliable analysis.\textsuperscript{102} More broadly, resources devoted to the field

\textsuperscript{97} Id. at 212.
\textsuperscript{98} Id. at 25.
\textsuperscript{99} Id. at 194, 195, 208, 212 (referring to examples from “technical professions” including clinical laboratory research, medicine, and engineering).
\textsuperscript{100} Id. at 23–24; see, e.g., Chris Swecker & Michael Wolf, An Independent Review of the SBI Forensic Laboratory 25 (2010) (finding in a review of the North Carolina State Crime Laboratory that 230 instances of negative or inconclusive laboratory test results were never disclosed to police or prosecutors, but that there were no instances of positive or confirmative results that were not disclosed), available at http://www.ncids.com/forensic/sbi/Swecker_Report.pdf.
\textsuperscript{101} See NAS REPORT, supra note 7, at 123–24 (citing work by, among others, Itiel Dror, and discussing the Mayfield case).
\textsuperscript{102} See id. at 183–84 (observing that in a system where the laboratory administrator reports to the head of the law enforcement agency, “significant concerns related to the independence of the laboratory and its budget” are raised); cf. Jan S. Bashinski & Joseph L. Peterson, Forensic Sciences,
and funneled through law enforcement institutions like the DOJ (and the NIJ) would not be devoted to the pursuit of scientific truth (wherever it may lie), but to self-serving confirmation of the already-developed infrastructure for forensic evidence.103

In any event, administrative segregation is viewed as a key feature of professionalism and the synergy with resourcing and general reliability concerns, and there is no suggestion that any tension exists among those three facets of the Report’s view of the field.104 Unsurprisingly, these features of the NAS Report’s reform agenda garnered the most negative response: while forensic science practitioners, police, and prosecutors largely welcomed calls for better resourcing and expanded research in the field, they opposed calls for outside regulation as well as for the institutional independence of laboratories.105 Also unsurprisingly, given the academic consensus prior to the Report, none of the opposition to independence or national oversight emanating from the forensic science and law enforcement communities has enjoyed a serious defense from outside law enforcement circles.106 But politics and self-interest aside, there may well be a more
complicated relationship among the three aims of professionalism, resourcing, and reliability than what the NAS Report presumes—or so the next Part will contend.

II. What’s Missing

This Part tells a different sort of story about forensic science, one that does not take place primarily in the laboratory, or even in the courtroom, but rather at crime scenes, in squad rooms, and in prosecutors’ offices in the course of criminal investigations. It aims to sketch the numerous ways in which law enforcement actors exercise discretion in regard to the production and use of forensic science that is (like much of criminal investigation and pretrial prosecutorial work) largely unexamined and unregulated. The picture that emerges problematizes both premises of the NAS Report by adding dynamics indispensable to forensic science production and usage that will sometimes prevent laboratory-level reform from positively affecting the quantity and quality of scientific evidence in the criminal justice system, and might well be exacerbated by some of the NAS Report’s reform proposals.

It is well to acknowledge that many of the ground-level concerns discussed below are well-known to criminal justice practitioners and to the law enforcement community in particular. Especially with regard to crime scene work and evidence collection more generally, management and research-priority setting within the police profession (at least at the upper echelons) has acknowledged the importance of and made some strides in previously neglected arenas. However the academic literature, particularly within the United States and certainly in the realm of legal scholarship, has not by and large reflected this priority, and in particular has done little to connect the (largely police-driven) dynamics of evidence gathering to the (laboratory-centered) forensic science production process. Both facts may have influenced the NAS Report’s excision of these issues from its focus: on the one hand, there exists a perception that questions concerning evidence gathering are well in hand in the law enforcement field; on the other, academic commentators influential to the Report have largely treated such questions as peripheral.

A caveat is necessary at the outset. By necessity, the account in Part II traffics significantly in generalization. To do otherwise would be an undertaking both enormous, accounting as it must for the massive and diverse set of actors, organizations, and practices represented by the

et al., supra note 3, at 761 (supporting the Report’s recommendation of laboratory independence). But see generally D. Michael Risinger, The NAS/NRC Report on Forensic Science: A Glass Nine-Tenths Full (This Is About the Other Tenth), 50 JURIMETRICS 21 (2009) (criticizing the Report for not going far enough in prescribing standards of laboratory practice by merely calling for further research on the subject).

country’s more than 15,000 law enforcement agencies and 2,300 prosecutors’ offices, and ultimately impossible, stymied as it is by a relative paucity of empirical data about the practices that are most relevant to the account. This Article responds to that challenge with something of a dance between the general and the particular, the theoretical and the anecdotal, the speculative and the data driven. I make one significant qualifying cut, confining the analysis (broad brush though it is) to nonfederal criminal law; the role of the FBI crime laboratory, the unique structure and role of U.S. Attorney’s Offices vis-à-vis federal (as well as state) investigators, and the distinctive (and, when compared to the states on aggregate, far smaller) caseload on the federal side (including perhaps most significantly a relative dearth of violent crimes and property crimes) render the story on the federal level sufficiently distinctive to be laid to the side. The account that follows attempts to marshal what empirical evidence is available with respect to the criminal justice system and forensic science usage to offer a plausible account of what might be happening on the ground; indeed, one independent aim here is to call scholarly attention to the social science literature that does exist in this area, which though limited is also underutilized in legal academic accounts of the field. To be sure, this is an approach that runs the grave risk of saying both too much (in overgenerality) and too little (in the selectivity of its focus). Nevertheless, it is a starting point for questioning the completeness of the NAS Report’s agenda, and for beginning to forge ahead down an admittedly more complex, but hopefully more fruitful, path forward.

A. Upstream Discretion

1. Evidence Collection.—It is perhaps too obvious to state that the quality and reliability of forensic science is entirely dependent upon the


109. BRIAN FORST, IMPROVING POLICE EFFECTIVENESS AND TRANSPARENCY: NATIONAL INFORMATION NEEDS ON LAW ENFORCEMENT 2, 6 (2008) (encouraging BJS and NIJ to do more data collection on police management and “use of technology” in order to raise conviction rates).
quality and reliability of the processes by which the analyzed evidence is collected.110

By “collection,” I refer to a range of activities that occur in relation to spatial or physical locations—primarily, a geographic location where a crime occurred, the body of a victim (as when a sexual assault kit is collected), or the body of a suspect (as when reference samples are collected for comparison to evidence found on a victim or at a crime scene). In addition to evidence gathering, other activities such as transportation (typically first to a police storage facility to await possible transmittal to a laboratory) and documentation also must occur in this stage.111 The stakes are high. If evidence is not identified and gathered, or if it is collected, transported, and stored in a deficient manner,112 items that could have established an element of a crime, implicated a perpetrator, or exculpated a suspect, could be destroyed or lost—or worse, could generate inaccurate results.113 Somewhat less obviously and far less glamorously, if the steps of evidence collection are not documented to show what, how, and when physical evidence was collected, exploitation of that evidence could be compromised (by, for example, precluding admissibility under chain-of-custody rules), and the ability for downstream actors to evaluate the integrity of the evidence and the investigation that uncovered it will be compromised.114

110. See Bashinski & Peterson, supra note 102, at 493 (“The effectiveness of a forensic operation rests on the ability of the police department’s evidence recovery system to recognize, preserve, document, and retrieve relevant physical evidence.”); VERNON J. GEBERTH, PRACTICAL HOMICIDE INVESTIGATION: TACTICS, PROCEDURES, AND FORENSIC TECHNIQUES 167 (3d ed. 1996) (recognizing that the proper collection and preservation of physical evidence is an essential step in homicide investigations); HENRY C. LEE ET AL., HENRY LEE’S CRIME SCENE HANDBOOK 1 (2001) (contending that processing crime scene evidence is the most crucial step in a forensic case); MIKE REDMAYNE, EXPERT EVIDENCE AND CRIMINAL JUSTICE 23 (2001) (noting that the “most fundamental” issue affecting the use of forensic science is that “[t]race evidence cannot be used unless the police are aware of its existence and usefulness, and know how to collect and preserve it”); JOHN K. ROMAN ET AL., THE DNA FIELD EXPERIMENT: COST-EFFECTIVENESS ANALYSIS OF THE USE OF DNA IN THE INVESTIGATION OF HIGH-VOLUME CRIMES 11 (2008) (“Biological specimens must be properly collected, stored, and submitted to the crime lab to get a sample that can be analyzed.”).


113. See Bashinski & Peterson, supra note 102, at 497 (“For example, potential evidence that could exclude a suspect may be overlooked at the scene if the crime scene examiner has prematurely focused on a particular theory of reconstruction. Or physical evidence capable of answering a critical investigative question may never be analyzed if an investigator is unaware of its potential value.”).

114. See, e.g., id. at 492–93 (discussing basic principles of forensic science including standards, controls, and evidence-handling operations).
Evidence collection practices and priorities unquestionably suppress forensic analysis in at least some cases in which it might be thought to aid in detection or arrest, though as discussed below the prevalence and magnitude of this effect is difficult to estimate.\footnote{115} The consequences of deficient evidence collection are borne by identifiable, putatively innocent suspects as well. O.J. Simpson’s highly publicized criminal trial popularized such concerns, when his attorneys successfully neutralized evidence of a DNA match between Simpson’s blood and that found at the scene of his wife’s (and her companion’s) murder by arguing that police and laboratory sloppiness and corruption, rather than Simpson’s presence at the crime scene, explained the inculpatory evidence.\footnote{116} In New York’s notorious Central Park Jogger case, failure to properly handle evidence likely led to the identification of hairs that were transferred at the police station and not the crime scene.\footnote{117} One of the Supreme Court’s recent forays into actual innocence claims concerned plausible allegations of flawed blood spatter analysis as a result of poor evidence handling and transport.\footnote{118} The recent exoneration of Texan Michael Morton, convicted in 1987 of murdering his wife, featured a near miss in this regard: a bandana, initially overlooked by investigators because it was located beyond the confines of what they adjudged the crime scene, was recovered by an enterprising relative of the victim and became critical in identifying the actual murderer and exonerating Morton nearly twenty-five years after his conviction.\footnote{119} There is fair reason to think that Morton’s (tragically delayed) near miss is not an isolated occurrence.\footnote{120}


\footnote{116. See, e.g., ARONSON, supra note 29, at 192–93 (describing a defense strategy of arguing that contamination occurred in crime scene processing).}


\footnote{118. See House v. Bell, 547 U.S. 518, 543–46 (2006) (describing an allegation of shoddy evidence storage and transport undermining blood spatter evidence in a capital case). These risks at the collection stage are only exacerbated in the DNA era—not simply because of the potential enormity of a missed opportunity to subject evidence to DNA testing, but also because, ironically, the sensitivity of the most current techniques of DNA analysis increases the potential for contaminated evidence to yield profiles of individuals who are not legitimate suspects in a crime. See Murphy, supra note 28, at 724 (asserting that new forms of forensic evidence can actually exacerbate the conditions that lead to wrongful convictions); see also Dist. Attorney’s Office for the Third Judicial Dist. v. Osborne, 557 U.S. 52, 80–81 (2009) (Alito, J., concurring) (noting that DNA testing is unique both in its promise of certainty and in its sensitivity to contamination).}


\footnote{120. See Ex parte Miles, 359 S.W.3d 647, 651–52, 653 n.2 (Tex. Crim. App. 2012) (recounting a detective’s failure to search an area in the bushes where an eyewitness stated the shooter in
This is in part because the degree of selectivity that is occurring at this early stage is more dramatic than might commonly be appreciated. The best (albeit limited) empirical data that exists indicates that, across the board, significantly less physical evidence is collected in most cases than is available; that the rates of collection vary widely across categories of crime; and that this gap between collection potential and actuality has not meaningfully diminished even as forensic science has become a more central feature of criminal cases. A recent study sponsored by the National Institute of Justice revealed (across four urban jurisdictions) that some physical evidence was collected in nearly all homicide investigations initiated during the study period, but in only 30% of assault investigations and only 20% of burglary investigations. Even in rape cases, which to most minds probably stand apart as consistently offering physical evidence that is likely to be of probative value, only 64% featured crime scene evidence collection. To some extent, these percentages reflect variation among crimes in terms of manner and area of commission that will affect the existence of physical evidence: biological evidence is less likely to be left behind in a nonviolent property crime than a sexual assault, while fingerprints are at least as, if not more, likely to be left in the former than the latter. But “natural” variation is not the whole story, as shown by a number of innovative studies that have actually checked the evidence collection work of crime scene responders or have compared evidence collection rates in a given jurisdiction with and

question had hidden); KAYE, supra note 6, at 258 (“Of course, the laboratory is not going to come back with a report that states that suspect I is the driver if its STR testing plainly excludes the suspect as the source of material swabbed from the driver’s airbag, but what might additional swabs from both airbags show?”); Robert B. Bates, Curing Investigative Tunnel Vision, POLICE CHIEF, Jan. 1987, at 41, 41 (discussing the investigative impact of overly selective collection of fingerprint evidence); Jonathan Schuppe & William Kleinknecht, Evidence of a Crisis, STAR LEDGER, Jan. 30, 2006, http://www.nj.com/starledger/specialprojects/index.ssf?/news/ledger/stories/013006_essex_murder_main.html (describing a beleaguered Essex County Crime Scene Unit and a Newark homicide investigation in which no physical evidence was recovered). But of course, where documentation practices are weak, it is more difficult to identify the extent of the problem. See, e.g., TEX. FORENSIC SCI. COMM’N, REPORT OF THE TEXAS FORENSIC SCIENCE COMMISSION: WILLINGHAM/WILLIS INVESTIGATION 20–21 (2011), available at http://www.fsc.state.tx.us/documents/FINAL.pdf (rejecting the allegation that potentially probative debris from fire scenes were discarded without examination in the investigation of two arson cases, but finding that the collection and examination of the debris were completely undocumented). Critically, documentation is likely to be the weakest in the cases that will naturally receive the least scrutiny: relatively minor offenses carrying relatively low sentences that are likely to lead to early negotiated guilty pleas.

121. PETERSON & SOMMERS, supra note 112, at 46, 63, 77.
122. Id. at 95. In fact, biological evidence, quintessentially associated with sexual assault investigations, was collected in only 54% of the investigations studied in Peterson’s research. Id.
123. See, e.g., id. at 21 (noting that the level of interaction between the offender and the victim or scene affects what evidence is available).
124. See generally BRIAN PARKER & JOSEPH PETERSON, PHYSICAL EVIDENCE UTILIZATION IN THE ADMINISTRATION OF CRIMINAL JUSTICE (1972) (detailing their study of the physical evidence gathered from crime scenes and input into crime laboratories).
without the intervention of training or standardized collection procedures.\textsuperscript{125} Human selectivity and error are undoubtedly major drivers.

What factors animate selectivity? Most generally, institutional and individual resource constraints are clearly the overarching driver. Not all crimes can possibly be met with a full investigative response along any dimension, forensic evidence gathering and analysis being only one. As with other investigative resource-allocation decisions in police departments, evidence collection activities are largely determined by the seriousness of a reported offense.\textsuperscript{126} Across the board, departments will devote the greatest resources of personnel, equipment, and time to homicides, sexual assault, and other violent crimes against persons—less so to property crimes, and even less so to run-of-the-mill drug crimes, despite their significantly greater numerical share of caseloads.\textsuperscript{127} Initial response to the least serious offenses will be the most standardized and least elaborate: collection of obviously relevant objects and perhaps fingerprint processing in property cases, but likely no search for and collection of, say, less apparent biological material for DNA analysis (despite technological advances permitting analysis of invisible, trace quantities of DNA in such cases).\textsuperscript{128}

Having a picture in mind of who is doing this work is critical to make this account of institutional and individual resource constraints more particular. First, and consistent with the NAS Report’s express cabining and

\textsuperscript{125} JOHNN RONAN ET AL., POST-CONVICTION DNA TESTING AND WRONGFUL CONVICTION 4 (2012) (noting that convictions of sexual assault are more likely to involve a determinate DNA profile than convictions of nonsexual assault because of standardized evidence collection in rape cases); see also Rebecca Campbell et al., The Effectiveness of Sexual Assault Nurse Examiner (SANE) Programs: A Review of Psychological, Medical, Legal, and Community Outcomes, 6 TRAUMA, VIOLENCE & ABUSE 313, 315 (2005) (discussing the effect of SANE programs on rates of evidence recovery in sexual assault cases); Donald Johnson et al., Use of Forensic Science in Investigating Crimes of Sexual Violence: Contrasting Its Theoretical Potential with Empirical Realities, 18 VIOLENCE AGAINST WOMEN 193, 194 (2012) (noting the role that DNA analysis has played in linking sexual offenders to their victims); cf. HER MAJESTY’S INSPECTORATE OF CONSTABULARY, UNDER THE MICROSCOPE—REFOCUSED: A REVISIT TO THE INVESTIGATIVE USE OF DNA AND FINGERPRINTS 2–3, 8 (2002) [hereinafter UNDER THE MICROSCOPE], available at http://www.hmnic.gov.uk/media/under-the-microscope-20020601.pdf (reporting that an increase in crime scene personnel in the United Kingdom yielded a substantial increase in DNA and fingerprint recovery).

\textsuperscript{126} See JOSEPH L. PETERSON ET AL., FORENSIC EVIDENCE AND THE POLICE: THE EFFECTS OF SCIENTIFIC EVIDENCE ON CRIMINAL INVESTIGATIONS 97–98 (1984) (concluding from statistics on cities’ evidence collection that police investigators “will usually go to greater lengths collecting information to attempt to solve personal crimes than they will for property crimes”).

\textsuperscript{127} See SOURCEBOOK OF CRIMINAL JUSTICE STATISTICS ONLINE tbl.4.6.2010, available at http://www.albany.edu/sourcebook/pdf/t462010.pdf (showing that more property and drug crimes than violent crimes were charged in the United States from 2001 to 2010).

\textsuperscript{128} Bashinski & Peterson, supra note 102, at 494; see also RONAN ET AL., supra note 110, at 148 (“Forensic labs should provide data to police describing the attributes of evidence collected that are associated with a higher probability of suspect identification . . . .”); Anita Hassan, Investigators Using ‘Touch DNA’ to Solve Property Crimes, HOUS. CHRON., Mar. 12, 2012, http://www.chron.com/news/houston-texas/article/ DNA-is-solving-property-crimes-3397341.php (discussing the rise of microscopic DNA sampling in combating property crime).
exclusion of evidence collection from its inquiry, evidence collection is only occasionally, and at most partly, a laboratory function. Only about half of the nation's crime laboratories even engage in crime scene response, and fewer than half of state laboratories do so (with a greater percentage of municipal and county laboratories offering such services). Even where crime laboratories do play a role in evidence collection, they are typically in any given case only one of multiple responsible parties.

The primary engines of evidence collection occupy the opposite end of the specialization spectrum, as they are typically patrol officers—the most junior, least trained, and most overtasked personnel in the police hierarchy.

129. NAS REPORT, supra note 7, at 183.
130. See DUROSE ET AL., supra note 23, at 3 (stating that 52% of the nation’s crime labs engaged in crime scene response activities and that both county labs (62%) and municipal labs (71%) were more likely than state labs (44%) to be directly involved in crime scene investigations in 2009); see also BARRY A.J. FISHER ET AL., INTRODUCTION TO CRIMINALISTICS: THE FOUNDATION OF FORENSIC SCIENCE 5 (2009) (explaining that the seriousness of the crime determines whether first responders or more specialized personnel collect evidence at the crime scene).
131. FRANK HORVATH & ROBERT T. MEESIG, A NATIONAL SURVEY OF POLICE POLICIES AND PRACTICES REGARDING THE CRIMINAL INVESTIGATION PROCESS: TWENTY-FIVE YEARS AFTER RAND 76 (2001), available at https://www.ncjrs.gov/pdffiles1/nij/grants/202902.pdf (“[I]n most agencies evidence-related duties are not assigned predominantly to any one type of individual or position. Rather, they are more likely to be shared among patrol officers . . . investigators . . . and evidence technicians . . . .”); KEITH INMAN & NORAH RUDIN, PRINCIPLES AND PRACTICE OF CRIMINALISTICS: THE PROFESSION OF FORENSIC SCIENCE 62 (2001) (“The individual making decisions about what evidence to collect and the person given the responsibility to collect it vary widely between jurisdictions, so it is difficult to generalize.”); ROMAN ET AL., supra note 110, at 23–24 (describing the range of evidence collection responsibilities among five studied jurisdictions).
132. See HORVATH & MEESIG, supra note 131, at 6 (describing the investigative role of patrol officers); FRED E. INBAU ET AL., SCIENTIFIC POLICE INVESTIGATION 36 (1972) (same); PAUL L. KIRK & LOWELL W. BRADFORD, THE CRIME LABORATORY: ORGANIZATION AND OPERATION 104–05 (1965) (same); TECHNICAL WORKING GRP. ON CRIME SCENE INVESTIGATION, supra note 111, at 14–16 (same).
Certainly, patrol officers are commonly—in small and large jurisdictions, and across offense categories—first responders to a reported crime, meaning that they will perform critical foundational tasks such as establishing a crime scene, the spatial parameters of which will guide the search for evidence, and securing that scene to prevent human and environmental contamination. In small departments that lack the personnel to differentiate between patrol and investigative functions, or in most departments in the case of a less serious crime, these same first responders will likely personally perform (or at least coordinate) the full task of evidence collection. Where a department’s size permits role differentiation or the reported crime is more serious—homicides, sexual assaults, serious assaults, or violent property crimes—a trained investigator, such as a detective, will typically direct or personally conduct evidence collection after the patrol officer’s initial preliminary crime scene response. Some law enforcement organizations, though perhaps surprisingly few, have specially trained evidence technicians or crime scene responders that are institutionally located within patrol or other units (including crime laboratories); in the smallest departments, they will likely simply be police officers who primarily perform other functions (either patrol or investigative) but have some additional training or experience in evidence collection. In the most serious crimes, particularly homicides, there may

134. GEBERTH, supra note 110, at 43 (“In almost all instances, the first officer to arrive at any homicide crime scene is the uniformed patrol officer.”).
135. Id.
136. See JOHN E. ECK, SOLVING CRIMES: THE INVESTIGATION OF BURGLARY AND ROBBERY 259–63 (1983) (explaining that patrol officers are typically the first to arrive on scene and suggesting that specialist technicians should be called to routine crime scenes only under special circumstances); HORVATH & MEESIG, supra note 131, at 6, 34–35, 41 (reporting that most preliminary investigation is conducted by patrol officers and observing that the involvement of specialized investigators in investigative tasks is surprisingly limited); Frank Horvath & Robert Meesig, The Criminal Investigation Process and the Role of Forensic Evidence: A Review of Empirical Findings, 41 J. FORENSIC SCI. 963, 966 (1996) (explaining that a patrol officer’s performance of evidence collection has a “significant impact on whether the case will . . . be assigned for follow-up investigation” and noting that if an officer fails “to recognize or to collect potentially valuable evidence, particularly from a suspect, the case outcome is likely to be adversely affected”).
137. JAN M. CHAIKEN, THE CRIMINAL INVESTIGATION PROCESS VOLUME II: SURVEY OF MUNICIPAL AND COUNTY POLICE DEPARTMENTS 25 (1975) (reporting that more than 80% of departments have evidence technicians); HORVATH & MEESIG, supra note 131, at 75–76 (reporting that only 45% of agencies employ evidence technicians); see also SAFERSTEIN, supra note 20, at 16 (noting that in most police forces “a patrol officer or detective is charged with the responsibility of collecting the evidence,” and that the officer’s effectiveness “will be dependent on the extent of his or her training and working relationship with the laboratory”).
138. See Childs et al., supra note 41, at 49 (reporting that 60% of police and sheriffs’ departments have one or more employees who work directly on forensic services); ROMAN ET AL., supra note 110, at 70 (describing case processing for burglaries in Los Angeles as involving first a responding officer, then a CSI technician, then a burglary detective); HORVATH & MEESIG, supra note 131, at 76 (stating that in most agencies evidence-related duties are likely to be shared among patrol officers, investigators, and evidence technicians). Strikingly, in Horvath & Meesig’s survey
be policies in place whereby one or more evidence technicians (perhaps but not necessarily assigned to a crime laboratory) respond to the scene and assist in evidence collection—though this is more likely a decision largely within the discretion of an investigator, or even (to the extent she retains responsibility for the crime scene) a patrol officer.139

For patrol officers, crime scene response is typically competing with calls for other crimes, ticket quotas, routine patrol responsibilities, and any number of other tasks that make up a patrol officer’s diverse portfolio of daily responsibilities.140 With limited time, patrol officers are undoubtedly triaging their work on any given call; there is good reason to suspect that meticulous performance of tasks associated with evidence collection will be less attractive and receive short shrift to “real” police work such as interviewing witnesses.141 Even the limited regime of evidence collection in the run-of-the-mill case is likely to be performed quickly—and perhaps shoddily.

In serious cases, where more time and human capital are devoted to evidence collection, selectivity is driven by more deliberate exercises of discretion. Evidence collection is shaped by and contributes to a process of case construction, as officials, particularly police, make judgments in selecting and prioritizing the collection of some subset of available material. Processing a crime scene, for example, requires attention not only to the technical requirements of evidence collection, but also to far more subjective judgments about what areas are likely to yield evidence of a crime.142 In one case, a researcher observed a homicide detective issue “specific directions” to crime scene unit personnel to fingerprint “everything possible in the bedroom where the victim was found,” perform “[n]o fingerprint examination in the second bedroom or of the deceased’s car,” and take prints in the kitchen and lounge only “near where blood marks are found or where objects that are likely to have been handled by the offender are located.”143

of law enforcement organizations, 12% of responding agencies indicated that evidence technicians were not required to have any specialized training. See id. (reporting that 88% of the agencies surveyed required specialized training).

139. See generally PETERSON & SOMMERS, supra note 112.

140. ROMAN ET AL., supra note 110, at 106, 148 (describing pressure that patrol experienced to quickly process crime scenes and become available for incoming calls).

141. See, e.g., PETERSON ET AL., supra note 126, at 46 (“Patrol officers seldom rope off a crime scene or ban other police personnel from the scene except in the most extraordinary situations. Most officers . . . are more interested in interviewing witnesses and completing their preliminary report so that they may resume patrol activities.”).


143. INNES, supra note 142, at 209.
David Kaye has shared a similar account from the perspective of a crime scene specialist called to an automobile crash:

Detective Thompson requested that I swab and impound both airbags in vehicle I. . . . I noted red stains . . . on both the driver and the front passenger airbags . . . . I swabbed a representative spot of the bloodstains on the driver’s airbag. . . . I cut and collected the driver’s airbag. . . . I then swabbed a representative spot on the front passenger airbag. . . . At the direction of Detective Thompson no further action was taken.144

Of course, particularly where these judgment calls are made by personnel who will remain involved in an investigation—a circumstance more typical in serious cases where a detective usually responds to a crime scene—they are likely to determine not only the available physical evidence, but also to shape investigators’ understanding of the relevance of that evidence (and, perhaps, the irrelevance of evidence not selected in the initial canvass) to the case.145 Such assessments will be better or worse depending on the crime and the personnel involved, of course, which only reinforces the importance of documenting the choices made early on.

Aside from the quite real but largely informal constraints created by organizational and individual capacity, there are also more formal constraints on law enforcement discretion in regard to the collection of physical evidence. From the standpoint of legal doctrine, these are important but relatively limited. In the main, police need not collect or save any quantum of evidence with any particular degree of competence, so long as they work in good faith.146 The most significant direct constraints flow from the Fourth Amendment: there is no general “crime scene” exception to the Fourth Amendment’s requirement of “reasonable” searches and seizures, and thus police may not enter premises and gather evidence absent an imminent threat to public safety, consent to entry, or the obtaining of a warrant.147 But where the space at issue is the site where a crime has occurred—the moment of

144. KAYE, supra note 6, at 258.
145. See LEE ET AL., supra note 110, at 1–2 (characterizing crime scene investigation as the first stage in crime “reconstruction”).
146. See Arizona v. Youngblood, 488 U.S. 51, 58 (1988) (rejecting the contention that due process was violated by the loss of potentially favorable evidence, in favor of the standard requiring a showing of official bad faith to make out the constitutional destruction-of-evidence claim); California v. Trombetta, 467 U.S. 479, 488–89 (1984) (rejecting the argument that failure to preserve breath test samples for later analysis violated due process unless their exculpatory value was apparent and comparable evidence was unavailable to the defendant).
147. As the Supreme Court has noted:
[P]olice may make warrantless entries onto premises if they reasonably believe a person is in need of immediate aid and may make prompt warrantless searches of a homicide scene for possible other victims or a killer on the premises, but we rejected any general “murder scene exception” as “inconsistent with the Fourth and Fourteenth Amendments—. . . the warrantless search of [an] apartment was not constitutionally permissible simply because a homicide had recently occurred there.” Flippo v. West Virginia, 528 U.S. 11, 14 (1999) (citations omitted).
initial crime scene response—none of those requirements presents a formidable or time-consuming barrier. A warrant is readily obtainable where an officer has received a report (and thus has probable cause to believe) that a crime has occurred at a given location;\textsuperscript{148} even better, consent to search can often be obtained;\textsuperscript{149} and in all events, the current trend in Fourth Amendment doctrine is to lower the remedial risk to police who proceed without a warrant, at least in arguably close cases.\textsuperscript{150}

Of course, these rules only directly constrain the initial decision to gather evidence, and say little about the particular manner in which that evidence will be gathered. But undoubtedly there are trickle-down effects. If a warrant must be obtained to search a location or a person, that increases the likelihood that more senior law enforcement personnel, or perhaps even a district attorney, will be involved, which might in turn enhance the expertise and care that is brought to the task. The warrant-application process also permits a moment of reflection (and documentation) concerning the value, known or hypothesized, of evidence to an investigation—an event that might serve some disciplining function, particularly later in an investigation as theories of a case start, for better or for worse, to coalesce.\textsuperscript{151} On the other hand, the prospect of delay might compromise evidence (although exigency doctrines permit warrantless searches and seizures to prevent imminent destruction),\textsuperscript{152} or it might present just enough hassle to disincentivize the request to collect it in the first place,\textsuperscript{153} particularly in less serious cases or where police are not otherwise convinced of the value of the effort.

\textsuperscript{148} See Yale Kamisar, Does (Did) (Should) the Exclusionary Rule Rest on a “Principled Basis” Rather than an “Empirical Proposition”?\textsuperscript{[\textsuperscript{[\textsuperscript{16 C REIGHTON L. REV. 565, 569–70 (1983) (describing search warrants as easy to obtain).\textsuperscript{149} See Mark Hutchins, Crime Scene Searches, PROSECUTOR, Nov./Dec. 1999, at 25, 26 (observing that “[w]arrants are seldom necessary for making the initial entry” to a crime scene because of the consent and exigent circumstances doctrines).\textsuperscript{150} See Jennifer E. Laurin, Messerschmidt and Convergence in Action: A Reply to Comments on Trawling for Herring, 112 COLUM. L. REV. SIDEBAR 119, 123 (2012) (arguing that the Supreme Court has recently given police “ample’ space to err” when deciding liability for departures from constitutional requirements).\textsuperscript{151} Cf. Chip Heath et al., Cognitive Repairs: How Organizational Practices Can Compensate for Individual Shortcomings, 20 RES. ORGANIZATIONAL BEHAV. 1, 3 (1998) (describing the concept of cognitive repairs, organizational practices that people use to correct initial errors in judgment).\textsuperscript{152} See, e.g., Kentucky v. King, 131 S. Ct. 1849, 1858 (2011) (permitting warrantless entry to prevent the destruction of evidence); Schmerber v. California, 384 U.S. 757, 770 (1966) (permitting warrantless collection of blood for purposes of toxicology analysis because “the delay necessary to obtain a warrant, under the circumstances, threatened the ‘destruction of evidence’”); Kaliku v. United States, 994 A.2d 765, 780 (D.C. 2010) (holding warrantless collection of penile swab from an assault suspect justified under the exigent circumstances exception); State v. Dupree, 462 S.E.2d 279, 282–83 (S.C. 1995) (permitting warrantless search of a suspect’s mouth given the risk that drugs were inside and would be swallowed).\textsuperscript{153} See RICHARD VAN DUIZEND ET AL., THE SEARCH WARRANT PROCESS: PRECONCEPTIONS, PERCEPTIONS, PRACTICES 19 (1985) (quoting a detective as saying: “Actually, there are a lot of warrants that are not sought because of the hassle. . . . I don’t think you can forgo a case because of the hassle of a search warrant, but you can . . . work some other method.”); David A. Sklansky, Quasi-Affirmative Rights in Constitutional Criminal Procedure, 88 VA. L. REV. 1229, 1250–51
With regard to the scope and manner of evidence collection, regulation comes largely from departmental policies, which are minimal and varied, particularly in smaller jurisdictions. Evidentiary chain of custody as a prerequisite to admissibility of course plays some role in spurring policies (or at least standardized practices) governing the collection, packaging, documentation, and transfer of evidence.\(^\text{154}\) Nevertheless, observers of the field have remarked that such policies are often lacking, and that evidence collection, documentation, and storage are widely viewed as low-priority matters within departments.\(^\text{155}\)

Significantly, much of the work in promulgating and encouraging good practices among police responsible for evidence collection appears to fall to crime laboratories. This is in part because, thanks to CODIS regulations, they face their own legal requirements for documenting and certifying the integrity of evidence they receive.\(^\text{156}\) But despite the fact that the vast majority of laboratories are under the control of law enforcement, relationships between crime laboratories and their police “customers” vary in terms of closeness and functionality. Indeed, notwithstanding the NAS Report’s overriding concern about coziness in these relations, the dominant theme sounding from criminal justice researchers as well as practitioners is one of a need for greater coordination than what currently exists between laboratory-based personnel and law enforcement, particularly with regard to evidence-collection tasks.\(^\text{157}\)

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\(^{154}\) See Technical Working Grp. On Crime Scene Investigation, supra note 111, at 37, 41, 43.

\(^{155}\) John E. Eck & Gerald L. Williams, Criminal Investigations, in Local Government Police Management, supra note 102, at 131, 144; Gebeth, supra note 110, at 805 ("Often agencies do not put enough emphasis on [the crime scene investigative] phase of the investigation . . . ."); Peterson et al., supra note 126, at 46 (noting that patrol officers are “rather blase” about going to great investigative lengths and prefer to “complet[e] their preliminary report so that they may resume patrol activities”); Joseph T. Latta & William P. Kiley, Property and Evidence Control—The Hidden (and Ticking) Time Bomb, CALEA Update Mag., June 2007, available at http://www.calea.org/calea-update-magazine/issue-94/property-and-evidence-control-hidden-and-ticking-time-bomb (discussing widespread problems with evidence storage and disposition stemming from the perception that property room control is low priority); see also Innes, supra note 142, at 208 ("The early stages of an investigation are frequently chaotic and confused, and . . . problems were often experienced in exerting control over the scene in the earliest stages. It was frequently the case that the continuity of records . . . was not maintained . . . .")


\(^{157}\) See, e.g., Bashinski & Peterson, supra note 102, at 495 (advocating for coordination); Roman et al., supra note 110, at 51, 73, 148 (describing how collaboration is critical and describing the breakdown in evidence collection in some jurisdictions because of poor coordination); Saferstein, supra note 20, at 16 (advising coordination but noting the lack thereof in many agencies).
2. Obtaining and Using Forensic Analysis.—In its last four terms, the Supreme Court has decided two cases concerning constitutional rights of access to DNA testing: District Attorney’s Office for the Third Judicial District v. Osborne and Skinner v. Switzer. Both cases directly raised the question of whether a defendant could challenge the state’s opposition to providing postconviction access to physical evidence for the purpose of DNA testing. But both also illustrated the consequences of decisions made by police and prosecutors that affected the availability and significance of forensic evidence in the cases. In Osborne’s case, DNA analysis on semen recovered from the rape victim included Osborne in a relatively large group of potential donors, but only after a putative accomplice fingered Osborne and the victim gave an equivocal identification; the state opted not to pursue more discriminating DNA analysis. In Skinner’s, a significant amount of evidence recovered from the crime scene, including blood-stained clothing, was never analyzed, despite the fact that fingerprints found on the murder weapon did not match Skinner’s. In both cases, the scientific evidence that was offered was ambiguous—inculpatory but far from definitive—making other forms of evidence crucial (in particular eyewitness accounts obtained by police before the forensic evidence was available) and raising the question of whether further analysis might not have yielded more probative, and perhaps exculpatory, results. In other words, police and prosecutorial roles in the production and usage of forensic evidence funnels may well have been material to the reliability of the scientific evidence offered at trial.

As it turns out, these cases are far from aberrational. Once gathered, evidence typically makes its way to a storage location (often though not always within a police department) to await further decisions about its fate. Will it be submitted to a crime laboratory for analysis? If so, what will that analysis entail? And if that analysis is obtained, what will be the investigative response? Each of these decisions is far less automatic, far more variable, and far more subject to the discretion of upstream, nonlaboratory actors than is commonly understood.

As to the first question, forensic evidence is funneled through the criminal justice system in a manner that results in surprisingly stark drop-offs from rates of collection to rates of submission to analysts and rates of analysis actually performed. Recent attention to rape kit backlogs has

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159. 131 S. Ct. 1289 (2011).
160. Id. at 1293; Osborne, 557 U.S. at 61.
164. See PETERSON & SOMMERS, supra note 112, at 122 (“[I]t is clear that criminal justice officials external to the laboratory screen much of the forensic evidence and have a major influence on evidence examination priorities and practices.”).
exposed one manifestation of this phenomenon: evidence collected from the bodies of sexual assault victims, sometimes in cases yet unsolved, has been found in a number of jurisdictions to be filling the storage lockers of police departments, never having been submitted for laboratory analysis.\textsuperscript{165} What limited empirical data exists suggests that the phenomenon of collected but unexploited potential forensic evidence is the rule rather than the exception. In an NIJ-sponsored study of crime laboratories in Indiana and Los Angeles, Joseph Peterson found significant drop-offs between evidence collection and evidence analysis across (though variable among) crimes.\textsuperscript{166} Thus, evidence was collected in 30% of assault investigations, but submitted in only 12% and analyzed in only 9%.\textsuperscript{167} Even in homicide investigations, which nearly always entailed the collection of physical evidence, only 89% of cases saw that evidence submitted to laboratories, and only 81% of cases had the submitted evidence analyzed.\textsuperscript{168} Sexual assaults featured even more dramatic funneling, with evidence collected in 64% of cases, submitted in only 32%, and analyzed in only half the cases in which it was submitted.\textsuperscript{169} Peterson’s results were consistent with the forensic evidence funnel revealed in other similar studies.\textsuperscript{170} Variation exists among types of forensic analysis as well. Some types of forensic testing are practically essential to establishing the elements of certain criminal offenses; for example, in drug offenses, where the chemical composition of a substance must be determined, evidence will invariably be submitted for forensic toxicological analysis (though whether it is analyzed before the case is disposed of is another story, as discussed below). Across a wider variety of offenses, fingerprints are the most consistently submitted and analyzed type of evidence for identification purposes—more commonly, and more consistently, than biological evidence.


\textsuperscript{166} See generally PETERSON & SOMMERS, supra note 112.

\textsuperscript{167} Id. at 46.

\textsuperscript{168} Id. at 77–78.

\textsuperscript{169} Johnson et al., supra note 125, at 206.

\textsuperscript{170} See STROM ET AL., supra note 75, at xi (reporting that in a 2007 survey of national law enforcement organizations, among unsolved homicide, rape, and property crime cases, 14%, 18%, and 23%, respectively and on average, featured unsubmitted forensic evidence); Travis C. Pratt et al., This Isn’t CSI: Estimating the National Backlog of Forensic DNA Cases and the Barriers Associated with Case Processing, 17 CRIM. JUST. POL’Y REV. 32, 36–37 (2006) (discussing their findings that over 200,000 U.S. rape and homicide cases contain biological evidence that has not been sent for testing).
susceptible to DNA analysis, which even when collected is frequently never submitted.\textsuperscript{171}

Moreover, once evidence is submitted to a laboratory, a series of decisions must be made about the type and timing of testing that will occur. To some extent, these are decisions that are typically and properly the subject of laboratory protocols. Biological evidence, for example, will typically be “screened” to determine whether it contains substances that might be susceptible to further testing, and laboratories typically do this testing first and automatically after a request for testing is made.\textsuperscript{172} Some evidence might be susceptible to multiple types of analysis (for example, an item that potentially bears both blood and latent fingerprints), and scientific protocols will dictate the order of testing to preserve the various samples. But typically, there are also choices to be made that fall within the investigative wheelhouse. Of course, in some (perhaps many) cases, police will approach evidence submission decisions in a fairly routine fashion. In the mine-run of drug cases, for example, evidence suspected of being or containing an illicit substance will undoubtedly be submitted for toxicology analysis.\textsuperscript{173} In more complex cases, however, there are likely to be multiple items of evidence, some or all of which could be subjected to a variety of different tests. A shoe, for example, might be examined for trace evidence (such as hairs), for the presence of biological material (such as blood), and for comparison to a shoe print left at a crime scene. If initial testing identified a stain on the shoe as blood, there might be a variety of different types of analysis available to try to associate that blood with an individual: for example, a small or degraded piece of evidence might be susceptible to DNA testing with certain techniques, such as mini-STR analysis (permitting the testing of much smaller samples but with less discriminating results than the now-standard method of STR analysis) or mtDNA analysis (more widely available for small samples than mini-STR but far less discriminating), but the choice will often entail trade-offs with respect to how narrow a field of inclusion will be drawn.\textsuperscript{174}

\textsuperscript{171.} See Peter

\textsuperscript{172.} See Nathan James, Cong. Research Serv., R41800, DNA Testing in Criminal Justice: Background, Current Law, Grants, and Issues 9 (2012) (explaining that one factor in the forensic casework backlog is the “time-consuming” process of biological evidence screening before further testing can begin).

\textsuperscript{173.} See Peter

There is a further, arguably crucial, issue of timing. Notwithstanding significant popular and academic attention to the recent ability of police to use DNA and (to a lesser extent) fingerprint databases to generate suspects through “cold search[es]” early in criminal cases,\footnote{175} it remains true that the vast majority of forensic evidence is generated and used not early but quite late in a case. Available empirical evidence demonstrates that while physical evidence might well be submitted for analysis prior to arrest, in the overwhelming majority of cases testing typically is not performed until after a suspect is in custody.\footnote{176} Indeed, it is quite common for forensic analysis not to be performed until well after charges are filed, and frequently not until shortly before a trial occurs in a case.\footnote{177} This is in large part—maybe in a but-for sense entirely—a reality of the press of caseloads on most crime laboratories, particularly in (high-volume) drug-analysis requests\footnote{178} and any request for (time-intensive) DNA analysis.\footnote{179} Significant wait times typically accompany requests for analysis in the ordinary course, often exceeding thirty days in these higher volume request categories.\footnote{180} For reasons of tactics or legal constraint (discussed in further detail below), decisions to

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\footnote{175}{See, e.g., Cole & Lynch, supra note 80, at 44–45 (attributing an increased principal usage of “[t]race evidence recovered from crime scenes” to late twentieth-century “databases indexed according to biometric information (fingerprints and DNA profiles)”).}

\footnote{176}{See Johnson et al., supra note 125, at 210 (reporting that while physical evidence was a predictor of arrest it was analyzed prior to arrest in only 1.6% of cases); see also Peterson & Sommers, supra note 112, at 123 (same).}

\footnote{177}{See Peterson & Sommers, supra note 112, at 22 (“Evidence sometimes remains in the property room for brief or extended periods of time while the investigation is proceeding and sometimes until suspects are identified, standards are being sought, or a decision is being made whether to pursue or terminate the investigation.”).}

\footnote{178}{Although relatively few requests for DNA analysis are made, each case is extremely time and resource intensive, and is competing against an ever-increasing stream of work flowing from state and federal laws requiring the routine collection and analysis of DNA from individuals who enter the criminal justice system. See DuRose et al., supra note 23, at 4 & tbl.5 (estimating that the total number of requests for forensic services received exceeded the total number completed by publicly funded forensic crime labs); Tex. Forensic Sci. Comm’n, Stakeholder Roundtable Report 12 (2012), available at http://www.fsc.state.tx.us/documents/StakeholderRoundtableReport-June2012.pdf (identifying stakeholder dissatisfaction with turnaround times among the “key issues and challenges” to quality and timeliness of forensic services); Michelle Villarreal, Department of Public Safety Crime Labs Limits DNA, Drug Testing, Corpus Christi Caller-Times (Sept. 1, 2012, 5:25 PM), http://www.caller.com/news/2012/sep/01/department-of-public-safety-crime-labs-limits/ (reporting a Department of Public Safety crime lab policy change limiting the DNA testing technicians will perform in response to their increased workload).}

\footnote{179}{See DuRose et al., supra note 23, at 4 (estimating that “60% of the estimated 887,000” forensic biology requests were backlogged in 2009 due to increases in collection of DNA samples); Tex. Forensic Sci. Comm’n, supra note 178, at 10 (questioning how a forensic examiner could be qualified to conduct independent casework but unqualified for certification in DNA testing); Villarreal, supra note 178 (reporting a recent limitation of the DNA testing technicians will perform to manage increased workload).}

\footnote{180}{DuRose et al., supra note 23, at 3–4.
arrest, and frequently even to charge, simply cannot await the completion of testing, at least in cases in which the low threshold of probable cause can be met with other evidence. Of course, not every case is handled in the ordinary course. Laboratories might have formal testing priority policies based on, say, some combination of court deadlines and offense type, giving priority to cases set for trial or other hearings—to take a typical example. In many laboratories, however, the approach is more improvisational: evidence is accepted (as submitted at the discretion of law enforcement), and testing and timing decisions are made on the basis of some combination of formal policy, informal practice, and negotiation between analysts and case investigators or prosecutors. There is likely to be at least some degree of communication, and perhaps even collaboration, among laboratory personnel and law enforcement “customers” in navigating these resource considerations; indeed, as with evidence collection, practitioners and criminal justice researchers view the facilitation of ongoing communication as a need and a goal for the field. Often, it is a matter of the squeaky wheel getting the grease—meaning, again, that the ball is often in the court of police and prosecutors.

Finally, there is the question of investigative and prosecutorial response to scientific evidence that is obtained. Of course, forensic evidence will not by its own force solve a crime; the thing never speaks for itself. Many forensic science techniques can only, at the top of their games, prove the nature of an object or instrumentality of crime: chemical drug analysis establishing a powder as cocaine, for example, or firearms examination linking a spent bullet cartridge to a weapon. And even those forensic methodologies that purport to identify linkages between physical evidence and human sources—DNA analysis, fingerprint comparison, and hair microscopy, for example—are only one piece of an investigative puzzle. Thus, DNA shed at a crime scene only points to a suspect if there is no lawful explanation for its presence. And, as in Osborne’s and Skinner’s case, even forensic evidence putatively capable of “identifying” its source might


182. See NAS Report, supra note 7, at 61 (reiterating the warning from the Los Angeles Sheriff’s Department Crime Laboratory Director that labs “triage” cases, prioritizing violent crimes and cases handled by persistent investigators who pester the lab frequently).

183. Griswold & Murphy, supra note 181, at 23–25.

184. NAS Report, supra note 7, at 61; see also Justin Fenton, Criminals’ DNA Ignored, BALTIMORE SUN, Sept. 27, 2008, http://articles.baltimoresun.com/2008-09-27/news/0809270007_1_dna-crime-lab-found-on-evidence (reporting that police told crime lab technicians not to follow-up on DNA found at crime scenes in at least six open homicide and sexual assault cases and three closed burglary cases).

185. See Cole & Lynch, supra note 80, at 55 (stating that forensic “evidence must have a material relation to the crime that renders it suspicious” to have probative value).
(often) do so to a degree of discrimination that requires further linking evidence to convince a fact finder (meaning, prior to trial, an investigator, a magistrate, or a prosecutor) that an identified suspect is probably guilty. But importantly, to the extent that forensic evidence is typically available only after an arrest, this is frequently the province of the prosecutor, who will generally have a number of options other than the one that typically receives the most focus—taking the case to trial. Rather, she will be faced with questions such as whether to charge a suspect or instead wait for forensic analysis or pursue additional lines of testing, as well as whether the availability (or not) of forensic evidence will affect negotiations to resolve the case by plea.

Perhaps even more so than was the case with evidence collection, police enjoy enormous discretion in connection with evidence submission and requests for testing. There are relatively few formal constraints. Most commonly, accepted practice or (rarely) formal policies will simply delegate to a lead investigator the decision of whether, when, and with what direction to submit evidence for forensic testing. She is most likely to be highly resource constrained, and critically, in all but the most serious or specialized instances, carrying far more cases than she could ever investigate thoroughly. So, the name of the game is typically doing the minimum required to close a case by arrest. To be sure, there are legal constraints to the extent that the substantive penal law forms the backdrop to any investigation: to effect an arrest, probable cause is required, which in turn requires reference to the substantive law underlying a given offense. Some forensic analysis is effectively required in order to establish an element of an offense: drug analysis in narcotics offenses, for example, or testing for the presence of semen in many sexual assault cases (particularly if a victim is

186. See GRISWOLD & MURPHY, supra note 181, at 17–18 (describing various approaches to prioritization). Indeed, the exceptions prove the rule. One of the most widely remarked and controversial consequences of the above-described revelations of unsubmitted, untested sexual assault kits has been the adoption in some police departments and crime laboratories of mandatory testing policies for all evidence collected in rape investigations. Compare Megan Twohey, Illinois to Test Every Rape Kit, Chi. Trib., July 6, 2010, http://articles.chicagotribune.com/2010-07-06/news/ct-met-rape-kit-law-20100706_1_untested-kits-crime-lab-dna-backlog (describing Illinois legislation requiring testing of all rape kits backed by victims’ groups), with JOSEPH PETERSON ET AL., SEXUAL ASSAULT KIT BACKLOG STUDY v (2012), available at https://www.ncjrs.gov/pdfsfiles1/nij/grants/238500.pdf (reporting that law enforcement was generally skeptical of mandatory testing).

187. See, e.g., Villarreal, supra note 178 (reporting that Texas crime lab requests related to drug and alcohol crimes increased nearly 500% within six years and describing a new policy allowing prosecutors to select which misdemeanor-related lab requests are analyzed).


189. U.S. CONST. amend. IV.
But in many cases, scientific evidence is just one potential form of proof, and even if forensic evidence would be desirable or even necessary for discharging the state’s burden at trial, the low threshold of probable cause to arrest or charge can typically be met without it. In the context of forensic science, these pressures against the marginal utility of additional investigative effort are only reinforced, at least as a general matter, by the prevailing culture of policing. Students of the field continue to depict it as a highly bureaucratic enterprise, generally resistant to innovation both at the management level and at the level of individual police actors. Challenges to policing from “outsiders” is typically viewed with the greatest skepticism; the contributions of those who are not “team players” are unlikely to be embraced, at least where they do not conform to existing police priorities. And so, researchers have noted that to the extent forensic science has been embraced, it is in service of police-defined objectives (determined in traditionally police-led ways), not as generative of lines of inquiry or tactics for pursuing them in a given case.

190. Peterson & Sommers, supra note 112, at 22–23. 191. For example, in drug cases, police will typically have a variety of “field tests” at their disposal, permitting them to make presumptive drug identifications that are sufficient as a legal matter to establish probable cause to arrest and charge—albeit perhaps not admissible in court to prove the chemical composition of a drug. See, e.g., Florida v. Harris, 133 S. Ct. 1050, 1056 (2013) (holding that an alert by a dog trained in narcotics detection may establish probable cause to search a vehicle based on the ordinary “totality-of-the-circumstances” standard regardless of whether documentation supports the reliability of the dog); People v. Swamp, 646 N.E.2d 774, 775–76 (N.Y. 1995) (holding that a positive result of a field test for identifying cocaine was sufficient to authorize an indictment without formal laboratory results); Villarreal, supra note 178 (emphasizing the importance of crime scene investigation given tighter regulations on forensic testing); see also Marc G. Kurzman & Dwight Fullerton, Drug Identification, in SCIENTIFIC AND EXPERT EVIDENCE 521, 523–54 (Edward J. Imwinkelried ed., 2d ed. 1981) (discussing the threshold of proof required to sustain a conviction when no scientific proof is available).

192. See generally Jerome H. Skolnick & David H. Bayley, Community Policing: Issues and Practices Around the World 49–65 (1988) (discussing challenges to community policing stemming from the “attitudes, internal divisions, belief systems, traditions, [and] values” of police departments). 193. See id. at 50 (discussing the causes of the “solidarity” concept in police culture). 194. See Cole & Lynch, supra note 80, at 50 (discussing empirical data that many law enforcement agencies still do not use DNA testing as an investigatory tool and noting their reluctance to submit DNA evidence in “suspectless” cases); Horvath & Meesig, supra note 136, at 966 (stating that “unless a suspect has been identified, the crime scene evidence is typically not analyzed”); David A. Schroeder & Michael D. White, Exploring the Use of DNA Evidence in Homicide Investigations: Implications for Detective Work and Case Clearance, 12 POLICE Q. 319, 337 (2009) (“[D]etectives consistently indicated that they would use DNA evidence when needed; they just did not need it that often.”); cf. Edward R. Maguire, Structural Change in Large Municipal Police Organizations During the Community Policing Era, 14 JUST. Q. 547, 569–70, 572 (1997) (describing the failure of community policing policies to create structural changes within police organizations and suggesting that structural changes only occur when they have symbolic value and are nondisruptive to day-to-day activities); James J. Willis et al., COMPSTAT and Bureaucracy: A Case Study of Challenges and Opportunities for Change, 21 JUST. Q. 463, 485 (2004) (recounting that commanders used data generated through COMPSTAT merely to fulfill “traditional ‘crime control’ function[s]” rather than to identify and respond to particular crime problems as COMPSTAT promised).
Ironically, these dynamics are likely to be particularly pronounced with respect to the types of forensic methodologies that society (and the NAS Report drafters) might most want police to embrace: those with the strongest footing in science rather than policing, such as DNA, for example, rather than fingerprint analysis and other techniques rooted in police training and culture. Studies suggest that this remains a prevailing attitude by demonstrating that DNA analysis tends to be requested by police far more in cases with very low clearance rates; it is a tool of last, rather than first, resort. It is also entirely consistent with the notable enthusiasm in the law enforcement community for expanded use of early DNA analysis to permit exploitation of the CODIS suspect databases in property crimes investigations. These are categories of cases that currently have extremely low clearance rates because there are typically no witnesses and little other evidence available for police to pursue along traditional lines: clearing property crimes is difficult, and many reported incidents never even pass the initial department screen of being worth the bother of opening a file. At the same time, though, there is concern that the type of investigative follow-up that should occur after obtaining a “hit” in such cases is frequently absent: no gathering of elimination samples to establish that a recovered DNA profile was not the result of lawful access, much less investigation to provide evidence confirming the plausibility of the database-generated suspect.

Of course, there is at least one institutional check on police discretion in all criminal cases—the prosecutor, who has the authority to accept or decline a case for prosecution, and must (as a matter of both legal and ethical constraint) assess anew whether probable cause supports charging the case. Prosecutors’ offices can, and sometimes do, undertake efforts to make police more or less sensitive to postarrest dynamics, with the aim of improving the quality of cases submitted, decreasing declination rates and plea bargaining, and freeing up prosecutorial resources. But there is good reason to suspect

196. Schroeder & White, supra note 194, at 337.
197. See Roman et al., supra note 110, at 13–18 (discussing the components of CODIS and their investigatory uses).
199. See, e.g., id. (discussing an unsolved murder case where laboratory error likely caused a false positive); Texas Crime Labs Ill-Equipped to Handle Coming Volume of Touch-DNA Cases, GRITS FOR BREAKFAST (July 15, 2012, 9:42 AM), http://gritsforbreakfast.blogspot.com/2012/07/texas-crime-labs-ill-equipped-to-handle.html (expressing concern that crime labs will be unable to keep up with growth in demand for their services).
that where such procedures do not exist as a matter of office policy or culture, prosecutors have limited power or inclination to prompt greater police effort. Despite the vaunted duty to see “that justice shall be done,” the overriding reality of most prosecutors’ work is to see that dockets are managed. Prosecutors have their own press of caseloads, only a small number of which will go to trial—at which time forensic evidence might well be viewed as critical whenever it is available, if only to deliver on juror expectations. Scrutiny of a police case file is typically light as a general matter, and perhaps even more so in regard to scientific evidence. The limited available studies of the effect of forensic evidence on charging decisions show that prosecutors screen, if at all, simply for the possibility of forensic analysis, not for its existence or content. And so, again, the incentive in most cases will be to pursue scientific evidence late if at all, and only as a corroborator; otherwise, forensics are far more hassle than they are worth.

Consider what is likely to be lost when forensic analysis occurs late in an investigation—postarrest or postcharge. To the extent that scientific evidence is susceptible to databasing (chiefly DNA, fingerprint, and firearms), delayed analysis means a missed opportunity to identify suspects or links to other crimes, or to save investigative resources in generating those leads. To the extent that scientific evidence has substantial disconfirming ability—i.e., to exclude suspects identified through other means—delay in analysis risks a prolonged investigation into an innocent individual.

29, 30–35 (2002) (advocating enhanced “screening” by prosecutors to cut down on the number of negotiated plea bargains that take place).


202. See, e.g., Donald E. Shelton, Juror Expectations for Scientific Evidence in Criminal Cases: Perceptions and Reality About the “CSI Effect” Myth, 27 T.M. COOLEY L. REV. 1, 23 (2010) (finding that jurors have high expectations that they will be presented with scientific evidence); Tom R. Tyler, Viewing CSI and the Threshold of Guilt: Managing Truth and Justice in Reality and Fiction, 115 YALE L.J. 1050, 1083 (2006) (asserting that CSI might raise juror standards and noting that jurors may view scientific evidence as overly conclusive).

203. See, e.g., Daniel Givelber, Meaningless Acquittals, Meaningful Convictions: Do We Reliably Acquit the Innocent?, 49 Rutgers L. Rev. 1317, 1362 (1997) (“Unless the police report on its face reveals an inconsistency or barrier to conviction, the prosecutor accepts the general conclusion of the police without making an independent investigation or evaluation of the evidence.” (quoting Lloyd L. Weinreb, Denial of Justice: Criminal Process in the United States 58 (1977))).

204. Peterson et al., supra note 195, at 1752.


analysis also compromises the ability of both prosecutors and defense attorneys to fully vet the strength of the overall case and of the scientific evidence in particular, potentially distorting charging decisions, plea negotiations, and of course, trial preparations.207

There are also more subtle, and perhaps more pervasive (though admittedly not fully understood) concerns, stemming from the risk that systematic skews in how police and prosecutors process information and make decisions could thwart or even pervert the objective value of scientific evidence. A warehouse of research in behavioral psychology suggests that once individuals form particular beliefs, they pursue and process information in a manner that aims to verify that belief.208 Trained professionals—police and prosecutors among them—are hardly immune to such cognitive biases; indeed, the dynamic of “tunnel vision” in criminal investigations has long been acknowledged.209 Most relevant, perhaps, is the category of “confirmation bias” that leads individuals systematically to both credit and pursue information that is consistent with prior belief, and to discredit and ignore

207. See Daniel Givelber, Lost Innocence: Speculation and Data About the Acquitted, 42 AM. CRIM. L. REV. 1167, 1180–81 (2004) (describing how prosecutors and defense attorneys rely only on information, including forensic evidence analysis, that is readily available when making pretrial decisions).


209. See, e.g., Karl Ask et al., The ‘Elasticity’ of Criminal Evidence: A Moderator of Investigator Bias, 22 APPLICATIONS PSYCHOL. 1245, 1246 (2008) (discussing the problem of confirmation bias in criminal investigations); Karl Ask & Pär Anders Granhag, Motivational Bias in Criminal Investigators’ Judgments of Witness Reliability, 37 J. APPLIED SOC. PSYCHOL. 561, 579–80 (2007) (finding disconfirmation bias regarding witness statements in a study group of Swedish investigators); Barbara O’Brien, Prime Suspect: An Examination of Factors That Aggravate and Counteract Confirmation Bias in Criminal Investigations, 15 PSYCHOL., PUB’L & L. 315, 328–29 (2009) (demonstrating that in a study group of college students the act of naming a suspect produced confirmation-bias effects, including believing or valuing available evidence to the extent that it confirmed suspect guilt); Barbara O’Brien, A Recipe for Bias: An Empirical Look at the Interplay Between Institutional Incentives and Bounded Rationality in Prosecutorial Decision Making, 74 MO. L. REV. 999, 1033 (2009) (noting that prosecutors, like other professionals, are not immune from confirmation bias); see also Bates, supra note 120, at 41 (noting that “tunnel vision” can result in the loss of evidence); D. Kim Rossmo, Failures in Criminal Investigation, POLICE CHIEF (Oct. 2009), http://www.policemagazine.org/magazine/index.cfm?fuseaction=display_article&article_id=1922&issue_id=102009 (giving an example of “tunnel vision” leading to a wrongful conviction). Indeed, studies have demonstrated that professionals with specialized expertise in a relevant area can exhibit exacerbated cognitive limitations—as when police trained in interrogation demonstrated inferior capacity to judge truth and deception in suspects as compared to untrained college student subjects. See, e.g., Ask & Granhag, supra, at 579–80 (identifying confirmation bias in controlled study of trained investigators); Saul M. Kassin & Christina T. Fong, “I’m Innocent!”: Effects of Training on Judgments of Truth and Deception in the Interrogation Room, 23 LAW & HUM. BEHAV. 499, 511–12 (1999) (finding that trained investigators were more likely than lay people to incorrectly “detect” deception in suspects); Christian A. Meissner & Saul M. Kassin, “He’s Guilty!”: Investigator Bias in Judgments of Truth and Deception, 26 LAW & HUM. BEHAV. 469, 478–79 (2002) (same); Eric Rassin, Blindness to Alternative Scenarios in Evidence Evaluation, 7 J. INVESTIGATIVE PSYCHOL. & OFFENDER PROFILING 153, 162 (2010) (finding that trained investigators, in contrast with laypeople, exhibited blindness toward alternative suspects).
information that is inconsistent.210 Critically, the later scientific evidence is available in a criminal investigation, the more strongly police, as well as prosecutors, are likely to be intellectually committed to a particular understanding of the case; indeed, where scientific analysis of evidence is not done until after charges are filed, the commitment is strongly to a particular suspect.211

Cognitive bias of this sort is likely to have particularly perverse effects with respect to precisely the types of forensic evidence that, from a reliability-enhancing perspective, we should be most concerned about: exculpatory science, and science that is less than the “gold standard.” On the former count, confirmation bias and tunnel vision have been widely accepted as causes of erroneous disregard, rejection, or recharacterization of exculpatory evidence by both police and prosecutors,212 and the anecdotal evidence is that the force of science does not render forensic evidence immune to this pressure. Far from it, as the cases of thirty-four DNA exonerees convicted in spite of the presence of known exculpatory evidence demonstrate.213 In Jeffrey Deskovic’s case, DNA evidence obtained post-charge, which established he was not the source of semen found in the classmate he was accused of raping and murdering, was disregarded in the face of a (now known to be) false confession.214 The late scientific evidence was reconciled with prior investigative commitment by adopting a baseless theory about the young victim’s sexual history.215 In Neil Miller’s case, pre-DNA blood group testing that excluded him as a source of the semen found on the bed where he was accused of raping a woman was disregarded in


211. Alaifair S. Burke, Improving Prosecutorial Decision Making: Some Lessons of Cognitive Science, 47 W.M. & MARY L. REV. 1587, 1605–06 (2006) (suggesting that because prosecutors have and presumably discharge an ethical duty to charge a defendant only if they are reasonably certain of that defendant’s guilt, “[i]f additional evidence arises, selective information processing comes into play”); see also ECK, supra note 136, at 156–57 (elucidating the shift in police behavior in an investigation once a prime suspect is identified, at which point the focus becomes proving the prime suspect’s involvement in the crime); Keith A. Findley & Michael S. Scott, The Multiple Dimensions of Tunnel Vision in Criminal Cases, 2006 WIS. L. REV. 291, 308 (“When what a person expects to see is the result of the person’s own generation of hypotheses . . . , the personal investment in those hypotheses will reinforce the tendency to perceive or overvalue confirming information and to miss or irrationally undervalue disconfirming information.”).

212. See, e.g., GARRETT, supra note 2, at 266–68 (recounting how “cognitive bias” changed the conclusions arrived at by a group of experts); see also infra notes 214–19 and accompanying text.

213. See generally GARRETT, APPENDIX TO CONVICTING THE INNOCENT, supra note 14 (describing the invalid evidence presented in these thirty-four cases).


215. Id. at 27–29.
favor of the victim’s identification, and information from the crime laboratory that semen from strikingly similar rape cases came from an individual with the same rare blood group type was ignored by police.\textsuperscript{216} Prosecutors argued that the source must have been a boyfriend, whose own blood was never collected or tested; DNA testing more than nine years after Miller’s conviction revealed that the source was not a boyfriend but the true perpetrator, a serial rapist.\textsuperscript{217} In James Edwards’s murder trial, jurors were told that blood evidence collected at the crime scene that was inconsistent with the victim and Edwards was left by a store employee—but again, no testing was ever conducted to verify that theory, which turned out to be false.\textsuperscript{218} The list goes on.\textsuperscript{219}

Confirmation bias can also, perversely, lead investigators or prosecutors to embrace less probative or less reliable evidence than what objective scientific evaluation would counsel. Consider, for example, the Massachusetts case of Edmond Burke, in which despite DNA testing that excluded him as the source of saliva found on a rape victim, Burke was arrested and prosecuted on the strength of forensic odontology examination that matched his teeth with the bite mark that caused the saliva to be deposited.\textsuperscript{220} The controversial use of canine scent lineups often reflects this dynamic as well, as dog scent experts have a curious habit of intervening late in cases in which other forensic evidence has proved unsuccessful in linking identified suspects to crimes.\textsuperscript{221} The concern is obvious: that the heat of pursuit (of a suspect or a theory) blinds investigators or prosecutors to the inconvenient but more fair-minded conclusion that the best available science counsels a new investigative path.

None of this should be taken to suggest, though, that the introduction of scientific evidence into an investigation at an earlier stage necessarily

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  \item \textsuperscript{216} Brandon L. Garrett & Peter J. Neufeld, Invalid Forensic Science Testimony and Wrongful Convictions, 95 VA. L. REV. 1, 82 (2009) (summarizing the Miller case).
  \item \textsuperscript{217} Id.; GARRETT, APPENDIX TO CONVICTING THE INNOCENT, supra note 14, at 26.
  \item \textsuperscript{219} See, e.g., Ex parte Brandley, 781 S.W.2d 886, 890 (Tex. Crim. App. 1989) (berating the lead investigator of a rape-murder for refusing to entertain the possibility of Brandley’s innocence and to follow leads pointing towards three janitors who saw the victim just before the attack); N.Y. STATE BAR ASS’N, FINAL REPORT, supra note 117, at 91–96 (describing multiple cases including those of Scott Fappiano, Anthony Faison, Hector Gonzalez, Charles Shepard, and the Central Park jogger defendants, in which known inconsistencies between evidence and theory of guilt existed, and additional potentially exculpatory forensic testing was not conducted); Garrett & Neufeld, supra note 216, at 81–83 (describing cases in which police and prosecutors failed to conduct elimination or comparison testing).
  \item \textsuperscript{220} Burke v. Town of Walpole, 405 F.3d 66, 81–85 (1st Cir. 2005).
  \item \textsuperscript{221} See Winfrey v. State, 291 S.W.3d 68, 69–74 (Tex. App.—Eastland 2009, pet. granted) (describing how multiple laboratory-based methods of analysis failed to connect crime scene evidence and individuals who police had developed as suspects through informants, leading to multiple dog scent lineups, each following interviews with informants allegedly reporting inculpatory information), rev’d by 323 S.W.3d 875 (Tex. Crim. App. 2010).
\end{itemize}
obviates concerns about the cognitive biases of investigators and prosecutors. Consider the textbook “early science” circumstance: development of a suspect following collection of evidence from a crime scene, immediate laboratory submission, and testing that permits database searching for the source of the evidence—the owner of a resulting DNA profile or a detected latent fingerprint. The Brandon Mayfield case illustrated in rather notorious fashion that such early science is far from infallible—and indeed that it might trigger investigative responses that are less truth seeking and skeptical than they should be, or might have been absent scientific evidence. In Mayfield’s case, multiple FBI fingerprint examiners erred in “matching” Mayfield’s prints to those detected on evidence recovered from the scene of the 2005 Madrid subway bombing, and Mayfield, an Oregon attorney who happened to be Muslim and somewhat active in the local Islamic community, was wrongly arrested for the crime.\textsuperscript{222} While the laboratory-based error garnered the most attention (and critical response), another feature of the investigation is relevant for present consideration: after obtaining the results of the fingerprint comparison, FBI agents obtained a warrant for Mayfield’s arrest based in part on allegations that he was likely to flee, given that he had no passport yet had previously traveled to Madrid illegally.\textsuperscript{223} In other words, what turned out to be an exculpatory fact—that government agencies had no record of Mayfield ever having been in Spain—was resolved against Mayfield on the strength of the fingerprint “match.”\textsuperscript{224}

Cases like this illustrate the risk that forensic science’s “apparent credibility[] leave[s] the process of detection, evidence gathering and investigation hidden. The canopy of science obscures the primitive analytic tools that persist.”\textsuperscript{225} In Mayfield’s case, and in most other known instances of questionable investigative paths following early suspect development through databases, we might have expected the high-profile and violent nature of the crimes at issue to trigger the greatest investment of investigative resources, as well as the most vigorous testing by defense counsel. The push to expand the tools of early suspect development through the tools of forensic science, including in property offenses and other high-volume crime, would seem to intensify these risks. Consider the recent exoneration of Dwayne Jackson in Las Vegas, convicted following a guilty plea to robbery,
following an investigation in which the only evidence against him was a CODIS hit.226 Jackson was innocent, as police discovered years later when crime scene samples originally matched to Jackson yielded another CODIS hit to a different individual; the source of the error was a laboratory sample mix-up.227 In a resource-restricted environment, scientific evidence may well cut short investigation that is still called for, and with far more appealing plea offers coming in these cases, we should expect less-than-full adversarial testing of that work, as Dwayne Jackson’s case tragically illustrates.228

3. Enter NAS.—Leading law enforcement researchers surveying the current state of affairs with respect to forensic science usage have concluded, “[P]hysical evidence is not collected in most cases investigated by police; when it is collected, much of it is not scientifically analyzed; and when it is analyzed, it is used not to promote investigative efficiency, but rather to bolster prosecutorial proceedings.”229 The previous two Parts explain why that state of affairs exists and why it is likely to persist.

The NAS Report itself has little to offer in response to the concerns raised by these observations. Simply creating the conditions for more and better quality science to be produced by laboratories will not address critical features of underproduction, underutilization, and qualitatively suboptimal exploitation of forensic science in the criminal justice system. To be sure, there are systemic resource constraints that, if addressed at the laboratory level, are likely at least partly to improve the state of affairs with respect to suppressed rates of evidence submission and analysis usage; undoubtedly, this behavior is at least in part a resigned response to laboratory backlogs.230 But the causes are likely more endogenous, and more entrenched, as well.231 Affirmative rather than trickle-down intervention appears to be called for.


227. Mower & McMurdo, supra note 226; Valley, supra note 226.

228. See supra notes 196–99 and accompanying text (describing problems with respect to DNA in property crimes).

229. Horvath & Meesig, supra note 136, at 965.

230. NAS REPORT, supra note 7, at 37.

231. For whatever self-reporting is worth in this context, it is instructive that recent surveys of forensic science “customers” reveal laboratory wait times to be only one of many reasons cited for nonsubmission of evidence. See Pratt et al., supra note 170, at 39–41 (providing numerous reasons for nonsubmission of evidence including lack of funding, expectation of a guilty plea, and no identifiable suspect). There is also good reason to doubt that laboratory backlogs are likely to substantially diminish, at least in the near future; indeed, despite significant dedicated federal funding prior to and since the NAS Report, they have not yet shrunk. See MARK NELSON, NAT’L INST. OF JUSTICE, MAKING SENSE OF DNA BACKLOGS, 2010—MYTHS VS. REALITY 3 (2011), available at https://www.ncjrs.gov/pdffiles1/nij/232197.pdf (presenting graphs showing steady
Moreover, the concern is not just that the reform agenda of the NAS Report might not address critical concerns, but that it might in some instances unwittingly confound them. Two features of the NAS Report’s proposals are illustrative. Consider first the NAS Report’s commitment to putting more scientific evidence into the hands of investigators early in investigations. This is perhaps most directly reflected in its call for expanded interoperability of Automated Fingerprint Identification Systems (AFIS) and its conclusion that a range of identification-orientated forensic disciplines (such as hair microscopy, handwriting analysis, or forensic odontology) might be well suited for investigative use although they may never be validated sufficiently to support the claims of individualization currently made in courtroom testimony.\footnote{NAS REPORT, supra note 7, at 127.}

Investigations might, for example, be aided by the ability of these “second-best” techniques to exclude suspects or narrow an otherwise wide field of suspects (to a manageable number if not one), especially where there is not opportunity (for lack of appropriate evidence) or resources (for lack of time or laboratory capacity) for preferred techniques such as DNA analysis, and especially if training of law enforcement actors on the scientific limits of such techniques is expanded.\footnote{See id. at 234–37 (proposing expansion of “education” for users as well as producers of forensic science).}

These may well be right-headed proposals on balance. Particularly with regard to AFIS, it is likely that the expanded ability to generate suspects based upon fingerprints recovered from crime scenes—a capacity currently limited by a surprising array of proprietary barriers to interoperability of multiple jurisdictions’ computerized fingerprint databases\footnote{Id. at 272–75 (discussing technical challenges in working towards AFIS interoperability).}—would permit police to pursue the investigation of cases (property crimes in particular) that are currently closed without resolution for lack of evidence. Moreover, it might well be that a range of forensic disciplines provide, on balance, more reliable inclusions of suspects than other more traditional forms of evidence (think, especially, eyewitness evidence)\footnote{So, for example, it may be that hair examiners can say with a higher degree of confidence that two hairs are consistent with being from the same source, than an eyewitness can say that a face seen in a lineup is in fact the face she saw at a crime scene; the latter would be more discriminating if true, but it might be highly likely to be false.}—and certainly might permit highly reliable exclusion.

But the preceding discussion suggests that the NAS Report’s ideal vision for how expanded emphasis on and access to these “second-best”
techniques will enhance investigations is simply unlikely to come to materialize—at least absent concerted intervention (beyond “education”) in the conditions and culture of most investigative environments. Cases like Edmond Burke’s illustrate the possibility that the limited capacity of investigators to fair-mindedly evaluate competing scientific evidentiary conclusions in a case diminishes the prospect for scientific evidence to be put to the best possible use in a criminal case, and creates a risk that second-best science will lock investigators into error. Thus, an early “inclusion,” however nonexclusive, might trigger a level of commitment by investigators that is not easily revised—even by putatively more valid or reliable scientific evidence. Second-best science might also be particularly likely to interact in undesirable ways with traditional, nonscientific investigative techniques. The motivations and pressures that cause investigators to have a “restricted” view of the value of forensic evidence as primarily a tool of confirmation rather than investigation, and to typically view the best investigative path as the one representing the shortest distance to case closure, create the risk that forensic evidence of this sort will be seen as most usefully deployed to enhance tried-and-true investigative methods—suspect interviews and interrogations among them. This could well be an effective strategy from the standpoint of closing cases, as scientific evidence has been established as an important factor in obtaining confessions. From the standpoint of reliability concerns, however, this should give us pause; scientific evidence has the capacity to convince both the guilty and the innocent that confession is in their interests, and confessions in turn diminish the capacity to independently scrutinize the reliability of the forensic evidence that prompts them.

Consider also the NAS Report’s much-debated call for laboratory independence. Critically, apart from the merits of the recommendation, its very meaning has been the subject of significant debate. While strong proponents of crime laboratories operating wholly outside of law enforcement control have claimed the NAS Report adopted their viewpoint,

236. See supra note 233.
237. See supra notes 208–28 and accompanying text.
238. See Ask & Granhag, supra note 210, at 47 (discussing the role of “commitment” in triggering effects of cognitive bias).
239. Horvath & Meesig, supra note 136, at 966.
240. See RICHARD A. LEO, POLICE INTERROGATION AND AMERICAN JUSTICE 143–47 (2008) (discussing interrogation techniques involving scientific or allegedly scientific evidence that law enforcement officers use in order to elicit confessions).
241. Id. at 147; see also TRUE STORIES OF FALSE CONFESSIONS 193–202 (Steven A. Drizin & Rob Warden eds., 2009) (describing false confessions in the Central Park jogger case).
242. See, e.g., GARRETT, supra note 2, at 25–26 (discussing the case where a man named Douglas Warney made a false confession); Dan Simon, The Limited Diagnosticity of Criminal Trials, 64 VAND. L. REV. 143, 181 (2011) (explaining that when one item in the chain of evidence is erroneous the result can be an “escalation of error” because “evidence items are not truly independent of one another”).
others—in particular, groups representing law enforcement interests—have argued that a more modest accommodation, “administrative independence” within a law enforcement organization, is consistent with the Report’s aims.243 Supporters of the NAS Report’s agenda have been largely dismissive of this minimalist take on “independence,” viewing its advocates (somewhat understandably) as tainted by the very dynamics of control that motivated the recommendation in the first place.244

Politics aside, a systemic view of forensic science oversight suggests that there are very real concerns raised about the design of an independent laboratory system that should be considered in connection with reform. How would fully independent crime laboratories assist, if at all, with evidence collection and crime scene response? To the extent a role is envisioned, would independence delay response or undermine working relationships between law enforcement officers and their “independent” colleagues? Will evidence collection instead fall within the domain of law enforcement, and do resources exist to manage that transition?245 In the course of an investigation, would fully independent laboratories mean more formalized submission and prioritization decisions for testing? Would discretion in regard to submission and prioritization be committed to investigators or to analysts? These are critical questions to be answered in connection with the independence proposal.

Of course, as Part I aimed to show, there were fair reasons why the NAS Report itself did not squarely take on these concerns, and thereby assume a more systemic (and correspondingly disruptive) posture toward the role of forensic science in the criminal justice system. Nevertheless, these concerns cannot fall out of the reform agenda that is solidifying in the Report’s

243. Compare Paul C. Giannelli, Independent Crime Laboratories: The Problem of Motivational and Cognitive Bias, 2010 UTAH L. REV. 247, 262–66 (supporting complete independence but proposing more limited alternatives that might achieve those aims), with Kenneth E. Melson, Embracing the Path Forward: The Journey to Justice Continues, 36 NEW ENG. J. ON CRIM. & CIV. CONFINEMENT 197, 217 (2010) (“Advocacy groups critical of forensic science have latched on to the complete removal of crime laboratories from law enforcement. . . . Several organizations oppose the removal of crime laboratories from law enforcement agencies, but support different degrees of autonomy within the parent law enforcement agencies.”).

244. See Giannelli, supra note 47, at 89–90 (concluding that the NAS Report’s recommendations are warranted and that “[t]he government has not only failed to conduct the needed research, it has thwarted any effort to do so”).

245. Peterson et al., supra note 126, at 76 (listing five basic considerations in prioritizing evidence); Roman et al., supra note 110, at 9, 349–50 (discussing consequences of delayed crime laboratory response to crime scenes, poor working relationships among police and crime scene responders, and the need to tailor individual training protocols to particular institutional cultures); State of N.Y. Office of the Inspector Gen., Report of Investigation of the Monroe County Public Safety Laboratory 30–32 (2012), available at http://www.ig.ny.gov/pdfs/MonroeCountyLaboratoryReport.pdf (discussing significant laboratory management failures); Horvath & Meesig, supra note 136, at 966–67 (urging that “improvements in the mutual exchange of information among investigators and others involved in the collection, analysis, and use of physical evidence would enhance the value” of that evidence more than reforming the identity or institutional role of particular actors in collection and analysis).
aftermath, and that is likely to dictate the terms of both policy response and academic inquiry going forward. In this regard, there is value in some comparative reflections. Consider the recent government-commissioned inquiry into the state of pediatric forensic pathology in Ontario, Canada, prompted by a number of high-profile wrongful convictions and other events indicating serious deficiencies in forensic pathology practice. The Goudge Report, as the massive four-volume document is known, examined and issued 169 recommendations concerning the forensic pathology field, including proposals largely analogous to those of the NAS Report, touching on training, education, professional protocols, and oversight of practitioners. But while “much of the focus must be on forensic pathologists and the issues surrounding their training, education, accreditation, oversight, and accountability,” the Report includes “specific recommendations . . . designed to ensure that [police, prosecutors, and defense attorneys] will be as effective as possible in th[e] task” of “protecting the public against the introduction of flawed or misunderstood pediatric forensic pathology into the system.”

In recognition of the fact “that other participants in the criminal justice system have important roles to play in protecting the public against the introduction of flawed or misunderstood pediatric forensic pathology into the system,” the Report’s recommendations also target police and prosecutors (among others), and encourage changes to practices in the substance and timing of information flow among pathologists, coroners, and police, increased training for police with regard to pediatric forensic death investigation and general confirmation bias in investigation, and special considerations for prosecutors in regard to case preparation and disclosure issues.

Consider also the British example. In recent years, the British government has produced at least two reports on scientific evidence in criminal investigations that have examined the roles of producers and users as integrated functions in the field of forensic science. This integration extends as well to national oversight of forensic science, which has long been a feature of the British system, most recently through the roles of the Forensic Science Regulator and the Forensic Science Advisory Counsel.

In addition to the promulgation of standards for forensic science practice at


247. Id. at 46, 437; see also id. at 437–69 (devoting an entire chapter of recommendations to this concept).

248. Id. at 437–57.

249. See Under the Microscope, supra note 125, at vii (explaining that the purpose of the 2002 report is to examine the police response to its first iteration, released in 2000).

the laboratory level, the Forensic Science Advisory Council has also undertaken the task of promulgating “End-User Requirements” for forensic science services, directed to the roles of police, prosecutors, judges, and others in utilizing scientific evidence. 251 Matters addressed by the End-User Specialist Group include, for example, codes of conduct relating to crime scene canvassing, the appropriate roles for evidence gatherers, and proper interactions between police and forensic pathologists. 252

This is not, of course, to suggest that the Canadian or British models of forensic science oversight ought to be, or even could be, borrowed by the United States, particularly given the important differences between these countries and the United States in terms of criminal justice administration as a general matter. Both Canada and the United Kingdom feature far more centralized bureaucratic control over policing and criminal adjudication in general and forensic science in particular, and both have many fewer provincial and local police and prosecutorial organizations. 253 Further, in the United Kingdom, policing has, as a general matter, been at the vanguard of a broader trend toward data-based accountability for government services for the last three decades, 254 which has provided incentive and opportunity for creating and funding the capacity to scrutinize and regulate law enforcement use of forensic science. 255 Nevertheless, the Canadian and British examples show that the instinct to view oversight through a more systemic lens is not quite so counterintuitive as it would seem when set against the dominant American paradigm.


255. See id. (analyzing the application of economic efficiency-based principles to the forensic science context and recommendations deriving from the “New Public Management” era in the United Kingdom). This was largely the outgrowth of a Thatcher-era embrace of New Public Management and related strategies of broad privatization. See generally Paul Roberts, What Price a Free Market in Forensic Science Services?: The Organization and Regulation of Science in the Criminal Process, 36 BRIT. J. CRIMINOLOGY 37 (1996) (examining the tension between free market reforms and the need for effective regulation).
III. Another Path Forward: Systemic Integration of Forensic Science

The primary goal of this Article is diagnostic: it aims to reveal deficiencies in forensic science usage that are systemic, driven by forces outside the laboratory, and unlikely to be addressed—indeed, perhaps exacerbated—by the prevailing approach to reform. Developing remedies for those ills will be at least as complex and multifaceted as the dynamics that drive them, and is thus an ongoing project for future work (my own and, hopefully, that of others). But one must strike while the iron is hot. The NAS Report has generated not only academic foment but also a relatively energetic level of response from policy corners. The Report’s call for national oversight looks to have been heeded in at least some form, as the Attorney General recently announced the formation of a thirty-member National Commission on Forensic Science charged with “recommend[ing] strategies for enhancing quality assurance in forensic science units.”256 Meanwhile, the last three years have seen an array of presidentially created working groups discussing the merits of the NAS Report proposals; white papers from that process, which are in turn likely to shape pending legislation, are soon to issue.257 Legislatively, two bills have been introduced in Congress, each largely tracking the NAS Report’s proposed reform agenda with regard to theoretical and applied research and expanded standard setting in the forensic sciences, as well as the creation of national oversight capacity; neither specifically incorporates or addresses the laboratory-independence recommendation.258 To the extent the NAS Report is driving these processes—and it undoubtedly is—now is a critical time to raise a dissenting, or at least qualified concurring, voice in relation to the trajectory of the path forward.

Accordingly, this Part outlines two categories of reforms that might widen the NAS Report’s path forward to address systemic concerns. The first category takes the NAS Report’s proposals on their own terms and suggests ways to supplement them in critical respects that account for the concerns raised in Part II: the Report’s research and standard-setting agenda should encompass police and prosecution practices such as evidence gathering, testing decisions, and disclosure regimes; the Report’s “independence” recommendation should be reflected upon in light of further research and the concerns raised in Part II; and policy makers should prioritize enhancing state-level oversight as a complement, or alternative, to national oversight of the field. If the proposals are not surprising or groundbreaking, they do have the advantage of feasibility, plausibly fitting

257. See, e.g., CHARTER OF THE SUBCOMMITTEE ON FORENSIC SCIENCE, supra note 12 (describing progress of the subcommittee in creating draft reports in response to the NAS recommendations and forthcoming white paper).
258. See supra note 12.
into the reform landscape that is already taking shape in the aftermath of the NAS Report; happily, some have the advantage of potentially being more feasible than the Report’s proposed reforms. The second category of proposals is more ambitious as well as more provisional, suggesting that the goals of enhancing forensic science use and integrity challenge foundational themes of existing criminal procedure doctrine.

A. The NAS Report: A Fuller Reform Agenda

1. Research, Standard Setting, and Training.—The lion’s share of the NAS Report’s recommendations aim to enhance our confidence in the forensic sciences by broadening and deepening the knowledge base concerning both the scientific foundations of its disciplines as well as the technical aspects of forensic science practice. A corollary aim is for this research to inform the development of more formal, detailed, and binding standards of practice for analysts. So too should police and prosecutorial practices vis-à-vis forensic science be put under the proverbial microscope.

   Much like the non-DNA forensic disciplines in the years prior to the NAS Report, the subject of police and prosecutorial practices with respect to scientific evidence has been relatively neglected by U.S. researchers and, critically, by federal research grants. An extremely small community of researchers has been the recipient of such funds over the past four decades, and while its work, particularly that of Joseph Peterson, has been critical in opening the black box of forensic science at the investigative stage, the work has occurred in only a small number of jurisdictions, confounding generalization. Perhaps most disappointingly, outside the limited context of expanding use of DNA analysis from homicides and sexual assaults to the field of property crimes, there has been little follow-up research to translate observed patterns of utilization into best (or at least better) practices.

259. See supra Part I.

260. See Fiscal Year 2011 Awards, NAT’L INST. JUST., http://www.nij.gov/funding/awards/2011-table.htm (last modified June 20, 2012) (showing all NIJ grant awards, including those related to forensic science); Fiscal Year 2010 Awards, NAT’L INST. JUST., http://www.nij.gov/funding/awards/2010-table.htm (last modified Jan. 12, 2011) (same); see also Analysis of 2010–2011 Forensic Science Award Abstracts (on file with author) (showing that among 678 total grants related to Forensic Science, 363 had available abstracts to review for applicability to nonlaboratory work, and only 10.7% had any such component, almost exclusively concerning crime scene work); see also supra note 32 and accompanying text (describing limited pot of non-DNA-specific funding for forensic science).

261. For only a sample of Professor Peterson’s field-defining work, see supra notes 20, 26, 102, 112, 124, 126, 186, and 195.

Particularly glaring in its absence from the field is a substantial body of qualitative, observational studies illuminating why and how it is that the data on significant filtering of physical and scientific evidence, reported by Peterson and a small number of other researchers, came to pass. Also relatively neglected has been the issue of cognitive bias, an area susceptible to study, and which the NAS Report singled out as a priority on the laboratory side of the equation.

With respect to standard setting and incorporation of best practices into policy guidance concerning forensic science, law enforcement users lag even farther behind the laboratories that are the subject of the NAS Report. Reviews of forensic science practices that have followed the NAS Report have recognized this deficiency, but their calls for reform have not enjoyed the prominence of the NAS’s recommendations, and have not to date influenced draft-implementing legislation. By contrast, a number of jurisdictions have in recent years been convinced to adopt (sometimes voluntarily but often following legislative mandate) detailed policies informed by the best-available science concerning eyewitness identification and interrogations—two critical tools of investigation, to be sure. That similar energy has not been seen with regard to forensic evidence undoubtedly owes in large part to the comparative lack of research in that arena, though there may also be a sense that practices with respect to forensic science in the investigative or other pretrial contexts defy standardization.

As a blanket premise, this is misguided. Indeed, as with SWGs and other voluntary, nonbinding standard-setting bodies in the forensic science field, there are currently examples of voluntary efforts internal to the police and prosecution fields to propose best practices bearing on forensic evidence, though adoption has been limited. Evidence collection, for example, is a field of practices that are susceptible to far more standardization than is currently seen, particularly with regard to role differentiation and

263. To the author’s knowledge, the most illuminating research in this area with respect to police has been done in Sweden; little has been done in the United States. See supra note 209.

264. See N.Y. STATE BAR ASS’N, FINAL REPORT, supra note 117, at 98–99 (pointing out the discrepancies in standards between crime labs and law enforcement personnel performing forensic disciplines that are not regulated by the New York Commission on Forensic Science).

265. See, e.g., Eyewitness Identification, INNOCENCE PROJECT, http://www.innocenceproject.org/fix/Eyewitness-Identification.php (describing jurisdictions that have adopted requirements concerning law enforcement identification procedures); False Confessions & Mandatory Recording of Confessions, INNOCENCE PROJECT, http://www.innocenceproject.org/fix/False-Confessions.php (discussing jurisdictions that have adopted requirements concerning law enforcement interrogation procedures); see also GARRETT, supra note 2, at 270 (discussing reform momentum).

coordination among patrol, investigative, and scientific personnel. But even more investigative tasks could be treated less improvisationally than they are in the status quo. One could imagine more default standards for what evidence will be submitted prior to arrest in particular cases—similar to the sorts of investigative “checklists” that have been proposed as mechanisms to improve documentation and discovery in criminal cases.267 Similarly, one could imagine the development of standards of practice concerning the type of forensic analysis that will, in the ordinary course, be conducted in particular types of cases, taking evaluation of both resource and reliability questions out of the hands of individual investigators in individual case contexts and committing law enforcement to standards of evidentiary evaluation that are rooted in the scientific objectivity they aim to exploit in their investigations. Perhaps most simple in theory though elusive in current practice, standards of documentation of evidence gathering by police are crucial to later efforts to reconstruct and deconstruct those sometimes-formative decisions made about investigative paths taken in a case.268

More structural reforms might be entertained as well. Some have proposed that laboratories be organized to assign “independent case managers” with responsibility for interfacing with law enforcement over submission and testing decisions, thereby segregating that assessment function from analysis.269 Analogously, Rachel Barkow and others have proposed more segregation within prosecutors’ offices to separate investigative from adjudicative decision making.270 One could well imagine a more modest version of Professor Barkow’s proposal taking hold with respect to decisions concerning scientific evidence, either within police departments or prosecutors’ offices: a dedicated supervisor (or committee) could oversee decisions regarding forensic evidence submission and follow-up response to testing, thereby countering some of the effects of time pressures, habit, and cognitive bias that might limit an individual investigator’s or prosecutor’s consideration of the question. Whereas


268. See supra notes 116, 154–55 and accompanying text (discussing current deficiencies in documentation of evidence gathering, and proposals by the Technical Working Group on Crime Scene Investigation, CALEA, and outside observers to formalize documentation requirements).

269. See O’Brien, supra note 209, at 1045–46 (discussing structural debiasing options and their limitations); D. Michael Risinger et al., The Daubert/Kumho Implications of Observer Effects in Forensic Science: Hidden Problems of Expectation and Suggestion, 90 CALIF. L. REV. 1, 46–47 (2002) (suggesting the creation of an evidence control unit that is staffed by “the most highly trained and highly respected personnel in the laboratory . . . responsible not only for coordinating work among examiners in different specialties, but also for being the sole contact point between the entity requesting the test and the laboratory”).

270. Barkow, supra note 89, at 869–70.
Professor Barkow’s proposal draws inspiration from administrative law, the instinct here is instead to incorporate some of the lessons of science into the investigative and prosecutorial realm, at least where those realms are drawing on scientific products to do their work.

Finally, just as training and education are viewed in the NAS Report as a critical piece of the reform puzzle, so too with respect to police and prosecutors. Calls from criminal justice researchers to ensure that law enforcement officials fully understand “the value of forensic evidence for investigative purposes,” rather than just adjudicative advantage, should be heeded as part of the forensic science reform agenda. So too, though, should users of forensic science be trained in the risks of overreliance on science, including the risks of erroneous “cold hits” from databases and cognitive bias.

All of these proposals posit a “fix” to some of the pathologies that emerge from the portrayal in Part II. If, accordingly, they offer the promise of better, more reliable outcomes in the criminal justice system, one could flippantly say that their advantages are self-evident. But of course, even if such a claim were backed by the sort of empirical validation that has yet to occur, certainty regarding the feasibility of implementation and magnitude of benefit will ultimately be elusive. In the meantime, the demands of these proposals in terms of behavioral change, cultural shift, and resource allocation mean that they are unlikely to be attractive candidates for adoption. That said, all of them are of a piece with analogous changes that have been seen among isolated police and prosecutor organizations, often in the wake of some public breakdown highlighting the risks that Part II describes. Indeed, an advantage of the sort of sustained attention to these

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271. Id. at 896 (“In the case of agencies, the law mandates structural separation within the agency itself or aggressive judicial review of the record to ensure unbiased decision making. . . . [A] corrective modeled along the lines of the APA’s separation requirement would be feasible and desirable in the case of federal prosecutors’ offices.”).

272. Cf. Ask et al., supra note 209, at 1246 (noting that while good scientific practice dictates that “the person administering a procedure or recording an observation to the fullest possible extent be blind to the hypothesis underlying the study, to avoid any influence from preconceptions and preferences with regard to the results[,] this stringent standard is not feasible in criminal investigations,” creating a challenge for investigators who must “discount the knowledge of the case that is irrelevant to the assessment of reliability”).

273. Strom & Hickman, supra note 75, at 398 (emphasis added); see also HORVATH & MEESIG, supra note 131, at 112.

274. See Goudge, supra note 246, at 447–48 (recommending that Ontario police “be trained to be vigilant against confirmation bias in their investigative work . . . . This training is best accomplished through increased professionalism, an enhanced awareness of the risks of confirmation bias, the promotion of an evidence-based culture, and complete transparency regarding what is communicated between the police and the forensic pathologist.”).

275. See, e.g., Memorandum from David W. Ogden, Deputy Att’y Gen., U.S. Dep’t of Justice, to Dep’t Prosecutors (Jan. 4, 2010), available at http://www.justice.gov/dag/dag-memo.pdf (announcing mandatory discovery policies in federal prosecutors’ offices in wake of Brady scandals including Ted Stevens’s prosecution); Minjae Park, Davis to Law Enforcement: Report Rape Kit Backlog, TEX. TRIB. (May 30, 2012) http://www.texastribune.org/texas-legislature/82nd-legislative-
matters that this Article calls for is that such responses might be informed by research concerning best practices rather than ad hoc political priorities.

2. Independence Reconsidered.—In the view of many observers, prior to the NAS Report, independence was the *sine qua non* of forensic science reform. As a political matter, it is unlikely that any strong form of this proposal will be implemented via any federally sponsored agenda. But some modified structural reforms aimed at the ills of bias and professional control that the Report sought to remedy may well emerge. Moreover, the ideal of independence may well continue to be touted and could take hold as a matter of state-level reform. Hence, it is well to consider the lessons of this Article’s systemic view for the independence debate.

As already previewed in Part II, the account herein suggests a number of risks from independence, at least in its strongest form. At the same time, it suggests that laboratory independence might not solve some of the bias concerns by its own force that, while not addressed by the NAS Report, nevertheless bedevil the integration of scientific evidence into criminal investigations.

The twin goals of building professionalism in forensic science and creating organizational firewalls against undue investigative influence over scientific analysis should not and need not obscure some of the advantages of collaboration between forensic scientists and law enforcement personnel. One of the more important contributions of a move toward organizational reform of the sort that the NAS Report calls for could and should be to identify those areas where collaboration is most advantageous, as well as those areas that, from the standpoint of reliability and integrity of investigative outcomes, are best committed to laboratory discretion and best committed to law enforcement discretion. Where tasks like evidence collection, evidence submission, and testing priority should be the subject of reasoned inquiry into best practices, not ad hoc determination. The goal in this context should be similar to what Dan Richman has argued for in relation to other dynamics of criminal investigations: “to promote teamwork” and to enable “each player [to] orient[] to his distinct institution and professional

276. See, e.g., Giannelli, *supra* note 243, at 247–48 & nn.4–9 (citing a number of journal articles and other sources asserting that laboratories associated with law enforcement agencies suffer from inherent biases).

277. See Risinger, *Path Forward, supra* note 106, at 239 (“[A]ny hope of congressional action to coerce or encourage the establishment of independence of forensic labs from law enforcement control is also dead on arrival.”); Jamie Downs, Speech at Texas Criminal Justice Integrity Unit–Texas Forensic Science Commission, Joint Conference on Forensic Science (June 4, 2012), available at https://www.dropbox.com/sh/z0adceaub177maq/kNqQCO_LWy/TCJJU-FSC% 202012%20Forensic%20Science%20Seminar%20Video/FSS2012-auditorium-2.rm (reporting that working groups are unlikely to agree on independence recommendations).
culture” such that “interaction presents less a risk of capture than an opportunity for both productive collaboration and mutual monitoring.”

In other words, laboratory independence is an institutional arrangement that requires thoughtful calibration, which in turn will likely require more information than we currently possess about best practices in the division of responsibilities and collaboration between and among investigators, prosecutors, and crime laboratory personnel. Here, then, is another area where empirical work should be funded and pursued. Researchers might, for instance, investigate both quantitative and qualitative measures of how successfully law enforcement works with crime laboratories (for example, both crime-scene-response times from a crime-laboratory-centered evidence collection team, and investigators’ narrative accounts of how effectively they work with such personnel). Of particular value might be comparisons that could be generated in those jurisdictions that use a variety of forensic service providers (for example, splitting evidence submission between a departmental crime laboratory and, when resources demand it, an independent private laboratory). Further research opportunities are presented by individual jurisdictions that take up the NAS Report’s call to alter the organizational or administrative structures of their crime laboratories to enhance “independence.” Such decision points offer natural experiments to observe and measure the effects of such changes.

3. Oversight.—In proposing the formation of NIFS to oversee forensic science at the national level, the NAS Report ran head-on into a long-entrenched resistance from the law enforcement and forensic science communities alike to outside regulation of the field. Perhaps the only proposal that would garner more opposition would be oversight of law enforcement and prosecutors themselves. And yet, to a certain extent, the logical takeaway from Part II is that the actions of those critical players in the production and use of forensic science cannot be immune from scrutiny if the goal of enhancing the contributions of scientific evidence is to be taken seriously.

From the standpoint of the systemic view advanced by this Article, the proposed NIFS (and its apparent, at least partial embodiment in the recently announced National Commission on Forensic Science) suffers from two deficiencies. The first is substantive. Oversight in the form of research, standard setting, and training that focuses on laboratory-level concerns and excludes questions of evidence procurement and usage will miss, and may confound, dynamics that are critical in ensuring that scientific evidence makes positive contributions to the criminal justice system. While it is far too soon to render a verdict on the National Commission on Forensic Science, it is clear that the field must find ways to ensure that its contributions are not undermined by the very measures that are intended to enhance its role.

278. Richman, supra note 17, at 813.
279. See supra Part I.
280. See supra note 256 and accompanying text.
Science, the announced scope of its mission—“enhancing quality assurance in forensic science units”—suggests the possibility that it might embody the very narrowest conception of what counts as forensic science oversight, taking the NAS Report’s scope as a ceiling rather than a floor.281

The second and related deficiency is structural. In service of the NAS Report’s goals of standardization and uniformity, national oversight sacrifices geographic and professional footholds in the thousands of state and local jurisdictions where its standard setting will most often play out. Indeed, as the Report acknowledges, “[o]versight of the forensic science community and medical examiner system will sweep broadly into areas of criminal investigation and prosecution”;282 yet, by design, national oversight lacks a certain context sensitivity necessary for understanding much less overseeing or reforming the work of law enforcement. Consider evidence collection and preservation, for example, which is an important issue for forensic science oversight, but which is closely tied to issues of institutional organization, local practices, and even state law.283

Policy makers should therefore consider supplementing national oversight with state-level institutes of forensic science (SIFSSs). SIFSSs could be administered through NIFS, or could be created through a more robust version of the existing Coverdell grant program, which conditions federal funds for state forensic science programs on the designation of a state agency responsible for receiving and investigating complaints stemming from the conduct of crime laboratories.284 Apart from the Coverdell mandate, a number of states have already created forensic science commissions, which might well be appropriate, existing entities to serve as SIFSSs. Models range from bodies with narrow mandates to accredit or otherwise create standards for laboratory practice, to entities having investigative functions as well, with authority to investigate complaints of forensic science negligence or

281. Notice of Establishment of the National Commission on Forensic Science and Solicitation of Applications for Commission Membership, 78 Fed. Reg. 12,355, 12,356 (Feb. 22, 2013) (detailing responsibilities that track NAS Report’s professionalization goals and also including a focus on “the intersection of forensic science and the courtroom”).

282. NAS REPORT, supra note 7, at 17.


misconduct on their own motion or through the receipt of complaints. 285 While none of these entities possesses a mandate to engage in oversight of police and prosecutors, those with broader investigative functions have done important work in assessing the role of forensic evidence in the construction and investigation of a case, in some instances exposing deficiencies in the manner in which police and prosecutors have responded to scientific evidence. 286 These state-level entities are well positioned to develop recommendations for areas of need or opportunity for research, or even for best practices in regard to the types of issues raised by Part II. Of course, proximity also carries the risk of undue influence, and it may well be that a SIFS entity is, though more knowledgeable about local context, far less politically inclined to push for change. 287 One way to address this concern is to conceive of SIFSs as advisory bodies for a national oversight entity, responsible for supplying local data that could inform proposed (and financially incentivized) standards emanating from a national entity.

B. The Criminal Justice Conversation Must Account for Forensic Science and Upstream Dynamics—Particularly Assuming a World of More Early Science

An implicit though important lesson of Part II is that criminal procedure doctrine currently has little role to play in the dynamics that this Article aims to highlight. True, the Fourth Amendment formally serves as a pervasive regulatory backdrop for the work of law enforcement in the investigative stage of a case, particularly where gathering and exploiting stuff is concerned—that is to say, in relation to search and seizure—as is fundamentally the case in relation to all physical evidence in a case. But for reasons described above—in particular, because of diminished warrant strictures and weakened remedies—Fourth Amendment doctrine serves as a fairly light constraint and an even weaker affirmative mandate in regard to law enforcement activity around forensic evidence. 288 Other areas of crim-

285. See generally Goldstein, supra note 23 (discussing models).

286. See generally, e.g., TEX. FORENSIC SCI. COMM’N, supra note 120 (discussing an expert report that found that the conclusions made by Fire Marshall Vasquez in the Willingham arson case were unscientific, and recommending a greater role for prosecutors and defense attorneys, as well as judges, in acting as gatekeepers to ensure that forensic expert testimony should not be allowed unless conclusions made by those experts are reliable).


288. An exception to this rule is the barrier that the Fourth Amendment may create to the suspicion-less collection of DNA specimens for purposes of populating the CODIS databases. The Supreme Court appears likely to take up the question of whether the Fourth Amendment bars such collection and retention on a showing of probable cause to arrest this Term. See Maryland v. King, 133 S. Ct. 1, 2 (2012) (granting a stay of a lower court judgment against the state of Maryland in
inal procedure doctrine are even less relevant: while the Fifth, Sixth, and Fourteenth Amendments speak (haltingly) to police work in relation to eyewitness identification and suspect interrogations, notions of due process are essentially viewed as irrelevant to scientific evidence absent evidence of fabrication or framing in the course of an investigation. **Brady** doctrine entitles the defense, as a feature of due process, to favorable information within the control of the state, but this has to date been limited to known rather than potentially exculpatory evidence and continues to be tethered solely to trial.

This is reflective of more foundational commitments revealed in the prevailing majorities (and occasionally, vocal dissents) in United States Supreme Court cases over the last half century of evolving constitutional criminal procedure. American criminal procedure doctrine is fairly preoccupied with policing a declared line between the inquisitorial and accusatorial features of our criminal justice system—the former attending the investigative and charge-screening work that police and prosecutors do in constructing a case, and the latter attending the trials in which that evidence is tested. Closely related, of course, is a tradition of substantial discretion enjoyed by police and prosecutors in their core pretrial tasks (investigation and charging, respectively), which has led courts to exercise minimal oversight in regard to decision making by those individuals. Indeed, what oversight exists is always carefully and expressly calibrated so as not to disrupt these lines: warrant doctrine cabins police and prosecutorial

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290. See supra note 146.

291. See Moore v. Illinois, 408 U.S. 786, 794–95 (1972) (finding “no constitutional requirement that the prosecution make a complete and detailed accounting to the defense of all police investigatory work on a case” and therefore holding that the prosecution was not required to disclose nonexculpatory statements of witnesses).

292. McNeil v. Wisconsin, 501 U.S. 171, 181 n.2 (1991) (“Our system of justice is, and has always been, an inquisitorial one at the investigatory stage . . . .”).

discretion with magistrate review, but only so much;\textsuperscript{294} \textit{Brady} doctrine has been doggedly constrained;\textsuperscript{295} and, at least until recently, the Court has roundly resisted the notion that the plea bargaining which displaces trial practice in the overwhelming majority of criminal cases should enjoy something like the scrutiny that attends courtroom proceedings.\textsuperscript{296}

Embracing the centrality of scientific evidence in the criminal justice system and understanding that evidence (as the NAS Report does) as a distinctive evidentiary product created under conditions of scientific rather than forensic legitimacy challenges this settled understanding, at least with respect to the role of forensic evidence in the inquisitorial, investigative stages of criminal proceedings.\textsuperscript{297} Others precede me in making this sort of observation in the context of the accusatorial stages of criminal adjudication, and in doing important work to think through how modes of scientific inquiry might appropriately reshape the adversarial modes of legal inquiry with respect to forensic science.\textsuperscript{298} The concerns raised herein push on a different front, however. The question is whether quite so much of what transpires in the investigative, inquisitorial stages of our criminal justice system is appropriately committed to the unfettered discretion of police and prosecutors, at least where forensic evidence is concerned. It is fair to ask why some standards to promote attitudes and practices consistent with scientific values—including, in particular, the value of inquiry—should not be imposed upon those investigative stages and decisions that rely upon scientific evidence. Critically, whereas police and prosecutors surely do possess comparative competence in making the mine-run of evaluations and decisions in the development, evaluation, and funneling of cases prior to

\begin{itemize}
\item\textsuperscript{294} See, e.g., Hudson v. Michigan, 547 U.S. 586, 601–02 (2006) (concluding that a violation of the “knock-and-announce rule” did not require suppression of evidence); Franks v. Delaware, 438 U.S. 154, 155–56 (1978) (holding that the Fourth Amendment requires a hearing be held on a defendant’s request when the defendant makes a substantial preliminary showing that a false statement was made in a warrant affidavit and that allegedly false statement was necessary to the finding of probable cause).
\item\textsuperscript{295} Connick v. Thompson, 131 S. Ct. 1350, 1369 (2011) (Scalia, J., concurring) (characterizing the claim of right to potentially exculpatory forensic evidence as lying on the “frontier” of \textit{Brady} doctrine); United States v. Ruiz, 536 U.S. 622, 633 (2002) (rejecting an extension of \textit{Brady} to the pretrial plea stage); United States v. Bagley, 473 U.S. 667, 674–75 (1985) (emphasizing that \textit{Brady} supplements rather than supplants adversarialism).
\item\textsuperscript{296} See Lafler v. Cooper, 132 S. Ct. 1376, 1397 (2012) (Scalia, J., dissenting) (“In the United States, we have plea bargaining a-plenty, but until today it has been regarded as a necessary evil.”).
\item\textsuperscript{297} See BRIAN FORST, ERRORS OF JUSTICE: NATURE, SOURCES, AND REMEDIES 41 (2004) (arguing that scientific evidence problematizes the adversarial–inquisitorial line); Susan Haack, \textit{Irreconcilable Differences?}: \textit{The Troubled Marriage of Science and Law}, 72 LAW & CONTEMP. PROBS. 1, 12–13 (2009) (contrasting the core business of science and that of a legal system); see also Dist. Attorney’s Office for the Third Judicial Dist. v. Osborne, 557 U.S. 52, 74 (2009) (“DNA evidence will undoubtedly lead to changes in the criminal justice system. It has done so already.”).
\item\textsuperscript{298} See generally, e.g., Giannelli, supra note 47 (arguing that there is more than adequate support for the NAS Report’s conclusions that meaningful reform requires an independent agency); Mnookin et al., supra note 3 (discussing the need for a research culture in the forensic sciences); Murphy, supra note 28 (challenging the new orthodoxy of forensic science).
\end{itemize}
trial, any such claim with regard to forensic evidence is far less clear—all the more so in a post-NAS Report world that acknowledges a professionally and ethically distinct field attending the production of such evidence.

What might be the consequences of pressing on the inquisitorial–accusatorial line that has tended to demarcate the appropriate boundaries of judicial oversight? An adequate answer depends on much fuller examination than can be undertaken in the confines of this Article, but some provisional thoughts are in order. Fourth Amendment doctrine might take a more demanding view of the warrant requirement where forensic evidence is concerned. Imagine, for example, a requirement that exculpatory facts concerning forensic evidence be detailed in an arrest warrant if they would be credited by a reasonable officer—a requirement that goes beyond current doctrine. As a matter of incentives, such a requirement might force more reflection on the part of investigators, as well as naturally bring additional perspectives into the process, since more demanding warrant requirements are likely to encourage supervisory or prosecutorial review.299 The right of defense access to favorable evidence would also be the subject of reconsideration under these different assumptions. The notion that information concerning forensic evidence should not be subject to disclosure at the earliest possible stage—i.e., promptly after it is available to the state—seems a tactically driven, uncomfortable fit with the goals of greater exploitation of science in the criminal justice system, all the more so in a world in which forensic analysts are understood as independent scientific contributors to the adjudicative process.300 More innovatively, we might imagine expanded opportunities for defendants to affirmatively test the science-supported premises of an investigation, including (as a small number of states have instituted) a right to compel testing of evidence not developed by the state.301

299. See Richman, supra note 17, at 782 (“The more technically demanding a warrant process is, the more a prosecutor can use her statutory role to scrutinize an agency’s investigation.”); see also Findley & Scott, supra note 211, at 384 (discussing that the best way to overcome the issue of tunnel vision is to preserve all notes and evidence for a third-party advisory investigator to analyze); O’Brien, supra note 209, 327–28 (finding that forcing individuals to articulate why a guilt hypothesis might be wrong mitigated confirmation bias, but that forcing individuals to generate multiple hypotheses had no such effect); cf. Heath et al., supra note 151, 5–22 (providing examples of a number of organizational practices that may effectively repair the cognitive shortcomings of individuals).

300. Indeed, a small number of states have adopted discovery reforms reflecting a robust concurrence with this view. See Paul C. Giannelli, Forensic Science, 33 J.L. MED. & ETHICS 535, 539–40 (2005) (arguing that full pretrial discovery disclosure should be required in criminal cases).

301. See 725 ILL. COMP. STAT. ANN. 5/116-5 (West 2008) (permitting a defendant in any case where DNA may be relevant to the defense investigation or at trial to move the court for an order requiring the state police to conduct certain genetic tests or to make certain comparisons or searches within the database); GA. CODE ANN. § 24-4-63 (2010) (providing similar rights); AM. BAR ASS’N, supra note 266, at 140 (providing similar rights through Standard 16-8.3); N.Y. STATE BAR ASS’N, FINAL REPORT, supra note 117, at 99 (arguing for provision of similar rights); see also Lynch, supra note 17, at 2117 (arguing that the pretrial phase of a case might bear more adversarial process).
For the time being, the Supreme Court has registered its resistance to rethinking any fundamental features of criminal procedure doctrine in light of the influence of forensic science, although its posture has been more “wait and see” than “nevermore.” Thinking outside existing criminal procedure boxes is therefore more than a proverbial academic exercise. As the Supreme Court watches and state legislatures and courts pursue more innovative responses to the pressures of forensic science on our settled understandings of competence, deference, and oversight in criminal investigation and adjudication, it becomes all the more important to develop a principled approach to reconciling these accommodations within existing criminal procedure theory and doctrine.

Conclusion

The NAS Report has fundamentally altered the landscape for forensic science in the criminal justice system. This is to be celebrated. But the accomplishments of the Report must not obscure the vast terrain that remains untouched by the path of reform that it charts. This Article has aimed to illuminate one important aspect of that currently neglected territory: namely, the manner in which upstream users of forensic science—police and prosecutors—will select priorities, initiate investigations, collect and submit evidence, choose investigative techniques, and charge and plead cases in ways that have critical and systematic, though poorly understood, influences on the accuracy of forensic analysis and the integrity of its application in criminal cases. By broadening our understanding of how forensic science is created and used in criminal cases—by adopting a systemic perspective—we begin to see a raft of yet unaddressed issues concerning the meaning of scientific integrity and reliability in the context of investigative decisions that are by and large committed to the discretion of decidedly unscientific actors. Moreover, we see that decisions with respect to oversight of one corner of the system—the laboratory, in the case of the NAS Report—cannot be made in isolation, lest responses from other corners render that oversight ineffective or counterproductive. Undoubtedly, this Article has raised at least as many questions as it has answered. This is for the best. The account here only scratches the surface of the sorts of systemic concerns that we might reflect upon, and that hopefully the active reform conversations will take up, as we commit our criminal justice system to more and more institutionally entrenched forensic science.

302. See Dist. Attorney’s Office for the Third Judicial Dist. v. Osborne, 557 U.S. 52, 74–75 (2009) (pointing to “active[]” efforts by state governments to manage the “challenges” and “opportunities” to the criminal justice system posed by DNA as reason to act cautiously in constitutionalizing a right of access to evidence).