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SENATE JUDICIARY COMMITTEE HEARING
STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES
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Thank you Chairman Leahy, Ranking Member Sessions, and members of the Committee. My name is Peter Neufeld and I am the co-director of the Innocence Project, affiliated with the Cardozo School of Law, which co-director Barry C. Scheck and I founded in 1992. The project is a national litigation and public policy organization dedicated to exonerating wrongfully convicted people through DNA testing and reforming the criminal justice system to prevent future miscarriages of justice, while at the same time enhancing public safety. I am extremely pleased to participate in this hearing reviewing the recommendations and conclusions of the National Academies of Science's (NAS) report *Strengthening Forensic Science in the United States: A Path Forward.* I am grateful for the invitation to testify before you today to share how faulty forensic science has impacted the work of the Innocence Project and our response to the NAS report.

The Innocence Project, the law enforcement community, prosecutors, and members of this committee all share the same core beliefs – that wrongful convictions are contrary to the basic principle of criminal justice; that forensic science plays a vital role in solving crime; that many forensic disciplines are in need of further validity and reliability research; and that valid and reliable forensic analyses will strengthen prosecutions, assist law enforcement in investigations, and improve public safety by ensuring that the true perpetrators of crime are identified and punished. We are proud to have collaborated frequently with police and prosecutors to identify and prosecute the real perpetrator. The first priority of our work and our advocacy has always been enhancing the truth seeking

function and reliability of criminal justice, which in turn advances the cause of public safety.

The development of DNA testing has allowed the Innocence Project to help exonerate 242 factually innocent Americans – 17 of whom were on death row awaiting execution. These 242 exonerees represent how the American criminal justice system can fail the people she was designed to protect. Once exonerated, we then deconstruct the wrongful convictions looking for common causes while distinguishing "one off" situations. Our research into these wrongful convictions yielded a stunning insight: unvalidated and/or improper forensics was the second-greatest contributing factor to those miscarriages of justice. Those cases demonstrate what the members of the NAS committee unanimously recognized: that the lack of scientific underpinning in commonly used non-DNA forensic science has the significant potential to mislead the criminal justice system away from the real perpetrators of crime.

When a crime's true perpetrator is not identified, communities are less safe: among the first 241 post-conviction DNA exonerations nationwide, the real perpetrators were identified in 105 cases. In many of those cases, the real perpetrator had gone on to commit additional violent crimes while an innocent person was in prison. These perpetrators were convicted of at least 90 serious, violent crimes – including 56 rapes and 19 murders – that they committed after innocent people were convicted for their earlier crimes. Many more were implicated in violent crimes but were never convicted because the statute of limitations on the crime had run out. Each one of these rapes, murders and other violent crimes could have been prevented if law enforcement had the tools to identify the correct suspect in the first place.

Although DNA is unparalleled in its ability to dispositively prove innocence or guilt, biological evidence that can be subjected to DNA testing is only available and affords proof in a minority of violent crimes. Some crime lab directors estimate that a mere 10% of the cases lend themselves to DNA testing; consequently, DNA testing cannot help us identify the truth in the remaining 90 percent of cases, many of which involve some form

of forensic evidence. Therefore, the need to be as sure as possible about the validity and reliability of non-DNA forensic evidence is essential for public safety and critical to the integrity of criminal justice.

However, the NAS report alarmingly observes that many of the commonly used non-DNA forensic assays have not been scientifically validated, and there is no formal apparatus in place to do so for new and emerging forensic technologies. Many forensic techniques – such as hair microscopy, bite mark comparisons, latent fingerprint comparisons, firearm/tool mark analysis and shoe and tire print comparisons – have never been sufficiently validated to permit an examiner to assert that a particular defendant is the "source" of the trace or impression evidence recovered from the crime scene. Moreover, there has been almost no research to establish the limits and measures of performance and to address the sources of variability and potential for inadvertent bias, despite the fact that these types of studies are routine in other applied sciences such as medicine and engineering. Finally, even for forensic disciplines that have been properly validated, imprecise or exaggerated expert report writing and testimony can lead to the admission of erroneous or misleading testimony.

In contrast, DNA typing had its start in the nation's premier academic research centers, and scientists validated its analytical methods before it was ever applied to the investigation of crime. When it was in its relative infancy, the NAS embarked on not one but two thorough reviews of empirical data to establish standards for the interpretation of casework results and set limits on what an analyst could reliably and scientifically say about the probative value of the DNA results. From research lab to clinical lab and from clinical lab to crime lab, forensic DNA testing developed under the same scrutiny given to medical devices. So when it entered the courtroom, there was already a tremendous body of basic and applied research reported in peer reviewed literature in highly respected scientific journals, amassed over a number of years, to support and validate it.

In contrast to DNA, most of the assays and techniques used in law enforcement – for example, tool mark and bite mark comparisons – have no other application. They were

developed for the purpose of investigation, prosecution and conviction and took on a life of their own without being subjected to the rigors of the scientific process. Simply as a matter of process, they often came on line in casework and in courts without following the fundamental principles of the scientific method described in Chapter 4 of the NAS report. Their assertions are accepted and repeated as fact, leaving juries with the false impression that the evidence is more scientific than it is.

In medicine, The National Institutes of Health (NIH) and National Science Foundation (NSF) serve the vital function of developing research agendas and funding a body of basic and applied peer reviewed research studies. Once that research has been completed and extensively reviewed, another conflict free entity – the Food and Drug Administration (FDA) – evaluates the newly developed product to test its reliability and to set standards and parameters for its use with patients before it is brought on line. Then, when the approved device gets to the clinical laboratory, the Clinical Laboratory Improvement Act mandates quality assurance practices to protect the integrity of the results in each laboratory.

However, many forensic disciplines are not buttressed by a vast body of basic and applied research; nor are their data presented in the premier peer review publications. For many of the pattern, trace and impression evidence forensic disciplines, there was no funding for basic academic research or even a research agenda created by an entity free of the appearance of conflict of interest to test for validity and reliability.

For the vast majority of forensic assays and techniques, there never was a conflict-free competitive grant program funding basic and applied research, nor an independent assessment of validity or reliability, nor enforceable standards in place to insure the integrity of the result in a laboratory setting. No entity comparable to the FDA ever scrutinized the forensic devices and assays, nor were crime laboratories subject to mandatory accreditation and forensic service practitioners subject to certification. Enforceable parameters for interpretation of data, report writing, and courtroom testimony have also never been developed. Yet as I speak, and despite the findings of the

NAS report, these assays and technologies are being used in investigations, prosecutions and convictions daily in this country despite their potential to mislead police, prosecutors, judges and juries away from the real perpetrators of crime.

Inadequate science leaves evidence open to attack and may mean that police, prosecutors, judges and juries across the country are at risk of being mislead away from the real perpetrators of crime. It erroneously steers the course of investigations, thus needlessly pursuing false leads and wasting precious resources and creating the need to reopen and renew investigations and litigate post-conviction appeals. That leads to countless manpower hours lost and significant, needless resource costs to law enforcement.

Conventional wisdom once stated that a sound defense and cross-examination would enable courts to properly assess the strength of forensic evidence. However, the NAS report unequivocally states, and the post-conviction DNA exoneration cases clearly demonstrate, that at least in criminal cases, the courts have not functioned well as gatekeepers of questionable scientific evidence, and given the lack of scientific knowledge among judges and legal practitioners, "judicial review, by itself, will not cure the infirmities of the forensic science community."[1] Moreover, we cannot expect the courts to sort through or overcome the patchwork of standards, or to assess for themselves the reliability of a device or technique, no matter how widely used. Because of the fragmentation of the criminal justice system and in particular the fragmentation of the forensic science community, given the lack of a sound scientific foundation for many forensic technologies and assays, 50 states may be operating under 50 definitions of "science" – and therefore 50 standards of justice.

It is essential that the validity of forensic techniques be established upstream of the court, before any particular piece of evidence is considered in the adjudicative process. There is simply no substitute for requiring the application of the scientific method to each forensic assay or technology, as well as parameters for report writing and proper testimony, as

[1] Strengthening Forensic Science in the United States: A Path Forward, Committee on Identifying the Needs of the Forensic Science Community, The National Academies Press (2009), p. 12.

part of the formal system of vetting the scientific evidence we allow in the courtroom. Indeed, for our justice system to work properly, standards must be developed and quality must be assured before the evidence is presented to the courts.

In *Melendez-Diaz v. Massachusetts*, the Supreme Court recently ruled that laboratory reports are considered testimony, and as a result defendants have the right to cross-examine the crime lab personnel who created them. Writing for the majority, Justice Scalia cited the NAS report's analysis of the shortcomings of forensic sciences in explaining the court's ruling:

> "Confrontation is one means of assuring accurate forensic analysis…[it] is designed to weed out not only the fraudulent analyst, but the incompetent one as well. Serious deficiencies have been found in the forensic evidence used in criminal trials. One commentator asserts that '[t]he legal community now concedes, with varying degrees of urgency, that our system produces erroneous convictions based on discredited forensics.'"[2]

The legitimate concerns about the burdens this decision may pose would be significantly alleviated by an improved forensic science system. The prosecutor's reliance on forensic assays that had been properly validated and of demonstrated reliability, carried out by crime lab personnel complying with enforceable standards would give both defense attorneys and prosecutors clarity about the particular strength of evidence being introduced in the courtroom. The participation of scientists who have no stake in the outcome of a court proceeding will not only raise the rigor of the science but will also boost public confidence, which, as the NAS report notes, is important because "if juries lose confidence in the reliability of forensic testimony, valid evidence might be discounted, and some innocent persons might be convicted or guilty individuals acquitted."[3]

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[2] *Melendez-Diaz v. Massachusetts*, 557 U.S. ___ (2009), p. 13.
[3] Strengthening Forensic Science in the United States: A Path Forward, Committee on Identifying the Needs of the Forensic Science Community, The National Academies Press (2009), p. 37.

The NAS notes that, despite these ongoing problems, neither the FBI nor the National Institute of Justice (NIJ) have, over the years, "recognized, let alone articulated, a need for change or a vision for achieving it."[4] Although the FBI and NIJ were aware of the lack of evidence-based validation for several forensic disciplines going back many years, through both Democratic and Republican administrations, no corrective action was taken. For over 40 years, the FBI used composite bullet lead analysis in its investigations; it was only after the NAS released a report that found bullet lead analysis to be "unreliable and potentially misleading"[5] that it was retired in the summer of 2005. Much of the research sponsored by the NIJ over the years in non-DNA forensic disciplines assumed validity.

The NAS report recognized the critical mission of DOJ to enforce the law, defend the interests of the United States according to the law, and the essential role law enforcement institutions play in that mission. However, the NAS concluded: "The entity that is established to govern the forensic science community cannot be principally beholden to law enforcement. The potential for conflicts of interest between the needs of law enforcement and the broader needs of forensic science are too great."[6] Unfortunately, the Scientific Working Group (SWG) system that the DOJ relies on to set forensic standards illustrates that, despite their good faith, that potential conflict of interest exists. Largely composed of professionals who are active members of the law enforcement community or forensic laboratories, there is not only an overlap between SWG membership and the groups to whom SWG guidelines are directed, but SWG members represent the very organizations for which the SWG is supposed to set standards and practices. Judge Harry Edwards, Senior Circuit Judge and Chief Judge Emeritus for the U.S. Court of Appeals for the D.C. Circuit, and the Co- Chair of the NAS report, underscored this point in his testimony before this Committee on March 18, 2009, saying that SWGs are, "as a general matter, of questionable value."[7]

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[4] Ibid., p. 16.
[5] Forensic Analysis: Weighing Bullet Lead Evidence. The National Academies Press (2004), p. 5.
[6] Strengthening Forensic Science in the United States: A Path Forward, Committee on Identifying the Needs of the Forensic Science Community, The National Academies Press (2009), p. 17.
[7] *Hearing before the Senate Judiciary Committee on Strengthening Forensic Science in the United States: A Path Forward*, 111th Cong., 1st Session, Testimony of Judge Harry T. Edwards, pp. 4 and 5.

In clinical science, the people who stand to benefit from a new product entering the marketplace are not given the authority to make grant award decisions at NIH or the authority to pass judgment on the product's efficacy at the FDA. If the pharmaceutical companies took the reigns of the research or product certification process, there is no doubt that the drugs or devices will become approved and put online for distribution more quickly. However, healthy inquiry would give rise to questions as to how comprehensively the products were reviewed given the benefit the reviewers would receive from their passage. For the same reasons we do not allow automobile makers to set vehicle performance standards. There is no justification for the nation accepting a lesser standard of oversight and conflict free independence for criminal justice than for the public's health.

It is critical that we all understand the real world consequences of the forensic problems. These were not incidents reflective of one bad actor, or one wayward jurisdiction; our review of the nation's DNA exonerations showed that 72 forensic analysts from 52 different labs, across 25 states had provided testimony that was inappropriate and/or significantly exaggerated the probative value of the evidence before the fact finder in either reports or live courtroom testimony.[8] According to the NAS report, the shortcomings in education, training, certification, accreditation, and standards for testing and testifying that contributed to wrongful convictions in those cases threaten the integrity of forensic results across virtually all non-DNA forensics.[9]

The NAS cited Brandon Mayfield's case as one that should "surely signal caution against simple, and unverified, assumptions about the reliability of fingerprint evidence."[10] Brandon Mayfield was arrested as a material witness in the Madrid Bombings of March 2004. Several FBI fingerprint experts "matched" his print to fingerprints lifted from a plastic bag containing explosive material found at the crime scene and swore in affidavits that they were "100% certain" that the prints belonged to Mayfield. When the Spanish

[8] Garrett, Brandon L. and Neufeld, Peter J.,Invalid Forensic Science Testimony and Wrongful Convictions(March 16, 2009). Virginia Law Review, Vol. 95, No. 1, (2009), p. 9.
[9] Strengthening Forensic Science in the United States: A Path Forward, Committee on Identifying the Needs of the Forensic Science Community, The National Academies Press (2009), p. 4 and 5
[10] Ibid., p. 105.

police ultimately arrested the real source of the fingerprint, the FBI initially defended their "mistake" as the result of poor digital image. Obviously, the two FBI experts could not have been 100% certain if the image was poor.[11] Several major investigations followed, including one conducted by the Inspector General of the Department of Justice that found that mistakes were made, in part, because the FBI which does not require a pre-determined minimum number of characteristics to draw a conclusion.[12]

Roy Brown was convicted of a 1991 murder and spent 15 years in prison for a crime he did not commit. His conviction was secured in large part by unvalidated and improper forensic bitemark analysis, which has been shown to have "a disturbingly high false-positive error rate."[13] Despite the fact that a leading forensic odontologist examined the bitemarks before trial and excluded Roy, the prosecution moved forward with testimony from a local dentist who stated that the seven bitemarks found on the victim's body were "entirely consistent" with Roy. Although that mark had two more upper teeth than he had, Roy was sentenced to 25 years to life.

While in prison, Roy suffered from liver disease and was in need of a liver transplant for which he was not eligible as an inmate. Dying in prison, he was determined to continue his fight for freedom. After obtaining legal documents through the Freedom of Information Act, Roy found material not disclosed to the defense at the time of trial that enabled him to solve his own case. He wrote to Barry Bench, the man who was implicated in those documents, and told him that DNA would identify him as the murderer once he secured post-conviction DNA testing. Bench committed suicide five days after the letter was mailed. Roy's freedom did not come until 2007, when DNA testing conclusively proved that Barry Bench committed the crime. A few days after his release, Roy received a liver transplant and lives today as a witness to how unvalidated and unreliable forensic evidence can not only take a person's freedom, but nearly his life.

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[11] Ibid., p. 105, footnotes 75 and 76, which indicated that contextual bias and confirmation bias played an important role in the misidentification.
[12] Office of the Inspector General, Oversight and Review Division, U.S. Department of Justice. 2006. *A Review of the FBI's Handling of the Brandon Mayfield Case*, p.11.
[13] C. Michael Bowers, Problem-Based Analysis of Bitemark Misidentifications: The Role of DNA, 159S *Forensic Science International*, S107 (2006).

Unlike Mayfield and Brown, reform will come too late for Cameron Todd Willingham. Willingham was convicted of intentionally setting fire to his house in which he and his three young daughters resided. The three girls perished in the fire. Since there was no real motive attributed to Willingham, the most significant issue in the case was whether the post-fire observations of the debris supported a finding of arson as opposed to accident. Willingham was convicted in 1993 of capital murder and sentenced to death on the strength of expert testimony provided by the state's arson investigator. He was executed by the State of Texas in 2004. The arson investigator's conclusions were based on "generally accepted," albeit an unscientific, understanding of accelerants. In the last five years, those conclusions were proven to be without scientific basis by the top arson investigators in the nation, all of whom concluded that the fire was accidental in origin. Based on evidence unearthed and published last week[14], the state of Texas most likely executed an innocent man. With your support, we will minimize the possibility that tragedies like Cameron Todd Willingham, Brandon Mayfield and Roy Brown and those endured by the nation's other 241 – and counting – exonerees and their families will be needlessly repeated, and we will significantly enhance the quality of justice in the United States.

The NAS report provided a critical wakeup call regarding the serious shortcomings that exist in the analysis of forensic evidence and laid out a roadmap to addressing the major improvements in the forensic system necessary to ensure the most accurate evidence – and therefore justice – possible. However, while the report's findings were a source of alarm about the criminal justice system's forensic practices, we must recognize that it provides the system with a tremendous opportunity. Namely, its recommendations will allow us to increase the accuracy of criminal investigations; strengthen criminal prosecutions; bring justice to victims; conserve resources so law enforcement can dedicate them toward finding true perpetrators; and protect the innocent from wrongful conviction.

[14] Gann, David, "Trial by Fire," *The New Yorker*, September 7, 2009.

Therefore, the Innocence Project supports the NAS report's primary recommendation that a National Institute of Forensic Science (NIFS) be established. We believe that there is an approach to the creation of a NIFS that is cost effective, and that does not create needless bureaucracy, by making use of existing federal and state resources. To ensure this agency's objectivity and scientific integrity, and to prevent any real or perceived institutional biases or conflicts of interest, it is paramount that NIFS be a non-partisan, independent agency.

For that reason, the Innocence Project suggests that NIFS be established within the Department of Commerce. The Commerce Department has existing expertise in research and standard setting through the National Institute of Standards and Technology (NIST). Housing NIFS at the Department of Commerce will allow scientists to conduct the science research and standard setting in the best traditions of the scientific method with the independence that will ensure the integrity of the forensic evidence used to guide the criminal justice system.

We agree with the NAS report that "[g]overnance must be strong enough – and independent enough – to identify the limitations of forensic science methodologies and must be well connected with the Nation's scientific research base in order to affect meaningful advances in forensic science practices."[15] Therefore, the Innocence Project would urge Congress to consider establishing NIFS outside of NIST, so that it has the sufficient stature within the Department to conduct its critical work without interruption.

The Innocence Project strongly believes that this body cannot operate in a vacuum. A system must be established that would solicit, encourage, and incorporate the suggestions and recommendations of the entire universe of affected stakeholders. NIFS will need the expertise of law enforcement to set the priorities on which tools are most important and therefore should be tackled first, for example. It will need to work with constituencies from throughout the criminal justice system to ensure that its standards are phased-in in a

[15] Strengthening Forensic Science in the United States: A Path Forward, Committee on Identifying the Needs of the Forensic Science Community, The National Academies Press (2009), p. 2-19.

way that is practical and achievable and to minimize disruption to the system.

NIFS should focus on three critical priorities: (1) basic and applied research to assess validity and reliability of existing forensic assays, devices and technologies and to discover new forensic technologies, (2) establish national standards for application of assays, devices and technologies to insure quality and integrity of results, and (3) implementation of standards and broader quality assurance through accreditation and certification programs. It should identify research needs, establish priorities, and precisely design criteria for identifying the validity and reliability of various extant and developing forensic assays and technologies. We believe that NIFS could work with the NSF to create new competitive grants, or reallocate existing grant monies, toward forensic science research that could be conducted at colleges and universities throughout the country.

Using the data generated by research, this entity should then undertake a comprehensive assessment of the validity and reliability of each assay and technology to develop standards by which the practitioners must adhere and under which their reporting and courtroom testimony must operate. The Innocence Project would then support the promulgation of standards by rulemaking to ensure that the public is given adequate notice and opportunity to comments on proposed standards.

We also believe that the Department of Justice, working with NIFS' standards, be responsible for ensuring compliance and enforcement. A central part of that endeavor must include mandatory accreditation and certification. Laboratories that seek accreditation must have quality controls and quality assurance programs to ensure their forensic product is ready for the courtroom. Individual practitioners must meet certain training and education requirements, continuing education, proficiency testing, and parameters for data interpretation, report writing and testimony. So that the DOJ does not needlessly undertake a significant expansion of its responsibilities, existing independent accrediting and certifying bodies could handle the accreditation and certification processes, with the approval of DOJ.

Voluntary accreditation of laboratories and voluntary certification of analysts have, of course, been part of the forensic system for years. However, many of the accredited labs and certified practitioners have, nevertheless, been reporting results that the NAS concludes – and DNA exonerations have confirmed – have never been scientifically validated for their accuracy or precision. Accreditation only provides assurance that protocols for laboratory operations, evidence handling, personnel management, review of lab reports, and monitoring of testimony takes place; and certification only monitors education, experience, training, and completion of a skills-based test. Neither practice is determinative of the correctness of the forensic product.

Because of both a lack of resources and the current fragmented allocation of funding streams, most crime labs are focused on eradicating backlogs in addition to new casework. In addition, current funding is not adequate to allow necessary research to be conducted to improve the various disciplines. This both delays justice and hinders the ability of a practitioner to conduct his or her work as well as possible. Therefore, the Innocence Project would support an assessment of the resource needs of the forensic science community – and those who employ forensic evidence – to allow us to fully grasp the magnitude of the problem and work to make sure that suitable funds are appropriated to address the work that needs to be done.

Additionally, we believe that a program promoting the research and development of both existing and new forensic disciplines will create new industries and jobs, and promote public-private partnerships, just as the development of DNA technologies and their applications has done.

Society as a whole benefits when the most reliable and probative evidence is used to ascertain truth. Implementation of the National Academy's recommendations will make criminal investigations and prosecutions more scientific and thus more reliable. Public safety will be enhanced, and, perhaps most importantly, justice will be more assured.