Forensic Evidence in Court

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A Case Study Approach

SECOND EDITION

Christine Beck Lissitzyn

Marc Wm. Vallen

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Contents

Table of Cases

List of Figures

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—CBL

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—MWV

Introduction

This textbook is designed to examine the process by which forensic evidence is used in the court system through case studies and the case law that has resulted when forensic evidence has been introduced. The text is designed for any student of law, criminal justice, or political science who wishes to understand both the power and the limitations of forensic evidence. The primary focus will be on criminal trials, in which forensic evidence is frequently introduced to prove one of two critical issues: (1) is the defendant the perpetrator of the crime, or (2) what happened at the crime scene?

As you will see, forensic evidence is frequently more reliable in excluding a defendant as the perpetrator (for example, the fingerprint on the weapon is not the defendant's or the blood at the scene is not the defendant's) than in positively identifying the defendant (for example, the hair sample or shoeprint at the scene is "consistent with" a class of individuals that includes the defendant but also many other individuals).

You will also learn how the rules of the U.S. court system limit the ways forensic evidence may be introduced in a trial, the types of expert "opinions" that may be offered in evidence, and the limitations on the ability of an appellate court to use its own judgment in deciding whether forensic evidence should have been introduced or excluded.

The public fascination with forensic evidence was captured with the advent of DNA testing. DNA evidence was introduced in 1995 in the trial of O.J. Simpson, in which a jury failed to convict Simpson of the murder of his wife, Nicole, and Ron Goldman, a waiter, despite a mass of DNA evidence pointing to his guilt. Due in part to the introduction of evidence that some DNA evidence may have been deliberately planted and testimony about a racist detective, the jury concluded there was "reasonable doubt" about Simpson's guilt. A different jury, in a subsequent civil trial, on virtually the same evidence, found based on a "preponderance of the evidence" that Simpson was liable in monetary damages for killing Nicole and Ron Goldman. This may be due in part to the fact that the standard of proof that a criminal jury uses requires a higher level of proof than that of a civil jury.

Television shows such as *CSI* depict detectives processing forensic evidence and getting a "hit" on a suspect. In most jurisdictions, the personnel who process forensic

evidence hold degrees in chemistry or other scientific studies and work separately from the police force. Several types of forensic evidence, such as DNA and fingerprints, are either processed by commercial laboratories, as in the case of DNA, or are processed in part by computer systems that yield reports that must be read and evaluated by a fingerprint expert before a "match" can be declared. DNA, in particular, is almost never processed overnight and the DNA backlogs in many states have led to substantial questions about the justice system's ability to render a speedy verdict.

However, juries may expect forensic evidence and this expectation, sometimes called the "*CSI* effect" may present problems at trial, similar to earlier tendencies of juries to simply accept as fact the opinion of an expert witness due to the "White Coat Effect." Today juries are sophisticated enough to realize that both the prosecution and the defense pay for their expert witnesses, who often give conflicting reports. However, many defendants who rely on public defenders may not be able to afford to pay an expert witness, which presents another access to justice issue.

In 1993, the use of forensic evidence in court was radically changed by the U.S. Supreme Court in a civil case involving whether a drug caused birth defects. This case, *Daubert v. Merrell Dow Pharmaceuticals*,[1] stated that in deciding whether to admit scientific testimony under the Federal Rules of Evidence, the party proposing to offer the evidence must show that it meets certain tests that demonstrate that it is based on the scientific method, tested, and reliable. This test subsequently was incorporated into a revised federal rule of evidence and subsequently adopted in most state rules of evidence. Therefore, it applies in almost all federal and state criminal cases today. This inquiry often requires attorneys and judges to understand the scientific method and statistics, which many do not.

Although *Daubert* was a civil case, the language of the Supreme Court opinion applies to any case — civil or criminal — in which forensic evidence is proffered. And it set off thousands of subsequent court hearings on admissibility and appeals based on convictions where the defendant contended that the evidence either should or should not have been admitted under the *Daubert* standard.

One important issue we will examine is the Supreme Court's "alternate test" that scientific evidence can also be admitted if it is "generally accepted" in the scientific community. This has led to a dispute over defining the scientific community. Is it composed of academics or law enforcement? Another dispute is whether "generally accepted" is the same thing as "generally admitted." As you will see when we examine handwriting analysis, expert opinions as to who wrote a questioned document have been admitted routinely for years (for example, in the trial of the Lindbergh baby kidnapping in 1935) but that does not mean that handwriting analysis has ever been subjected to the scientific method. It has been generally admitted (and continues to be) but it is not generally accepted as scientifically reliable.

Forensic evidence almost always requires an "expert witness," someone who either processed the evidence and testifies to what he or she concluded, or an expert hired

1. 509 U.S. 579 (1993).

to evaluate the work or report of a forensic laboratory and give an opinion about what the test results mean. The expert witness must be qualified by training and/or experience before he or she can testify, which is another battleground we will examine.

The language of the opinion permitted by courts varies based on history and the ability of a jury to look at the evidence and draw their own conclusions. For example, historically, fingerprint experts have been permitted to declare that a fingerprint they have examined is a "match" to the defendant's fingerprint and that it was made by the defendant and no one other than the defendant. Yet DNA experts typically give an opinion, for example, that the chance a DNA sample taken from a rape kit matches anyone other than the defendant is 1 in 300 million. Why this difference? You will see that in part it is because fingerprint experts were permitted to give their "match" opinion long before DNA evidence was available. The other reason is that fingerprint evidence is not used for anything other than criminal investigations, whereas DNA evidence resulted from rigorous scientific studies as the human genome was mapped. Finally, a jury is frequently shown a picture of the crime scene fingerprint and the defendant's fingerprint. They can see for themselves the similarities. Of course, the crime scene print is frequently smudged and incomplete, so the ability of a jury to make a meaningful comparison is often impaired.

We will also look at areas of forensics that are considered "junk science," rather than true science. Junk science is a term used for a type of forensic evidence that has not been subjected to scientific testing and validation. As we will see, the question of how much testing is sufficient is not a bright line. Polygraph, for example, is generally viewed as reliable in measuring blood pressure and sweat. But can these physical measurements correspond to truthfulness? Does the fact that polygraph reliability varies widely based on the training and experience of the person who formulates the questions mean that it is not science because it cannot be replicated by anyone? Bitemark analysis is an example of something that sounds like science, but has never been tested. Can bitemarks conclusively identify a person? Unlike fingerprints, which have been subjected to a test (albeit flawed) of 50,000 fingerprints, bitemarks have never been tested at all. Can a person be identified by his smell? This is another topic that may or may not be reliable. Do MRIs of certain areas of the brain indicate the defendant is violent or dangerous? We will examine these and similar contentions.

The U.S. Constitution bears on a number of important issues relating to forensic evidence. A major issue is whether a defendant has the right to confront and cross-examine the individual who processed a forensic sample. In the case of DNA, for example, the prosecutor generally offers a report conducted by an outside laboratory and asks an independent expert to explain its significance. The issue arose in 2009 in a case called *Melendez-Diaz v. Massachusetts*,[2] in which the U.S. Supreme Court held that a criminal defendant has a constitutional right to confront the lab technician who ran a forensic test used as evidence against him. The particular facts related to a test of a white substance found on the defendant and identified by a laboratory report

2. 557 U.S. 305 (2009).

entered into evidence as cocaine. In this case, the results of the report were admitted to prove a fact in issue — that the powder was cocaine — but the defendant was not able to cross-examine the analyst who tested the powder to determine what test was performed or whether the analyst used any judgment in interpreting the results.

The Supreme Court stated that forensic evidence is not immune from manipulation, particularly by scientists who may feel pressure from a law enforcement official to alter evidence in a manner favorable to the prosecution. It cited a commentator whose research showed over 60% of overturned criminal convictions involved invalid forensic testimony.[3] Finally, it said that the ability to confront and cross-examine the analyst could expose incompetent analysts:

> Contrary to respondent's and the dissent's suggestion, there is little reason to believe that confrontation will be useless in testing analysts' honesty, proficiency, and methodology — the features that are commonly the focus in the cross-examination of experts.[4]

This case could have far-reaching implications for an already-overburdened forensic laboratory system if individual lab technicians must leave work to testify in court. Following *Melendez-Diaz*, the Supreme Court has held that the Confrontation Clause also requires the analyst who tests blood alcohol levels[5] to be present for cross-examination, but rejected the argument that the analyst who tests a DNA sample at an outside laboratory must appear. Although the U.S. Supreme Court in *Williams v. Illinois*[6] later held in a plurality opinion that DNA test results were not "testimonial" and therefore did not trigger the Confrontation Clause, at least one court has restricted that opinion to its unusual facts and declined to follow it, holding that at least certain personnel involved in DNA testing must be present to testify. This issue can be expected to have widespread implications in the future.

In 2009, the National Research Council of the National Academies released a report entitled *Strengthening Forensic Science in the United States: A Path Forward* (referred to in this text as the NRC Report).[7] The report resulted from a congressional mandate to the National Academy of the Sciences to study both research and the technical practice of the forensic science community. It was influenced, no doubt, by a widely reported decision by a federal court in Philadelphia that banned a fingerprint expert on the ground that fingerprint matching was not sufficiently scientifically reliable. Although the opinion was later withdrawn, calls for research about fingerprinting promptly ensued.

The NRC Report stated that fingerprinting and 11 other areas of forensic evidence (other than DNA) had not been sufficiently scientifically validated. It also concluded

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3. Brandon L. Garrett and Peter J. Neufeld, "Invalid Forensic Science Testimony and Wrongful Convictions," *Virginia Law Review* 95, no. 1 (2009): 14.

4. *Melendez-Diaz*, *supra* at 321.

5. *Bullcoming v. New Mexico*, 564 U.S. 647 (2011).

6. 132 S. Ct. 2221 (2012).

7. The National Academies Press, Washington, D.C., www.nap.edu.

that testing and training in forensic examination varied widely among the states. It made 13 recommendations, including the creation of a federal agency to "establish and enforce best practices for forensic science professionals and laboratories," to be called the National Institute of Forensic Science. It called for standardized laboratory reports and terminology and the development of quantifiable measures of uncertainty in the conclusions of forensic analyses.

The report highlighted a "major problem" in the forensic science community:

> The simple reality is that the interpretation of forensic evidence is not always based on scientific studies to determine its validity. This is a serious problem. Although research has been done in some disciplines, there is a notable dearth of peer-reviewed published studies establishing the scientific bases and validity of many forensic methods.[8]

Substantial funds will have to be found to conduct peer-reviewed scientific studies, studies that may be of use only to the crime enforcement community. Without support from the academic scientific community, it may be difficult to achieve the type of scientific testing this board recommended.

Subsequent to this report, Congress established an Office of Forensic Science Improvement and Support (OFSIS) to direct forensic science-related research and standard-setting. The Department of Justice is to direct accreditation, certification, and compliance enforcement of the standards set by OFSIS. As of June 26, 2014, the Department of Justice and the U.S. Commerce Department's National Institute of Standards and Technology had named 17 academic researchers and forensic science experts to a Forensic Science Standards Board. And by May 2016, this board had issued some standards for public comment as well as a number of calls for research studies, including one for Forensic Document Examination Friction Ridge (fingerprint) analysis, and Firearms and Toolmarks.

This text will present a number of case studies in which forensic evidence was presented and contested in court. Some, such as the O.J. Simpson case, the Amanda Knox case, and the JonBenét Ramsey case may be familiar to you. Others, such as the kidnapping and murder of the Lindbergh baby, the Sam Shepherd murder trial, and the Richard Crafts "wood-chipper murder" took place before DNA profiling, yet involved forensic issues such as blood spatter analysis, crime reconstruction, and handwriting analysis. We will also refer frequently to a Connecticut "cold case," *State v. Edward Grant*, in which Grant was convicted of murdering Penney Serra twenty-five years after the crime. The arrest and conviction were triggered by a routine run of fingerprints in cold cases through the AFIS computer fingerprint matching system.

Here is a short summary of the case of *State v. Grant*.[9] Edward Grant was convicted in 2002 for the 1973 murder of Concetta "Penney" Serra in a New Haven, Connecticut, garage. Serra had driven her car into the garage and parked on the top floor. At some

8. NRC Report, p 8.
9. A detailed case record appears in the Appendix to this text.

point, her attacker got into her car, a fight ensued with a knife, and his blood, which was Type O, was left in the car (and in a trail throughout the garage, believed to have been left by the attacker as he looked on foot for his own car after the crime). The blood was typed but DNA profiling was not yet invented. Serra then fled across the lot and tried to escape up a staircase, which was locked at the top. Her body was found stabbed at the foot of the stairs. She was not raped and nothing was taken from her car. Based on these facts, investigators believed the murder was a "crime of passion" by someone Serra knew. They interviewed three former boyfriends and put them in a lineup for possible identification by some people who had been in the garage. A prior boyfriend of the victim was identified the following day in a lineup, but he was ruled out based on his blood type. Another was arrested and charged with the crime, but charges were dropped on the eve of trial when it turned out his blood type did not match the Type O blood trail either.

Investigators lifted one clear fingerprint from a tissue box on the floor behind the driver's seat. The print did not match any of the fingerprints on card files in New Haven at the time. (The Automated Fingerprint Identification System, AFIS, was not yet in operation.) They also found a handkerchief four flights down in the garage, which they initially thought was unconnected to the crime. They later connected it based on a blood trail in the garage, which they believed was the attacker's as he searched the garage trying to find his own car. Blood typing showed the victim's blood type — A — was found where Serra was killed, but Type O blood, believed to be the attacker's, was present in the trail and in the car.

The case remained a "cold case" for almost twenty-five years until Chris Grice, a fingerprint examiner in the Connecticut State Forensic Laboratory (who had been involved as one of the investigators in New Haven twenty-five years prior), did a cold case run of the fingerprint from the tissue box through AFIS. As we will see in the "Fingerprint Analysis" chapter, the AFIS report was a series of numbers identifying people. Grice then needed to pull actual prints and visually compare them. Ed Grant was not number 1 on the list. However, Grice eliminated the higher numerical "matches" and identified Grant as the print on the box.

The *Grant* case is unique in that the defendant was convicted based on two pieces of forensic evidence and virtually nothing else. There was no evidence that he had ever met Penney Serra. No one saw the fight in the car, Penney's flight to the stairs, or the stabbing. The few witnesses at the time — other drivers and the garage ticket taker — were inconsistent in their descriptions of a man driving erratically in the garage. The ticket taker said he was handed a bloody parking ticket by a driver in a car that did not match any Grant ever owned and the man spoke with a foreign accent. Grant had no accent.

Grant's attorneys did not deny that the forensic tests were accurate, but argued that there was no evidence to prove that the fingerprint was impressed on the tissue box at the time of the crime, so even if it was Grant's, it didn't prove he was in the car the day Serra was murdered. Nor was there any testimony that proved the handkerchief was Grant's or that it was dropped at the time of the crime. They also

questioned how only one small spot of "blood" could have remained testable after years of investigators moving the handkerchief from place to place under conditions that deteriorated the rest of the spots beyond testing. None of these arguments were persuasive to the jury.

Grant's main argument on appeal was that his arrest warrant lacked probable cause because it was based on a fingerprint on a moveable object — the tissue box in the car — and there was no proof that the fingerprint was placed on the tissue box at the time of the crime. The court was not persuaded and denied Grant's appeal:

> In most of the cases relied on by the defendant, the courts held that fingerprint evidence with a possible innocent explanation was insufficient to support a finding of guilt *beyond a reasonable doubt.* The mere possibility of an innocent explanation for evidence connecting a defendant with a crime does not, however, preclude a finding of probable cause.[10]

This text will examine the *Grant* case and many other court cases where forensic evidence has been contested in the following primary areas:

- DNA
- Fingerprints
- Firearms and Ballistics
- Toolmarks
- Computer Forensics
- Eyewitness Identification
- Blood Spatter
- Handwriting

This text will also discuss these questions:

- How does the way crime scene investigators handle evidence affect whether it is admissible in court?
- What is circumstantial evidence? Is it as good as direct evidence? Is forensic evidence direct evidence or circumstantial?
- Does a jury have to believe a forensic expert witness?
- Why does an appeals court allow an evidence ruling of a trial court to stand, even where the appeals court disagrees with the decision of the trial court?
- How can a prisoner who believes he is innocent get access to crime scene DNA for post-conviction testing?
- Is the judge better than the jury in deciding whether scientific testimony is reliable? Why not just let all forensic evidence in and let the lawyers cross-examine the opposing experts?

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10. 286 Conn. 499, 518, 944 A.2d 947, 962 (2008).

- How does the Constitution apply to the defendant's right to confront and cross-examine experts who tested forensic evidence?
- When does the possible prejudice to a defendant of introducing evidence justify excluding it?
- How does the fact that a forensic fingerprint examiner must use his subjective judgment in comparing fingerprint samples affect its admissibility?
- When must an expert simply present forensic evidence to a jury (such as handwriting) and let the jury decide if it matches, rather than giving an opinion?
- How have evidentiary principles been applied to digital evidence?
- Is firearm and toolmark evidence appropriate for expert testimony?
- How have advances in psychological sciences affected the admissibility of both eyewitness identification and expert testimony on eyewitness identification?