

**THE ADMISSIBILITY AND RELIABILITY
OF FINGERPRINT IDENTIFICATIONS
IN FEDERAL COURT**

by

Emanuel N. Mouganis

Forensic Science
University at Buffalo
Professor Jay
Spring 2007

INTRODUCTION TO FINGERPRINT IDENTIFICATION

In today's era of forensic science, fingerprints collected from crime scenes, on items used in the commission of crimes, as well as bodies of victims, can be used to identify suspects, victims and other persons who touched a surface of concern within a criminal investigation. A fingerprint is an impression of the friction ridges of all or any part of the finger.¹ A friction ridge is a raised portion of the epidermis on the palm and fingers or skin, consisting of one or more connected ridge units of friction ridge skin.² Essentially, fingerprint identification is the process of comparing questioned and known friction skin ridge impressions.³ Fingerprint identification is considered a forensic science (sometimes called forensics), derived from the Latin word "forensis", which means "before the forum" or "related to the courts." In forensic investigations, the two most common types of fingerprints are patent prints and latent prints. Patent prints are friction ridge impressions that are easily visible to the human eye, and most often can be photographed without the need for digital enhancement.⁴ Latent fingerprints (or sometimes called "chance prints" by criminal investigators) differ from patent fingerprints in the sense that they are hidden or invisible to the naked eye and require electronic, chemical or physical processing techniques to permit the visualization.⁵

In the last century, fingerprint identification has become an integral investigative technique within police agencies and has gained considerable recognition from the courts for its remarkable reliability in identifying persons. The scientific basis for fingerprint identification has been shown by the empirical study and statistical analysis of billions of human and automated fingerprint comparisons. In fact, there has never been an instance where two human beings have been shown to have identical fingerprints, even among

¹ Peer Review Glossary of the Scientific Working Group on Friction Ridge Analysis, Study and Technology (SWGFAST)

² Id.

³ Ashbaugh, David R. (1991) "Ridgeology". *Journal of Forensic Investigation* Vol 41 (1) ISSN 0895-173X

⁴ (SWGFAST)

⁵ Id.

identical twins.⁶ This dynamic of virtually infallible reliability, has undisputedly been the primary reason nearly every police agency around the world utilizes fingerprint identification as their primary identification technique in law enforcement.⁷

STANDARD OF ADMISSIBILITY FOR FINGERPRINT IDENTIFICATION

In criminal prosecutions, prosecutors will often offer evidence of latent fingerprint identification as proof of a defendant's identity. Almost instinctively, defense counsel will motion to preclude such proof, by contending that the evidence fails to conform to the standard for admitting expert testimony. The standard for expert testimony in Federal Court is governed by Federal Rule of Evidence 702, which states:

[I]f scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

In the landmark decision of Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993), and supported by the subsequent decision of Kumho Tire Co., Ltd. v. Carmichael, 526 U.S. 137 (1999), the Supreme Court has determined and articulated clear standard for analyzing forensic evidence under the rule. In essence, *Daubert* set forth a non-exclusive checklist for trial courts to use in assessing the reliability of scientific expert testimony. The specific factors explicated by the Daubert Court are (1) whether the expert's technique or theory can be or has been tested - that is, whether the

⁶ Ashbaugh, David R. (1991) "Ridgeology". *Journal of Forensic Investigation* Vol 41 (1) ISSN 0895-173X

⁷ Id.

expert's theory can be challenged in some objective sense, or whether it is instead simply a subjective, conclusory approach that cannot reasonably be assessed for reliability; (2) whether the technique or theory has been subject to peer review and publication; (3) the known or potential rate of error of the technique or theory when applied; (4) the existence and maintenance of standards and controls; and (5) whether the technique or theory has been generally accepted in the scientific community. The Court in *Kumho* held that these factors might also be applicable in assessing the reliability of nonscientific expert testimony, depending upon "the particular circumstances of the particular case at issue."

UNITED STATES v. MITCHELL

In *United States v. Mitchell*, 365 F.3d 215 (3rd Cir. 2004), the Third Circuit considered a case where in 1991, two men with handguns robbed an armored car employee of approximately \$20,000 as he entered a check cashing agency in North Philadelphia. The robbers then got into a car driven by a third person, engaging in gunfire with the armored car employees as they fled. The getaway car, which was stolen, was found abandoned near the scene of the crime. At trial, the government sought to prove that Mitchell and two other accomplices had committed the robbery. Although there was testimony and circumstantial evidence linking Mitchell to the crime, the most controversial evidence against Mitchell were his fingerprints recovered from the getaway car.

When the government and the defense counsel have not stipulated to the reliability of the government's expert witness presenting testimony on latent fingerprint identification, District Courts will conduct a *Daubert* hearing on the admissibility of the proposed testimony, under Fed. R. Evid. 702. The hearing will focus on the reliability of the government's expert witness testimony regarding the fingerprint identification, which is purporting to link a defendant to a particular crime. At a *Daubert* hearing, the court

will categorically determine if the expert witness is qualified in their respective field under the five enumerated factors. At Mitchell's *Daubert* hearing, the court concluded that, all of the six government expert witnesses, and four expert witnesses for Mitchell, were qualified experts and capable of giving their expert testimony to the court. The government's experts offered testimony that focused on the biological aspects of fingerprints, primarily on the prenatal development of friction ridges, opining that unique arrangements of friction ridges develop in the womb within a matter of months after conception, and on the widespread acceptance of latent fingerprint identification in the medical community due to the anatomical and cellular bases for the permanence of friction ridge arrangements. The government experts further went on to testify to the virtual lack of similarity found between corresponding fingerprints among individuals, even in extensive studies involving identical twins. As a matter of procedure, the experts explained that once a fingerprint examiner analyzes the characteristics of the latent print and then compares the suspect's prints, evaluates whether they match, and then has the evaluation verified by another examiner. In conclusion, the government experts jointly argued that their propositions established a well grounded scientific foundation for latent fingerprint identification as required by *Daubert* and that it was their opinion that positive identifications can be made from fingerprints containing sufficient quantity and quality of ridge detail.

Mitchell's experts at the *Daubert* hearing raised many of the same arguments that others have argued against the admission of forensic fingerprint identifications in the wake of the establishment of the *Daubert* standard. One argument was that the research on the issue has not established a scientific error rate for forensic fingerprint identifications or even that each person's fingerprints are unique. Additionally, Mitchell's experts directed the court's attention to the fact that fingerprint examiners operate without uniform objective standards regarding such matters as how many characteristics two prints must have in common before they may be considered a match.

DAUBERT FACTORS

Until the recent and groundbreaking case of *Mitchell*, similar challenges by defendants have not gotten much traction from the courts. Previously, courts have generally held that expert testimony on fingerprint identification satisfies the *Daubert* standard for admission.⁸ Nevertheless, probably the most interesting aspects of the Third Circuit's *Daubert* analysis were in its evaluations of the (1) the error rate and (2) the testing of the underlying hypothesis that positive identification can be made from fingerprints that contain a sufficient quantity of matching comparison points and sufficient quality of detail.

In making fingerprint identifications, the forensic science examiner will rely on a subjective sliding-scale standard that balances the quantity of the matching comparison points and the quality of the matching comparison points and the quality of detail of the latent print. However, the court acknowledged that this is flexible, subjective standard "makes meaningful testing elusive, for it is difficult to design an experiment to test a hypothesis with unspecified parameters." Consequently, the court determined that there are only two things that can rescue the technique of fingerprint identification from the apparent failure of testability: First, the examiner can testify to how much detail (quantitative and qualitative) was necessary for the particular identification at issue; and second, any testing directed toward falsifying the premise that a greater or equal amount of detail is sufficient to make an identification will serve as an attempt to falsify the adequacy of the identification standard actually used. To further articulate the second idea, the court said that an examiner's hypothesis (for example that 14 points of comparison at quality Level 2 is enough to make an identification) can be shown to be false if, at such standard, more than one rolled print matches the latent print.

⁸ United States v. Crisp, 324 F.3d 261 (4th Cir. 2004)

In spite of the Mitchell court's stringent adequacy of identification standard, the court however, decided that since all the fingerprint identifications performed were performed by the FBI, utilizing their computerized comparison system that will test a latent print against their entire database which is comprised of surveys in all 50 states, the District of Columbia, Canada, and the United Kingdom, the FBI's computerized comparisons did provide a measure of testing of a match at whatever quantity/quality standard is employed, thus satisfying the reliability element of the Daubert standard.

The Third Circuit paid particular attention to the ability of latent fingerprint identification to effect a positive identification, or conversely, the ability to effect false identification. In addressing this issue, the court determined that the evidence of the error rate of false positive or false negative identifications were "immaterial to the Daubert admissibility of latent fingerprint identification offered to prove positive identification because it is not probative of the reliability of the testimony for the purpose for which it is offered (i.e., for its ability to effect a positive a positive identification. Essentially, with respect to the court's determination error rate of fingerprint identification, the court indicated that it was persuaded by the government's proof that the error rate for false positives is near zero. This contention was interjected by the government when the evidence presented showed that when the FBI sent out two latent prints recovered from the getaway car in its survey, no jurisdiction matched the prints to anyone other than the defendant after comparing the prints to over 70 million 10-print records. Although the court did point out that it is quite possible that fingerprint examiners sometimes do make false positive identifications on proficiency exams, these mistakes reflect the competency of the examiner. In conclusion, the court's ruling provides that the science of latent fingerprint identification is reliable enough to pass muster under the scrutiny of the rigorous Daubert standard because the error rate is zero or very near zero, which makes the possibility of a false positive identification very unlikely. Therefore, a defendant challenging the reliability or admissibility of fingerprint identifications can only challenge competency of the expert presenting testimony on the fingerprint identifications. However, the science of latent fingerprint identification has been firmly

established within the courts as a reliable method for identification and can not be challenged under Daubert.

THE MITCHELL HEARING

The Mitchell decision has undisputedly had a significant impact on premises that a fingerprint identification can be challenge on admissibility grounds. In fact, all federal courts now conduct a “Mitchell hearing” when the testimony of a fingerprint examiner is called into question. At a Mitchell hearing, the court will only hear arguments made on: (1) the level of detail of the fingerprint examination (2) the uniqueness and permanence of the fingerprint examination, and (3) the actual examination of the fingerprints.

LEVEL OF DETAIL

In assessing the level of detail of a fingerprint examination, the fingerprint examiner refers to three levels of detail that can be observed on mature fingerprints. At the first level, the examiner looks at the overall pattern of a fingerprint, as described in whorl patterns, loop patterns, and arch patterns.⁹ On the second level, the examiner looks for points (referred to as “Galton points”) on the ridges that the latent and rolled prints have in common.¹⁰ The third test, considered to be most intricate analysis in assessing detail, consists of the examiner analyzing the sweat pores and their structures of a particular individual and then determining if there are corresponding features observed in the fingerprint of question.¹¹

UNIQUENESS AND PERMANENCE

⁹ Ashbaugh, David R. (1991) “Ridgeology”. *Journal of Forensic Investigation* Vol 41 (1) (p53) ISSN 0895-173X

¹⁰ Id. at 74

¹¹ Id. at 83 (quoting: FBI, *An Analysis of Standards and Fingerprint Identification* (1972))

The uniqueness and permanence requirement of a Mitchell hearing is predicated on a two premise theory - that each person's fingerprints are unique and they are permanent.¹² The uniqueness component can be supported by presenting statistical evidence of the low probability of finding two people with identical prints when compared with many other prints,¹³ such as fingerprint identification done using the FBI's computer-based fingerprint system (the Automatic Fingerprint Identification System, or AFIS). The permanence component can be supported by providing medical studies showing that an individual's fingerprints do not change over time once mature. Specifically, that when an individual is 17 weeks old, the friction ridges in their prints basically become permanent and fixed on the surface of the skin.¹⁴

EXAMINATION OF FINGERPRINTS

In questioning the integrity of the actual fingerprint examination, all fingerprint examiners employ a process known as "ridgeology" or ACE-V, an acronym for "analysis," "evaluation," and "verification."¹⁵ During the analysis stage, the examiners look at the unknown or latent print and note both the "anatomical aspects" of the fingerprint and the clarity of the print. The next stage involves the objective comparison of ridge formations and other fingerprint characteristics, to determine that the overall patterns of configuration are in agreement between the individual's fingerprint and the latent fingerprint. The last stage of ACE-V deals with the verification of the original fingerprint identification examiner's conclusion. To verify the conclusion of the examiner, the whole process must be completed a second time by another examiner, who is both unaware of the results of the initial findings and has reached a completely independent and identical conclusion. In the scientific community, this process is known as peer review and represents a vital aspect of objective scientific testing.

¹² Id. at 50-80

¹³ Id. at 126

¹⁴ Id. at 67

¹⁵ U.S. Dep't Justice, Fed'l Bur. Investigation, *The Science of Fingerprints: Classification and Uses*, 170

JUDICIAL NOTICE

One final issue, which is relevant in the admission of fingerprint identifications, is the court's ability to take judicial notice of fingerprint identifications under Federal Rule of Evidence 201(b), which states:

[A] judicially noticed fact must be one not subject to reasonable dispute in that it is either (1) generally known within the territorial jurisdiction of the trial court or (2) capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned.

Under the rule, in situations where the government and the defendant stipulate to the uniqueness and permanence of the latent print identification, the court may undoubtedly take judicial notice of the positive identification of the fingerprint. However, when the uniqueness of the fingerprint is in dispute, the court may still take judicial notice of the uniqueness if the court has been presented and satisfied with an empirical study recognized in the scientific community, showing that the probability of two different individuals having the same fingerprints being impossible or virtually impossible. Additionally, the court may take judicial notice of the permanence of the fingerprint if the court is presented with and satisfied by, a study of the same nature, showing that the individual's print is mature in development and that the individual has not sustained any type of deep or serious wounds that could have altered the fingerprint.

HARMLESS ERROR ANALYSIS

Nevertheless, under *Mitchell*, if the judge errors by taking judicial notice of two disputed premises underlying latent print identification, the error is considered harmless and therefore, subject to the harmless error analysis if there is sufficient evidence supporting the judge's ruling.