

# Fingerprint Challenges Annotated Bibliography 2017

New York State Defenders Association

By Ken Strutin

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## INTRODUCTION

Developments in courtrooms, academia and government institutions are laying the groundwork for defense challenges to fingerprint matches.<sup>1</sup> Most noteworthy are the [Inspector General's Report](#) in the Brandon Mayfield case;<sup>2</sup> the Massachusetts Supreme Court decision in [Patterson](#);<sup>3</sup> a flurry of expert, scholarly and judicial criticism;<sup>4</sup> the exhortations of [Strengthening Forensic Science](#)<sup>5</sup> in 2009 and the [PCAST](#)<sup>6</sup> report in 2016 and other reports;<sup>7</sup> and the exposition of

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<sup>1</sup> See Simon A. Cole, [Grandfathering Evidence: Fingerprint Admissibility Rulings from Jennings to Llera Plaza and Back Again](#), 41 Am. Crim. L. Rev. 1189 (2004) (discussing the problems of validating forensic methods with history and judicial acceptance rather than scientific inquiry); Tamara Francita Lawson, [Can Fingerprints Lie?: Re-weighing Fingerprint Evidence in Criminal Jury Trials](#), 31 Am. J. Crim. L. 1 (2003) (discussing fingerprint science, misidentification and examiner error); Lisa J. Steele, [Defense Challenge to Fingerprints](#), 40 Crim. L. Bull. 213 (2004) (discussing (1) recovered evidence; (2) the expert witness; (3) the science of fingerprint identification; (4) methodology used in case on trial; (5) the expert's opinion; and (6) legitimate access). See generally Chp 16 Fingerprints in [Scientific Evidence](#) (Lexis-Nexis 2016).

<sup>2</sup> See [Review of the FBI's Handling of the Brandon Mayfield Case](#) (OIG 2006).

<sup>3</sup> See [Commonwealth v. Patterson](#), 445 Mass. 626, 840 N.E.2d 12 (Mass. Sup. Jud. Ct. 2005).

<sup>4</sup> See, e.g., Hon. Alex Kozinski, [Preface—Criminal Law 2.0](#), 44 Geo. L.J. Ann. Rev. Crim. Proc. iii (2015) ("Fingerprint evidence is foolproof. Not so. Identifying prints that are taken by police using fingerprinting equipment and proper technique may be a relatively simple process, but latent prints left in the field are often smudged and incomplete, and the identification process becomes more art than science. When tested by rigorous scientific methods, fingerprint examiners turn out to have a significant error rate." Id. at iv). See generally Sue Russell, [Why Fingerprints Aren't the Proof We Thought They Were](#), Pacific Std., Sept. 20, 2012.

<sup>5</sup> See [Strengthening Forensic Science in the United States: A Path Forward](#) (NAS 2009). See also Jacqueline McMurtrie, [Swirls and Whorls: Litigating Post-Conviction Claims of Fingerprint Misidentification After the NAS Report](#), 2010 Utah L. Rev. 267. See generally Ken Strutin, [Strengthening Forensic Science: The Next Wave of Scholarship](#), LLRX, Nov. 23, 2009.

<sup>6</sup> See [Report on Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods](#) (PCAST 2016). See generally Ken Strutin, [President's Council of Advisors on Science and Technology Casts Doubt on Criminal Forensics](#), LLRX, Mar. 19, 2017.

<sup>7</sup> See, e.g., [Fingerprint Inquiry Report](#) (Scotland 2011) (Discussing limits on conclusions offered by fingerprint examiners in court: 38.13. "The ability of any examiner to 'individualise' without the potential for any error at the

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fingerprint exonerations.<sup>8</sup> This collection of materials highlights key opinions,<sup>9</sup> significant articles and online resources concerning accuracy, reliability, and validity<sup>10</sup> as well as authenticity of fingerprint evidence.<sup>11</sup> It also includes information on scientific and technological developments pushing the frontiers of biometric analysis.<sup>12</sup>

## FEDERAL CASES

[Canen v. Chapman](#), 847 F.3d 407, 408-409 (7th Cir. 2017)<sup>13</sup>

"Lana Canen was convicted of felony murder on August 10, 2005 in Indiana state court. Over

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claimed level of one person in the whole of human history is not scientifically validated. Fingerprint examiners do not presently base their conclusions on validated statistics of the incidence of variation in friction ridge details in the population. Their opinions on 'sufficiency' are derived from personal assessments founded in training and personal experience. The second proposition is, accordingly, one that cannot be substantiated." Id. at 683 (footnote omitted).

<sup>8</sup> See Simon A. Cole, [Prevalence and Potential Causes of Wrongful Conviction by Fingerprint Evidence](#), 37 Golden Gate U. L. Rev. 39 (2006); Simon A. Cole, [More Than Zero: Accounting for Error in Latent Fingerprint Identification](#), 95 J. Crim. L. & Criminology 985 (2005). See also [Cases May Be Jeopardized After Orange County Fingerprint Analyst Accused of Mishandling Evidence](#), WFTV, Feb. 8, 2017 ("An Orange County [Florida] Sheriff's Office fingerprint analyst is off the job and under investigation after being accused of mishandling evidence, clerical errors, failure to identify prints and mislabeling of print cards. Because of the accusations, thousands of criminal cases are under the microscope. Defense attorneys will have to review more than 2,600 cases with ties to the analyst."); Rene Stutzman, [Public Defender Reviewing 1,675 Cases Amid Fingerprint Investigation](#), Orlando Sentinel, Feb. 8, 2017.

<sup>9</sup> See generally "Court of Appeals Decisions; District Court Decisions; State Court Decisions" in 2-16 Scientific Evidence § 16.10 n. 361 (Lexis-Nexis 2016) (collection of cases); [Reviewing Challenge to the Admissibility of Expert Fingerprint Testimony](#), Fed. Evid. Rev., Jan. 28, 2013 (collection of cases); [Fingerprint Analysis](#) in Forensic Resources (NCIDS 2017) (collection of cases, motions and other resources).

<sup>10</sup> See Sect. 16.02 Scientific Premises in [Scientific Evidence](#) (Lexis-Nexis 2016). See generally [Fed. R. Evid. 702. Testimony by Expert Witnesses](#); [Kumho Tire Co. v. Carmichael](#), 526 U.S. 137 (1999) (technical or other specialized knowledge); [General Electric Co. v. Joiner](#), 522 U.S. 136 (1997) (abuse of discretion review); [Daubert v. Merrell Dow Pharmaceuticals](#), 509 U.S. 579 (1993) (relevance and reliability); [Frye v. United States](#), 293 F. 1013 (D.C. Cir 1923) (general acceptance); Alice B. Lustre, [Post-Daubert Standards for Admissibility of Scientific and Other Expert Evidence in State Courts](#), 90 A.L.R.5th 453 (2001); Daniel A. Klein, [Reliability of Scientific Technique and Its Acceptance Within Scientific Community as Affecting Admissibility, at Federal Trial, of Expert Testimony as to Result of Test or Study Based on Such Technique—Modern Cases](#), 105 A.L.R. Fed. 299 (1991); Michael Morgenstern, [Daubert v. Frye – A State-by-State Comparison](#), Expert Institute Blog, Apr. 3, 2017 (infographic). Accord [People v. Wesley](#), 83 N.Y.2d 417 (1994) (Frye Standard apropos of DNA "fingerprint").

<sup>11</sup> See generally Kaveh Waddell, [When Fingerprints Are as Easy to Steal as Passwords](#), Atlantic, Mar. 24, 2017 ("Last year, a pair of researchers at Michigan State University used an inkjet printer and special paper to convert high-quality fingerprint scans into fake, 3-D fingerprints that fooled smartphone fingerprint readers—all with equipment that cost less than \$500."); Dave Roos, [How New Tech Knows If a Fingerprint Is 'Alive'](#), Seeker, Jan. 17, 2017 ("New technology has extra keen sensors that can detect whether fingerprints and other biometric security data come from a living person or a spoof."); [Could Your Fingerprints Be Stolen From Your Peace Sign?](#), BBC, Jan. 11, 2017; David Alexander, [5.6 Million Fingerprints Stolen in U.S. Personnel Data Hack: Government](#), Reuters, Sept. 23, 2015; Pat A. Wertheim, [Latent Fingerprint Evidence: Fabrication, Not Error](#), Champion, Nov./Dec. 2008, at 16.

<sup>12</sup> See, e.g., Eileen H. Rumfelt, [Bring Your Own . . . Fingerprint?](#), ABA Crim. Litig. Sect. Pract. Points, Apr. 26, 2017 ("One recently litigated issue is whether law-enforcement officials, during a search, can compel a person to disclose passwords or apply his or her fingerprint to access a touch-enabled device."); Rose Eveleth, [Police Asked This 3D Printing Lab to Recreate a Dead Man's Fingers to Unlock His Phone](#), Fusion, July 21, 2016; Eugene Liscio and P. Eng, [Forensic Uses of 3D Printing](#), Forensic Mag., June 4, 2013 ("Small scanning systems such as those created by FlashScan3D5 allow for a suspect's fingerprints to be captured fully in 3D."). See generally Sects. 16.04 Permanent Recordation of Crime Scene Impressions and 25.07 Digital Photography in [Scientific Evidence](#) (Lexis-Nexis 2016); Ken Strutin, [3D Printing: The Manufactory of Knowledge](#), LLRX, Mar. 29, 2014.

<sup>13</sup> See Kathleen Bright-Birnbaum, [Erroneous Fingerprint Identification of Lana Canen](#), Champion, Dec. 2013, at 44.

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seven years later, the state postconviction court vacated her conviction after Detective Dennis Chapman, the state's fingerprint expert, recanted his trial testimony. He conceded that he mistakenly had identified a latent fingerprint found at the crime scene as belonging to Ms. Canen. The misidentification occurred because Detective Chapman only was trained to compare "known prints" (i.e., digital, ink, or powder fingerprint exemplars), not "latent prints" (i.e., invisible, unknown fingerprints found at a crime scene), and thus lacked the necessary qualifications to identify the latent print removed from the crime scene. At no time had he disclosed his lack of training to any party in the underlying state criminal proceeding. Following her release, Ms. Canen brought this action against Detective Chapman under 42 U.S.C. § 1983. She claimed that he had withheld his lack of qualification to perform latent fingerprint analysis and therefore had violated *Brady v. Maryland*, 373 U.S. 83, 83 S.Ct. 1194, 10 L.Ed.2d 215 (1963). The district court dismissed the case at summary judgment. It held that Detective Chapman was entitled to qualified immunity. Ms. Canen then filed an appeal in this court.

We now hold that the district court's analysis was correct. Detective Chapman's failure to disclose that he was not trained as a latent print examiner cannot be characterized as a violation of any clearly established right, and, accordingly, the doctrine of qualified immunity protects Detective Chapman. Moreover, to the degree that this action is premised on the preparation or presentation of his trial testimony, absolute immunity protects him. Accordingly, we affirm the judgment of the district court."

[United States v. Strayhorn](#), 743 F.3d 917, 923 (4th 2014)

"Viewing these cases holistically, they reveal that in challenges to convictions involving fingerprints on movable objects, in the absence of evidence regarding when the fingerprints were made, the government must marshal sufficient additional incriminating evidence so as to allow a rational juror to find guilt beyond a reasonable doubt. Although the government may meet this burden with circumstantial evidence, that evidence must be sufficiently incriminating to support the conviction."

[United States v. Herrera](#), 704 F.3d 480, 484, 486 (7th Cir. 2013)<sup>14</sup>

"The method the examiner used is called ACE-V and is the standard method for determining whether two fingerprints are from the same person. See Scientific Working Group on Friction Ridge Analysis, Study and Technology, "Standards for Examining Friction Ridge Impressions and Resulting Conclusions," Sept. 13, 2011, [www.swgfast.org/documents/examinations-conclusions/111026\\_Examinations-Conclusions\\_1.0.pdf](http://www.swgfast.org/documents/examinations-conclusions/111026_Examinations-Conclusions_1.0.pdf) (visited Jan. 4, 2013); Michele Triplett & Lauren Cooney, "The Etiology of ACE-V and Its Proper Use: An Exploration of the Relationship Between ACE-V and the Scientific Method of Hypothesis Testing," 56 J. Forensic Identification 345, 346 (2006). The defendant is therefore mounting a frontal assault on the use of fingerprint evidence in litigation, an attack the courts have frequently rebuffed. See, e.g., *United States v. Havvard*, 260 F.3d 597, 601 (7th Cir.2001); *United States v. George*, 363 F.3d 666, 672-73 (7th Cir.2004); *United States v. Crisp*, 324 F.3d 261, 268-70 (4th Cir.2003); *United States v. Mitchell*, 365 F.3d 215, 235-46 (3d Cir.2004). . . .

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<sup>14</sup> See Gabriel A. Fuentes, [How I Created a Monster](#), Litig. (ABA), Winter 2015, at 46; Jonathan J. Koehler, [Forensic Fallacies and a Famous Judge](#), 54 Jurimetrics J. 211 (2014); Gabriel A. Fuentes, [Toward a More Critical Application of Daubert in Criminal Cases: Fingerprint Opinion Testimony After the National Academy of Sciences Report](#), 12 Expert Evidence Rep. (Bloomberg BNA) 549 (2012).

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Matching evidence of the kinds that we've just described, including fingerprint evidence, is less rigorous than the kind of scientific matching involved in DNA evidence; eyewitness evidence is not scientific at all. But no one thinks that only scientific evidence may be used to convict or acquit a defendant. The increasingly well documented fallibility of eyewitness testimony, see Elizabeth F. Loftus et al., *Eyewitness Testimony: Civil and Criminal* (4th ed. 2007); *United States v. Ford*, supra, 683 F.3d at 764-66, has not banished it from criminal trials. *Perry v. New Hampshire*, \_\_\_ U.S. \_\_\_, 132 S.Ct. 716, 728, 181 L.Ed.2d 694 (2012)."

[United States v. Baines](#), 573 F.3d 979, 989-990 (10th Cir. 2009)

"Our task is not to determine the admissibility or inadmissibility of fingerprint analysis for all cases but merely to decide whether, on this record, the district judge in this case made a permissible choice in exercising her discretion to admit the expert testimony. Although this record raises multiple questions regarding whether fingerprint analysis can be considered truly scientific in an intellectual, abstract sense, nothing in the controlling legal authority we are bound to apply demands such an extremely high degree of intellectual purity. Instead, courts applying Fed. R. Evid. 702, *Daubert*, and *Kumho Tire*, are charged only with determining that the expert witness "employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." *Kumho Tire*, 526 U.S. at 152, 119 S.Ct. 1167.

To begin our analysis, we will consider the parties' arguments and the record on the *Daubert* factors, with the understanding that they are not exclusive and that expert testimony does not have to meet all of them to be deemed sufficiently reliable. The inquiry is a "flexible one," as *Daubert* itself teaches. 509 U.S. at 594, 113 S.Ct. 2786. We also remain mindful that *Daubert* addressed evidence that was claimed to be scientific. *Kumho Tire* held that the trial court's gatekeeping function applies to all expert testimony and noted that there is no clear line separating "scientific" knowledge from technical knowledge or knowledge based on experience. Nonetheless, the Court there said that "some of *Daubert*'s questions can help to evaluate the reliability even of experience-based testimony," 526 U.S. at 151, 119 S.Ct. 1167 (emphasis added), strongly suggesting that the Court realized that some of the *Daubert* factors may be less helpful when the evidence under consideration is not scientific in the strict sense. Although the importance of the distinction is thus uncertain, we agree with the Third Circuit that fingerprint analysis is best described as an area of technical rather than scientific knowledge. *Mitchell*, 365 F.3d at 234."

[United States v. Mitchell](#), 365 F.3d 215, 220, 236 (3rd Cir. 2003)

"This appeal by Byron Mitchell from a judgment in a criminal case raises important questions concerning the admissibility of latent fingerprint identification evidence under Fed. R. Evid. 702. We adjudicate on the basis of a voluminous record developed at a *Daubert* hearing, see *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993), and explore in considerable detail the application of the various *Daubert* factors to the prosecution's expert testimony. We conclude that the testimony passes *Daubert* muster, and that there are "good grounds," *id.* at 590, 113 S.Ct. 2786, for its admission. In a related matter, we must decide whether the District Court properly took judicial notice that "human friction ridges are unique and permanent throughout the area of the friction ridge skin, including small friction ridge areas, and that ... human friction ridge skin arrangements are unique and permanent." App. 1472a. We conclude that the District Court erred in taking

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judicial notice, but that the error was harmless. . . .

The uniqueness proposition is testable because it would immediately be shown false upon the production of identical friction ridge arrangements taken from different fingers (either from different fingers on the same person, or from two different people). The uniqueness proposition has also been tested in several ways: First, the full-print matching portion of the FBI's 50/50 experiment tested it and found no true matches. Second, studies on identical twins (testified about by Agent German) showed unique fingerprints. *While this is a small sample, there are independent and solid genetic grounds for believing that if identical friction ridge arrangements are to be found, they are most likely to be found in identical twins.*<sup>15</sup> Third, in the course of routine fingerprint examination, there are certainly opportunities to encounter identical fingerprints; as several witnesses testified, such a discovery would be very notable and word would spread quickly throughout the fingerprint examiner community. Yet no reports of non-unique friction ridge arrangements were introduced, and, indeed, the FBI survey sent to state agencies revealed that none had ever encountered two different persons with the same fingerprint. Joint Supp. App. at 55."

[United States v. Havvard](#), 260 F.3d 597, 600-601 (7th Cir. 2001)

"For his part Havvard argues that fingerprint comparisons are not reliable because the government admits that the basic premise that all fingerprints are unique remains unproven, and because there are no objective standards for defining how much of a latent fingerprint is necessary to conduct a comparison or for evaluating an individual examiner's comparison. Havvard relies heavily on a [National Institute of Justice solicitation, issued in March 2000](#), which sought proposals for fingerprint research studies to be performed and published under its guidance. The National Institute of Justice's stated goal was "to provide greater scientific foundation for forensic friction ridge (fingerprint) identification," which Havvard characterizes as an "admission" by the government that more research needs to be done in the area of fingerprint analysis. This document, however, was not part of the record in the district court and cannot now be relied upon here. See [McClendon v. Ind. Sugars, Inc.](#), 108 F.3d 789, 795 (7th Cir.1997). The same is true for a 1995 report of the Collaborative Testing Service, which Havvard cites to suggest a higher error rate for fingerprint comparisons than was testified to by Meager. Like the National Institute for Justice solicitation, the Collaborative Testing Services's study was available prior to the Daubert hearing and could have been made part of the district court record or been used as a basis to cross-examine Meager."

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<sup>15</sup> See also [United States v. Aman](#), 748 F. Supp. 2d 531 (E.D. Va. 2010) ("While the proposition that all fingerprints are unique is impossible to prove across all human beings who have ever lived, studies of identical twins have shown that their fingerprints are dissimilar at all points in their lives. *Since it is believed that, if anyone, identical twins would be most likely to have identical fingerprints, the lack of such similarity weighs in favor of the hypothesis that no two fingerprints are alike.* See [United States v. Mitchell](#), 365 F.3d 215, 236 (3d Cir. 2004) (discussing such studies)." *Id.* at 540, n. 10 (italics added)). However, if twins are not truly identical, then this argument for fingerprint uniqueness might fail. In other words, if identical twins have detectable genetic distinctions, then there is no reason to expect they would share fingerprint characteristics. See Jacqueline Weber-Lehmann et al., [Finding the Needle in the Haystack](#), 9 Forensic Sci. Int'l: Genetics 41 (March 2014) ("Monozygotic (MZ) twins are considered being genetically identical, therefore they cannot be differentiated using standard forensic DNA testing. Here we describe how identification of extremely rare mutations by ultra-deep next generation sequencing can solve such cases."). See also [Judge Rules Against Novel DNA Test in One Twin's Rape Case](#), WBUR, Apr. 18, 2017; David Boeri, [Standard DNA Testing Can't Differentiate Between Identical Twins. A New Test Challenges That](#), WBUR, Mar. 7, 2017.

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[United States v. Cerna](#), No. CR 08-0730 WHA, at 12, 2010 U.S. Dist. LEXIS 144424, at 23 (N.D. Cal. Sept. 1, 2010)

"For the aforementioned reasons, a pretrial Daubert hearing on the ACE-V method in general is unwarranted. Nonetheless, as discussed above, the government still must present the necessary foundational evidence at trial as part of its case-in-chief to ensure an adequate record regarding the reliability of the ACE-V method. Ms. Del Bene must explain at trial why and how the ACE-V method is reliable under the Daubert factors. It will not be enough for Ms. Del Bene to state that the ACE-V method is widely accepted. If the government fails to make an adequate threshold showing regarding the ACE-V method, this order's preliminary finding that the ACE-V method is reliable may be revisited. (*United States v. Cerna*, 2010 US Dist LEXIS 144424, at \*22-23 [ND Cal Sep. 1, 2010,].)"

[United States v. Rose](#), 672 F. Supp. 2d 723, 725-726 (D. Md. 2009)<sup>16</sup>

"The record before me in this case, though without live testimony, contains an abundance of information to guide the gatekeeping decision under Daubert, Crisp, and Fed. R. Evid. 702. In addition to the briefing on relevant case law, the parties proffer the National Academy of Sciences ("NAS") Report, the Office of the Inspector General ("OIG") Report related to the Brandon Mayfield case, affidavits from defense experts Drs. Lyn and Ralph Haber, and, as noted, the amicus brief prepared for the Baltimore County case and the IAI and SWGFAST memoranda. Having carefully considered these documents and counsels' argument, I [[Judge Catherine C. Blake](#)] am persuaded that the government's proffered expert testimony on fingerprint identification is properly admissible in this case.

[United States v. Llera-Plaza \[III\]](#), 188 F. Supp. 2d 549, 575-576 (E.D. Pa. 2002)<sup>17</sup>

"By agreeing to reconsider my prior ruling, I [[Judge Louis H. Pollak](#)] had the opportunity to acquire information not previously presented, or that I had not fully digested, on the record made in another courtroom more than two years ago. Through the efforts of government

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<sup>16</sup> See earlier unpublished state trial court order in [Maryland v. Rose](#), No. K06-0545, 2007 Md. Cir. Ct. LEXIS 14 (Cir. Ct. Baltimore Co. Oct. 19, 2007) ("Pending before the Court is Defendant's Motion to Exclude Testimony of Forensic Fingerprint Examiner and Request for a Frye Hearing (paper 100000,"Motion to Exclude"). The State opposed the Motion. The Court granted the request to have a Frye hearing and the hearing was held May 29 and 30, 2007. Each side presented testimony of one expert to support its position. For the reasons set forth herein, the Court will grant the Motion because the State did not prove in this case that opinion testimony by experts regarding the ACE-V method of latent print identification rests on a reliable factual foundation as required by MD Rule 5-702."). But see later appellate court opinion in [Markham v. State](#), 189 Md. App. 140, 984 A.2d 262 (Ct. Spec. App. Md. 2009) ("Given the consensus that fingerprint identification is reliable, other courts recently have reaffirmed Maryland's view that a court can take judicial notice of the reliability of fingerprint identification evidence." Id. at 159-160, 984 A.2d at 274 (citations omitted)).

<sup>17</sup> This decision was vacated and superseded by the court's earlier ruling in [United States v. Llera-Plaza \[II\]](#), 179 F. Supp. 2d 492 (E.D. Pa. 2002) ("Currently before the court is defendants' Motion to Preclude the United States from Introducing Latent Fingerprint Identification Evidence, in which defendants contend that evidence relating to fingerprints fails to conform to the standard for admitting expert testimony under Federal Rule of Evidence 702, as interpreted by the United States Supreme Court in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993) and *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137 (1999). . . . In support of their respective positions, the defendants and the government have agreed by stipulation to rely on the testimony regarding fingerprint evidence that was presented to my colleague Judge Joyner in 1999 in *United States v. Mitchell*, Cr. No. 96-407 (E.D. Pa.). The testimony that is referred to in the remainder of this opinion is drawn from the *Mitchell* hearing" Id. at 494-495 (footnotes omitted). Court's order: "[N]o expert witness for any party will be permitted to testify that, in the opinion of the witness, a particular latent print is—or is not—the print of a particular person." Id. at 518).

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counsel, Stephen Meagher, heretofore a name in a transcript, became a real person, and through his live testimony I was able to get a substantially more rounded picture of the procedure — the FBI's ACE-V process of fingerprint identification — whose degree of reliability for expert evidentiary purposes it is my responsibility to determine. And, through the efforts of defense counsel, I had the opportunity to learn from Allan Bayle, a senior English fingerprint specialist, that one aspect of the FBI's system — the annual proficiency testing of FBI fingerprint examiners — may have shortcomings. But I also learned from Allan Bayle's testimony two more important truths: namely, that the ACE-V process employed by New Scotland Yard is essentially indistinguishable from the FBI's ACE-V process, and that this formidably knowledgeable and experienced veteran of the Yard — the legendary and actual source of the systematic and comprehensive utilization of fingerprint identification as an instrument of law enforcement—believes in ACE-V without reservation. Reopening the record also led me to educate myself about the legal framework with respect to the receipt in evidence of expert fingerprint identification testimony that has just been put into effect in England by Her Majesty's Government. That new legal framework — which departs very significantly from the regime I had read about in the Mitchell record — turns out to be substantially the same as the legal framework that our government, in the case at bar, has contended is appropriate for FBI fingerprint identification evidence. Based on the foregoing considerations, I have concluded that arrangements which, subject to careful trial court oversight, are felt to be sufficiently reliable in England, ought likewise to be found sufficiently reliable in the federal courts of the United States, subject to similar measures of trial court oversight. In short, I have changed my mind."

## STATE CASES

People v. Jennings, 252 Ill. 534, 546-547, 96 N.E. 1077, 1081-1082 (Ill. Sup. Ct. 1911)<sup>18</sup>  
"This class of evidence is admitted in Great Britain. In 1909 the court of criminal appeals held that finger prints might be received in evidence, and refused to interfere with a conviction below though this evidence was the sole ground of identification. (In re Castleton's case, 3 Crim. App. 74.) While the courts of this country do not appear to have had occasion to pass on the question, standard authorities on scientific subjects discuss the use of finger prints as a system of identification, concluding that experience has shown it to be reliable. (10 Ency. Britannica, -- 11th ed. -- 376; 5 Nelson's Ency. 28; see, also, Gross' Crim. Investigation, -- Adams' Transl. -- 277; Fuld's Police Administration, 342; Osborn's Questioned Documents,

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<sup>18</sup> This decision marks the beginning of fingerprint acceptance in American legal history. See Ken Strutin, Criminal Law Forensics: Century of Acceptance May Be Over, N.Y.L.J., Jan. 8, 2008, at 5 ("In People v. Jennings, 252 Ill. 534, the Illinois Supreme Court justified its decision by relying on a 1909 decision from England, various encyclopedias and police texts, as well as the testimony of four prosecution witnesses employed by the government or police. Defense counsel took issue with the photographic fingerprint comparison evidence. However, in this pre-Frye/Daubert world, there were no questions about the hallmarks of scientific validity: independent testing, peer reviewed studies, protocols and standards, general acceptance, established error rates or record keeping."). See also Davis v. Mississippi, 394 U.S. 721, 727 (1969) ("Furthermore, fingerprinting is an inherently more reliable and effective crime-solving tool than eyewitness identifications or confessions and is not subject to such abuses as the improper line-up and the "third degree." Id. at 727). See generally Jeffery G. Barnes, Chp 1: History in Fingerprint Source Book (NIJ 2011); Andre A. Moenssens and Stephen B. Meagher, Chp 13: Fingerprints and the Law in Fingerprint Source Book (NIJ 2011); Sec. 16.10 Admissibility of Fingerprint Evidence in Scientific Evidence (Lexis-Nexis 2016); and Andre A. Moenssens, Admissibility of Fingerprint Evidence and Constitutional Objections to Fingerprinting Raised in Criminal and Civil Cases, 40 Chi.-Kent. L. Rev. 85, 86-94 (1963).

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479.) These authorities state that this system of identification is of very ancient origin, having been used in Egypt when the impression of the monarch's thumb was used as his sign manual; that it has been used in the courts of India for many years and more recently in the courts of several European countries; that in recent years its use has become very general by the police departments of the large cities of this country and Europe; that the great success of the system in England, where it has been used since 1891 in thousands of cases without error, caused the sending of an investigating commission from the United States, on whose favorable report a bureau was established by the United States government in the war and other departments."

[Commonwealth v. Patterson](#), 445 Mass. 626, 628, 840 N.E.2d 12, 15 (Mass. Sup. Jud. Ct. 2005)

"Consistent with the decisions of other courts that have considered the issue since Daubert, we conclude that the underlying theory and process of latent fingerprint identification, and the ACE-V [Analysis, Comparison, Evaluation-Verification]<sup>19</sup> method in particular, are sufficiently reliable to admit expert opinion testimony regarding the matching of a latent impression with a full fingerprint. In this case, however, the Commonwealth needed to establish more than the general reliability of latent fingerprint identification. It needed to establish that the theory, process, and method of latent fingerprint identification could be applied reliably to simultaneous impressions not capable of being individually matched to any of the fingers that supposedly made them. On the record before the judge below, the Commonwealth failed to meet its burden."

[State v. Sheehan](#), 273 P.3d 417, 430 (Utah Ct. App. 2012)

"In this case, the trial court's error in limiting Sheehan's use of the evidence proffered to cross-examine the State's experts was not harmless. See *id.* *The State's case relied almost entirely on the print identification made by the State's experts, making the State's experts' testimony crucial in its case against Sheehan. No other evidence corroborated that Sheehan was physically present at the victim's residence on the night of the attack.*<sup>20</sup> The State did not elicit testimony from the victim, presumably because of her inconsistent identification of her

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<sup>19</sup> See "[ACE-V](#)" in [Fingerprint Dictionary](#) (Michele Triplett, CLPE 3rd ed. 2015) ("Analysis, Comparison, Evaluation, Verification. The acronym for the process of analyzing information, performing a visual comparison, arriving at a conclusion and having the conclusion verified. ACE-V was first formulated and suggested for use for physical evidence in 1959 by Inspector Roy A. Huber, RCMP. Inspector Huber referred to the process as ACE with Verification. It was then brought to the friction ridge discipline in the 1980's by RCMP Staff Sergeant David Ashbaugh, who popularized the process and termed it ACE-V.").

<sup>20</sup> See generally [People v. Ray](#), 626 P.2d 167, 170-171 (Colo. 1981) (collecting cases discussing uncorroborated fingerprint evidence); [State v. Irick](#), 291 N.C. 480, 491-492, 231 SE2d 833, 841 (N.C. 1977) ("Fingerprint evidence, standing alone, is sufficient to withstand a motion for nonsuit only if there is "substantial evidence of circumstances from which the jury can find that the fingerprints could only have been impressed at the time the crime was committed." (citations omitted). What constitutes substantial evidence is a question of law for the court. Citation omitted."). See generally Ken Strutin, [Limitations of Forensics as Standalone Evidence of Guilt](#), N.Y.L.J., May 24, 2010, at 5 ("When the principal, and perhaps sole, proof of guilt is a forensic test, such as DNA or fingerprint matching, there is a risk that credibility inflation or a "CSI" effect might unduly influence the jury. This is a cautionary tale about the dangers of allowing convictions to rest primarily on a single type of forensic identification evidence without meaningful corroboration." (footnote omitted)); Laura Spinney, [The Fine Print](#), 464 Nature 344 (2010) ("Champod [[Christophe Champod](#), an expert in forensic identification at the University of Lausanne in Switzerland], too, would like to see its importance downgraded. "Fingerprint evidence should be expressed by fingerprint examiners only as corroborative evidence," he says. If other strands of evidence limit the pool of suspects, then a fingerprint is much less likely to be misattributed." *Id.* at 346).

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attacker. Furthermore, the court did not allow the defense to cross-examine the State's experts to challenge their subjectivity and possible misidentification of the print evidence. Thus, because the constitutional error was not harmless beyond a reasonable doubt, we reverse Sheehan's convictions."

## BOOKS

[Challenges to Fingerprints](#) (Lawyers & Judges Pub. 2009)

"This book is the culmination of years of research. The authors have meticulously researched the field of fingerprint comparisons and now offer you an in-depth look at the reliability of this science. They cover topics such as forensic individualization, the ACE method, Automated Fingerprint Search, certification, error rates, contamination, training, and court challenges to fingerprints, among others. Beginning with a brief background into fingerprints, [Ralph and Lyn Haber](#)<sup>21</sup> explain, in lay terms, the science behind forensic fingerprint comparison, and how exactly reliable is a fingerprint identification. They then take a more in-depth look into fingerprints and their use, including fingerprint comparison."

[Classification and Use of Finger Prints](#) (Routledge 1900) [Henry Classification System]<sup>22</sup>

"The employment of finger prints in many branches of public business, as a check upon false personation, having necessitated the use of a book of reference, this volume has been prepared by order of the Government of India. It is divided into two Parts, over two hundred diagrams being provided to illustrate the letter-press."

[Courtroom Testimony for the Fingerprint Expert](#) (Staggs Pub. 2nd ed. 2007)

"Courtroom Testimony for the Fingerprint Expert was written by retired FBI Supervisory Fingerprint Specialist [Gary W. Jones](#). This 114 page 5 ½" by 8 ½" book is a valuable text in preparing you to testify as an expert witness in court. You will refer to this text over and over to become more effective as an expert witness. . . . A Comment from the Author: The criminal trial is the final phase in an often long road of hard work by many individuals. What a waste when after all the hours of investigation, laboratory examinations, surveillance, dangerous undercover work, gathering witnesses, pre-trial conferences, legal research, etc., it all ends in disaster because an expert failed on the witness stand. When presenting testimony, it is not enough to tell the truth; the expert must also make the truth appear to be the truth. Effective courtroom testimony involves knowledge, experience, training, preparation, demeanor, and appearance. This book will attempt to address some methods and techniques that will aid the fingerprint expert in presenting the most convincing testimony possible."

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<sup>21</sup> See [Ralph Norman Haber, Ph.D., and Lyn Haber, Ph.D. Forensic Scientific Research Publications and Presentations Revised, September, 2012](#) in [Human Factors Consultants](#).

<sup>22</sup> See generally [Edward Henry](#) (Wikipedia) ("Sir Edward Richard Henry, 1st Baronet, GCVO, KCB, CSI, KPM (26 July 1850 – 19 February 1931) was the Commissioner of Police of the Metropolis (head of the Metropolitan Police of London) from 1903 to 1918. His commission saw the introduction of police dogs to the force (a development which he regarded with good will), but he is best remembered today for his championship of the method of fingerprinting to identify criminals."); [Henry Classification Technique](#) (Wikipedia).

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[Fingerprint Dictionary](#) ([Michele Triplett, CLPE](#) 3rd ed. Updated June 2015)<sup>23</sup>

"A collection of over 1000 terms and items of interest used in the Science of Friction Skin Identification." See also [Fingerprint Terms](#) (Updated Feb. 7, 2015) (PDF).

[Fingerprint Source Book](#) (NIJ 2011)

"The Fingerprint Sourcebook aims to be the definitive resource on the science of fingerprint identification. The Sourcebook was prepared by the [International Association for Identification](#) [IAI] and topics covered include the anatomy and physiology of friction ridge skin (the uniquely ridged skin found on the palms and soles); techniques for recording exemplars from both living and deceased subjects; the FBI's Automated Fingerprint Identifications Systems (AFIS); latent print development, preservation and documentation; equipment and laboratory quality assurance; perceptual, cognitive and psychological factors in expert identifications; and legal issues." [Table of Contents and Preface](#); [Chp 1: History](#); [Chp 2: Anatomy and Physiology of Adult Friction Ridge Skin](#); [Chp 3: Embryology, Physiology, and Morphology](#); [Chp 4: Recording Living and Postmortem Friction Ridge Skin Exemplars](#); [Chp 5: Systems of Friction Ridge Classification](#); [Chp 6: Automated Fingerprint Identification System \(AFIS\)](#); [Chp 7: Latent Print Development](#); [Chp 8: The Preservation of Friction Ridge Information](#); [Chp 9: Examination Methodology](#); [Chp 10: Documentation of Friction Ridge Impressions: From the Scene to the Conclusion](#); [Chp 11: Equipment](#); [Chp 12: Quality Assurance](#); [Chp 13: Fingerprints and the Law](#); [Chp 14: Scientific Research in the Forensic Discipline of Friction Ridge Individualization](#); [Chp 15: Special Abilities and Vulnerabilities in Forensic Expertise](#); [Appendices](#): App A: Author and Reviewer Biographies; App B: The Origin of the Scientific Working Group on Friction Ridge Analysis, Study and Technology (SWGFAST); App C: Members of SWGFAST; App D: SWGFAST Standard Terminology of Friction Ridge Examination, Ver. 3.0.

[Fingerprint Source Book: Manual of Development Techniques](#) (UK 2013)

"The Fingerprint Source Book was prepared as an internal reference document, drawing together all of the information held by the Home Office Centre for Applied Science and Technology (CAST) regarding internally managed experimental work on finger mark enhancement techniques. The preparation of the document was carried out in anticipation that supporting evidence would be required for validation of the techniques within the Manual of Fingerprint Development Techniques, as part of the ISO 17025 accreditation of the CAST forensic laboratories. As CAST and police force laboratories have progressed with the ISO 17025 accreditation process, the Fingerprint Source Book has become regarded as a more widely important document. Because it provides the validation of the techniques contained within the manual, and hence the techniques used by police forces, it has become necessary for the document to be formally issued and controlled."

[Fundamentals of Fingerprint Analysis](#) (CRC Press 2014)

"The "CSI effect" has brought an explosion of interest in the forensic sciences, leading to the development of new programs in universities across the world. While dozens of professional texts on the science of fingerprint analysis are available, few are designed specifically for

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<sup>23</sup> See generally [Articles by Michele Triplett](#) ([Michele Triplett's Fingerprint Information](#)); [Publications by Michele Triplett](#) (Ron Smith & Assoc., Inc.) (e.g., [The Invincible Fingerprint: Understanding the Basics, Defeating the Myths](#), NYSBA Crim. Just. Sect. Fall Meeting, Oct. 2013; [Pattern Evidence Witnesses: Questions That Should Be Asked, But Rarely Are](#), NYSBA Crim. Just. Sect. Fall Meeting, Oct. 2013).

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students. An essential learning tool for classes in fingerprinting and impression evidence, *Fundamentals of Fingerprint Analysis* takes students from an understanding of the historical background of fingerprint evidence to seeing how it plays out in a present-day courtroom. Using a pedagogical format, with each chapter building on the previous one, the book is divided into three sections. The first explains the history and theory of fingerprint analysis, fingerprint patterns and classification, and the concept of biometrics—the practice of using unique biological measurements or features to identify individuals. The second section discusses forensic light sources and physical and chemical processing methods. Section Three covers fingerprint analysis with chapters on documentation, crime scene processing, fingerprint and palm print comparisons, and courtroom testimony."

## [Science of Fingerprints Classification and Uses](#) (FBI 1973)

"This booklet concerning the study of fingerprints has been prepared by the Federal Bureau of Investigation for the use of interested law enforcement officers and agencies, particularly those which may be contemplating the inauguration of fingerprint identification files. It is based on many years' experience in fingerprint identification work out of which has developed the largest collection of classified fingerprints in the world. Inasmuch as this publication may serve as a general reference on classification and other phases of fingerprint identification work, the systems utilized in the Identification Division of the Federal Bureau of Investigation are set forth fully. The problem of pattern interpretation, in particular, is discussed in detail."

## [Suspect Identities: A History of Fingerprinting and Criminal Identification](#) (Harv. U. Press 2002)

"'No two fingerprints are alike,' or so it goes. For nearly a hundred years fingerprints have represented definitive proof of individual identity in our society. We trust them to tell us who committed a crime, whether a criminal record exists, and how to resolve questions of disputed identity. But in *Suspect Identities*, [Simon Cole](#) reveals that the history of criminal identification is far murkier than we have been led to believe. Cole traces the modern system of fingerprint identification to the nineteenth-century bureaucratic state, and its desire to track and control increasingly mobile, diverse populations whose race or ethnicity made them suspect in the eyes of authorities. In an intriguing history that traverses the globe, taking us to India, Argentina, France, England, and the United States, Cole excavates the forgotten history of criminal identification—from photography to exotic anthropometric systems based on measuring body parts, from fingerprinting to DNA typing. He reveals how fingerprinting ultimately won the trust of the public and the law only after a long battle against rival identification systems. As we rush headlong into the era of genetic identification, and as fingerprint errors are being exposed, this history uncovers the fascinating interplay of our elusive individuality, police and state power, and the quest for scientific certainty. *Suspect Identities* offers a necessary corrective to blind faith in the infallibility of technology, and a compelling look at its role in defining each of us."

## BOOK CHAPTERS

### [Chp 13 Fingerprints and the Law](#) in [Fingerprint Source Book](#) (NIJ 2011)

"Fingerprints, palmprints, and impressions of bare soles have been widely recognized and accepted as a reliable means to identify a person. A reproduction of the friction ridge arrangements on a fingerprint, palmprint, or footprint may be left on an object when it is touched. This permits the impression to be used for the personal identification of individuals in

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criminal investigations. Thus, the forensic science of fingerprints, palmprints, and footprints is utilized by law enforcement agencies in support of their investigations to positively identify the perpetrator of a crime. This forensic science is also used for exculpatory or elimination purposes. This Chapter will address the laws and rules of evidence as they apply to friction ridge impression evidence. Historical court decisions and recent appellate and United States Supreme Court rulings will be addressed. This Chapter will primarily address federal court decisions and the Federal Rules of Evidence, which may not be applicable to all states."

## Chp 16 Fingerprints in Scientific Evidence (Lexis-Nexis 2016)

"Synopsis: § 16.01 In General; § 16.02 Scientific Premises; § 16.03 Detection and Visualization of Crime Scene Impressions; § 16.04 Permanent Recordation of Crime Scene Impressions; § 16.05 Taking Known Impressions; § 16.06 Locating Existing Known Impressions—Classification of Fingerprints; § 16.07 Comparison—Identification of Fingerprints; § 16.07 Comparison—Identification of Fingerprints; § 16.08 Age Determinations; § 16.09 Sex Determinations; § 16.09.1 Ethnicity and Other Determinations; § 16.10 Admissibility of Fingerprint Evidence; § 16.11 Sufficiency of Fingerprint Evidence; § 16.12 The Weight of Fingerprint Evidence—The Biasing Effect of the Examiner's Exposure to Prejudicial Extraneous Information; § 16.13 Lack of Fingerprint Evidence."

## Chp Critical Analysis of Selected Features of Fingerprinting in Forensic Science and Law: Investigative Applications in Criminal, Civil and Family Justice (CRC 2006)

"Forensic science has undergone dramatic progress in recent years, including in the areas of DNA collection and analysis and the reconstruction of crime scenes. However, too few professionals are equipped with the knowledge necessary to fully apply the potential of science in civil, criminal, and family legal matters. Featuring contributions from renowned experts in the forensic, scientific, and legal professions, *Forensic Science and Law: Investigative Applications in Criminal, Civil, and Family Justice* communicates the wide range of methods and approaches used for achieving justice in these circumstances. A solid grounding in the underlying principles of our legal system provides a context for understanding how these methods are applied. The book brings together the words and thoughts of diverse professionals whose common goal is to uncover the truth."

## Chp Reference Guide on Forensic Identification Expertise (55) in Reference Manual on Scientific Evidence (FJC 3rd ed. 2011)

"Over the years, fingerprint analysis became the gold standard of forensic identification expertise. In fact, proponents of new, emerging techniques in forensics would sometimes attempt to invoke onto the new techniques the prestige of fingerprint analysis. Thus, advocates of sound spectrography referred to it as "voiceprint" analysis. Likewise, some early proponents of DNA typing alluded to it as "DNA fingerprinting." However, as previously noted, DNA analysis has replaced fingerprint analysis as the gold standard." Sub-Sect. Fingerprint Evidence (73)

## **REPORTS, GUIDES, and MANUALS**

### Fingerprint Capture Challenges and Opportunities (NIST 2016)

"Importance of Fingerprint Quality: Impacts on identification system; Fingerprint Capture

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Challenges: Factors that will affect/impact fingerprint capture process; Fingerprint Capture Opportunities: Possible approaches/solutions to enhance fingerprint capture quality."

## [Fingerprint Inquiry Report](#) (Scotland 2011)

"In May 1997, David Asbury was convicted of the murder of Marion Ross. The prosecution case against him included fingerprint evidence. In the course of the investigation into Miss Ross's murder, a fingerprint was found on the doorframe of the bathroom in Miss Ross's home. It was identified as belonging to Shirley McKie, a serving police officer involved in the murder investigation. That fingerprint became known as "Y7". In the course of the trial of David Asbury, Shirley McKie denied that she was inside the house beyond the porch area and claimed that she could not have left her fingerprint where Y7 was found. After the murder trial, Shirley McKie was prosecuted for perjury (lying while giving evidence on oath) because of what she had said in her evidence at David Asbury's trial. The evidence before the jury at Shirley McKie's trial included evidence from defence fingerprint experts that Y7 was not her fingerprint. The jury, unanimously, found Shirley McKie not guilty of perjury. The identification of Y7 was made, originally, by officers of the Scottish Criminal Record Office. Various fingerprint experts have expressed differing views as to whether Y7 is the fingerprint of Shirley McKie. In August 2000 David Asbury was granted interim liberation pending an appeal against his conviction for murder. His conviction was quashed in August 2002. The Crown did not oppose his appeal. Shirley McKie raised an action for damages arising from the identification of Y7 as her fingerprint. It was settled out of court by the Scottish Ministers, without admission of liability, in February 2006. The steps taken to identify and verify Y7, and the measures that might be taken to avoid any shortcomings in the identification and verification of fingerprints in the future in Scotland have not previously been the subject of a public judicial inquiry."

## [Fingerprint Science \(F4\)](#) (800) in [69th Annual Scientific Meeting of the American Academy of Forensic Sciences](#), Feb. 13-18, 2017<sup>24</sup>

"After attending this presentation, attendees will have a more skeptical attitude toward testimony concerning fingerprints. This presentation will impact the forensic science community by bringing more science into fingerprint analysis and testimony. To what extent are statements and testimony about fingerprint evidence supportable scientifically? This study presents a statistician's view to answer this question."

## [Forensic Friction Ridge \(Fingerprint\) Examination Validation Studies](#) (NIJ 2000) [Solicitation]

"Forensic friction ridge (i.e. fingerprint, palmprint, footprint) examination (FFRE) has long been

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<sup>24</sup> See Laura French, [Stats Expert to Present Fingerprint Doubts at AAFS 69th Annual Meeting](#), Forensic Mag., Feb. 15, 2017 ("Fingerprints left behind at a crime scene are one of the best possible identifiers of a suspect or perpetrator, rivaled only, in popular opinion, by DNA evidence. However, fingerprint analysis, which has been used in criminal investigations for over a century, may not be as infallible as believed by law enforcement, court officials and the media, according to statistics expert [Joseph "Jay" Kadane](#), a Carnegie Mellon University professor emeritus and upcoming presenter at the 69th Annual Scientific Meeting of the American Academy of Forensic Sciences."); Shilo Rea, [Fingerprint Evidence Is Circumstantial, Not an Identification](#), Carnegie Mellon U. News, Feb. 10, 2017 ("In "[Fingerprint Science](#)," Kadane will show how a fingerprint analyst may observe common characteristics between the mark left at a crime scene and a fingerprint on file. However, there is no current scientific basis to estimate the number of people who share these characteristics. In particular, there is no science to support the conclusion that only one person, the person whose fingerprint is on file, could have left the mark. "Fingerprint analysts are exaggerating what they can do, and policies need to be changed to prevent this from happening. Courts need to stop accepting fingerprint identifications — because they have no scientific basis," Kadane said.").

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recognized and accepted as the standard for personal identification worldwide. The National Institute of Justice (NIJ) publication [Forensic Sciences: Review of Status and Needs](#) (NCJ173412) has identified the need for validation of the basis for friction ridge individualization and standardization of comparison criteria. Furthermore, all expert testimony must follow the admissibility rules for scientific evidence set forth in recent court cases e.g. *Daubert v. Merrill Dow Pharmaceuticals* (113 S.Ct. 2786). These rules require scientists to address the reliability and validity of the methods used in their analysis. Therefore, the purpose of this solicitation is to address the needs identified in the above NIJ publication and to provide greater scientific foundation for forensic friction ridge (fingerprint) identification."

[Forensic Sciences: Review of Status and Needs](#) (NIJ 1999)

"For many years, courts have accepted the work performed in latent print examinations because they understand that friction-ridge detail in individual fingerprints is empirically unique. Nonetheless, two efforts are now under way to increase the understanding of fingerprint features and content. There is a modest effort to better comprehend the genetic basis and relative importance of specific print features and a significant effort to characterize and understand the chemical content of latent prints. The latter effort will ultimately allow examiners to design more sensitive visualization techniques. Latent print examiners currently use RDT&E activities that include the visualization, recording, and recovery of latent prints; comparison of prints; storage and retrieval systems; and automated comparison systems. Criteria used during print comparisons to determine individualizations vary throughout the world. Although there are some jurisdictional exceptions, in the United States examiners are not generally required to find a specific number of comparison points to determine an identity between two prints." See sect. Latent Print Examinations at 28-31.

[Improving the Understanding and the Reliability of the Concept of "Sufficiency" in Friction Ridge Examination](#) (NIJ 2013)

"This project examined the concept of "sufficiency" associated with decisions by latent print examiners at the conclusions of the various phases of the print examination process. The study resulted in two main findings. First, the concept of "sufficiency" is mainly driven by the number and spatial relationships between the minutiae observed on the latent and control prints. Examiner demographics (training, certification, and years of experience) or non-minutiae features (such as level-three features) did not play a major role in examiners' decisions. Second, there was significant variability between the detection and interpretation of friction-ridge features. This was observed at all levels of detail and for factors that potentially influenced the examination process, such as degradation, distortion, or influence of the background and the development technique. Researchers concluded that standards and training should be developed in order to ensure consistency in the definition, selection, interpretation, and use of observation in examiners' decisions on friction-ridge impressions. The study's methodology involved a Web-based interface designed to capture the observations of 146 latent-print examiner and latent-print trainees on a set of 15 pairs of latent/control prints, as well as examiners' decisions at the end of each phase of the examination process. A statistical model was also developed for quantifying the specificity of the configurations of minutiae annotated on the prints by the participants. Random Forest classifiers were used to measure the importance of variables on the decisions made by the participants. Random Forest classifiers were used as rational proxies for the

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decisionmaking process of the examiners based on the observations of the latent/control prints. 48 figures, 36-item bibliography, and appended 14 trial photographic images of latent prints."

### [Latent Print Examination and Human Factors: Improving the Practice Through a Systems Approach](#) (NIST 2012)

"Fingerprints have provided a valuable method of personal identification in forensic science and criminal investigations for more than 100 years. The examination of fingerprints left at crime scenes, generally referred to as latent prints, consists of a series of steps involving a comparison of the latent print to a known (or exemplar) print. In addition to reaching correct conclusions in the matching process, latent print examiners are expected to produce records of the examination and, in some cases, to present their conclusions and the reasoning behind them in the courtroom. In recent years, the accuracy of latent print identification has been the subject of increased study, scrutiny, and commentary in the legal system and the forensic science literature. In December 2008, the U.S. National Institute of Standards and Technology (NIST) convened The Expert Working Group on Human Factors in Latent Print Analysis to conduct a scientific assessment of the effects of human factors on forensic latent print analysis and to develop recommendations to reduce the risk of error. This report documents their findings and recommendations, addressing issues ranging from the acquisition of impressions of friction ridge skin to courtroom testimony, from laboratory design and equipment to research into emerging methods for associating latent prints with exemplars. It provides a comprehensive discussion of how human factors relate to all aspects of latent print examinations including communicating conclusions to all relevant parties through reports and testimony."

### [Processing Guide for Developing Latent Fingerprints](#) (FBI 2000)

"The identification of latent print evidence is often key in solving a crime. A latent print results from the production of friction ridges found on parts of the fingers, hands, and feet. These prints consist of a combination of different chemicals that originate from natural secretions, blood, and contaminants. Natural secretions mainly derive from the eccrine and sebaceous glands and contain known chemical components. Eccrine gland secretions from the fingers, hands, and feet are both organic and inorganic, but only organic materials are secreted from the sebaceous glands. Other contaminants found in prints result from contact with different materials in the environment. Latent prints can be found on all types of surfaces. In general, surfaces can be characterized as porous, nonporous, or semiporous. Understanding these characteristics will aid in processing an item for latent prints. The beginning of this manual is a list of processes and procedures for different surface types. Also included are processing sequences that specifically involve prints that are left in blood. Following these lists are details for each process that is currently implemented in the Latent Print Unit (LPU) of the Federal Bureau of Investigation (FBI) Laboratory. "

### [Report on Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods](#) 9-10 (PCAST 2016)

"Latent fingerprint analysis was first proposed for use in criminal identification in the 1800s and has been used for more than a century. The method was long hailed as infallible, despite the lack of appropriate empirical studies to assess its error rate. In response to criticism on this point in the 2009 National Research Council report, those working in the field of latent fingerprint analysis recognized the need to perform empirical studies to assess foundational validity and

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measure reliability and have made progress in doing so. Much credit goes to the FBI Laboratory, which has led the way in performing black-box studies to assess validity and estimate reliability, as well as so-called "white-box" studies to understand the factors that affect examiners' decisions. PCAST applauds the FBI Laboratory's efforts. There are also nascent efforts to begin to move the field from a purely subjective method toward an objective method—although there is still a considerable way to go to achieve this important goal. PCAST finds that latent fingerprint analysis is a foundationally valid subjective methodology—albeit with a false positive rate that is substantial and is likely to be higher than expected by many jurors based on longstanding claims about the infallibility of fingerprint analysis. The false-positive rate could be as high as 1 error in 306 cases based on the FBI study and 1 error in 18 cases based on a study by another crime laboratory. In reporting results of latent-fingerprint examination, it is important to state the false-positive rates based on properly designed validation studies."

[Review of the FBI's Handling of the Brandon Mayfield Case](#) (OIG 2006) [106 megs]

"Executive Summary; Chapter 1 - Report Cover, Table of Contents and Introduction; Chapter 2 - Chronology of Events Related to the Mayfield Case; Chapter 3 - Background for the OIG's Analysis of Fingerprint Issues Raised by the Mayfield Case; Chapter 4 - OIG's Assessment of the Causes of the Fingerprint Misidentification; Chapter 5 - OIG's Assessment of the FBI Laboratory's Responses to the Fingerprint Misidentification; Chapter 6 - OIG's Analysis of the Investigation, Arrest, and Confinement of Mayfield; Chapter 7 - Conclusion and Appendices."

[Strengthening Forensic Science in the United States: A Path Forward](#) 31 (NAS 2009)

"Great improvement is necessary in AFIS [Automated Fingerprint Identification System]<sup>25</sup> interoperability. Crimes may go unsolved today simply because it is not possible for investigating agencies to search across all the databases that might hold a suspect's fingerprints or that may contain a match for an unidentified latent print from a crime scene. It is also possible that some individuals have been wrongly convicted because of the limitations of fingerprint searches. At present, serious practical problems pose obstacles to the achievement of nationwide AFIS interoperability. These problems include convincing AFIS equipment vendors to cooperate and collaborate with the law enforcement community and researchers to create and use baseline standards for sharing fingerprint data and create a common interface. Second, law enforcement agencies lack the resources needed to transition to interoperable AFIS implementations. Third, coordinated jurisdictional agreements and public policies are needed to allow law enforcement agencies to share fingerprint data more broadly. Given the disparity in resources and information technology expertise available to local, state, and federal law enforcement agencies, the relatively slow pace of interoperability efforts to date, and the potential gains from increased AFIS interoperability, the committee believes that a broad-based emphasis on achieving nationwide fingerprint data interoperability is needed."

### SCHOLARLY and PRACTICE ARTICLES

[Accuracy and Reliability of Forensic Latent Fingerprint Decisions](#), 108(19) PNAS 7733 (2011)

"The interpretation of forensic fingerprint evidence relies on the expertise of latent print examiners. The National Research Council of the National Academies and the legal and forensic sciences communities have called for research to measure the accuracy and reliability of latent

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<sup>25</sup> See generally [Chp 6 Automated Fingerprint Identification System \(AFIS\)](#) in [Fingerprint Source Book](#) (NIJ 2011).

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print examiners' decisions, a challenging and complex problem in need of systematic analysis. Our research is focused on the development of empirical approaches to studying this problem. Here, we report on the first large-scale study of the accuracy and reliability of latent print examiners' decisions, in which 169 latent print examiners each compared approximately 100 pairs of latent and exemplar fingerprints from a pool of 744 pairs. The fingerprints were selected to include a range of attributes and quality encountered in forensic casework, and to be comparable to searches of an automated fingerprint identification system containing more than 58 million subjects. This study evaluated examiners on key decision points in the fingerprint examination process; procedures used operationally include additional safeguards designed to minimize errors. Five examiners made false positive errors for an overall false positive rate of 0.1%. Eighty-five percent of examiners made at least one false negative error for an overall false negative rate of 7.5%. Independent examination of the same comparisons by different participants (analogous to blind verification) was found to detect all false positive errors and the majority of false negative errors in this study. Examiners frequently differed on whether fingerprints were suitable for reaching a conclusion."

[Can Fingerprints Lie?: Re-weighting Fingerprint Evidence in Criminal Jury Trials](#), 31 Am. J. Crim. L. 1 (2003)

"This article discusses fingerprint evidence and its use in criminal jury trials. It is commonly thought that fingerprints "never lie"; however, this article reveals the little known fact that the "science" of fingerprint identification has never been empirically tested or proven to be reliable. It further exposes the seldom-discussed issue of fingerprint misidentification and latent print examiner error. The article explains the importance of fingerprint evidence and its extensive use in all phases of the criminal justice system. Specifically, the article plays out the dramatic courtroom scenario of incriminating fingerprints being found at a crime scene and matching the accused all while the defendant strongly claims innocence. The expert opinion testimony of the latent fingerprint examiner becomes seminal to the case and is often received as powerfully persuasive evidence of guilt - virtually guaranteeing conviction.

Notwithstanding the fact that fingerprints are nearly universally accepted as infallible proof of identity in court, defense attorneys are currently urging courts to exclude fingerprint identification evidence from criminal jury trials by arguing that the findings of latent fingerprint examiners are scientifically invalid and legally unreliable. Notwithstanding the nearly universal acceptance of fingerprint evidence, at least one state court in Maryland refused to admit fingerprint evidence at all. This article dissects the defense's argument for exclusion and explains the larger debate over the correct application of the evidentiary rules for expert witnesses articulated by the United States Supreme Court in *Daubert* and *Kumho Tire*. Although the exclusion of fingerprint evidence may sound outlandish, this article illuminates the substance of the argument and why due process requires judges to closely monitor whether the opinions of latent fingerprint examiners are accurate and reliable evidence to be considered by the jury. Further, this article proposes a special jury instruction that would be given in certain criminal cases to guide jurors in weighting the value of the fingerprint evidence."

[Cautionary Note About Fingerprint Analysis and Reliance on Digital Technology](#), Backup Center Report, June-July 2006, at 5

"[I]n the days of yore, living, breathing fingerprint examiners compared the images. Several aspects of that paradigm inspired confidence. To begin with, a human being made a meticulous

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comparison of the inked and latent impressions. Moreover, that person was working with the best possible images. Admittedly, no image perfectly captures a person's fingerprint pattern, but some are more complete and therefore more reliable than others. For the most part, today, that paradigm is passé. We will not and should not return to the days of yore; but, as we shall see, we need to be far more aware of the pitfalls lurking in the new paradigm." See also [Cautionary Note About Fingerprint Analysis and Reliance on Digital Technology](#), *Champion*, Aug. 2006, at 27.

[Certainty, Individualisation and the Subjective Nature of Expert Fingerprint Evidence](#), [2012] *Crim. L.R.* 824

"This article provides a critical evaluation of the findings of the [Fingerprint Inquiry Report](#) and considers the implications of those findings for practice and the presentation of fingerprint evidence in criminal trials."

[Challenge of Fingerprint Comparison Opinion in the Defense of a Criminally Charged Client](#), 19 *Ga. St. U. L. Rev.* 705 (2003)

"This article examines the scientific reliability of fingerprint evidence and its implications for the criminal defense practitioner. Part I provides an overview of the history of fingerprint analysis and the present controversy about fingerprint comparison evidence. Parts II, III, and IV explore whether fingerprint analysis and the accompanying comparisons can meet the required tests for scientific reliability. The remaining sections demonstrate that the underlying premises currently used to justify fingerprint identification have questionable scientific validity and fail the test elucidated by the United States Supreme Court for the admission of scientific evidence."

[Challenges to Fingerprint Identification Evidence: Why the Courts Need a New Approach to Finality](#), 42 *Wm. Mitchell L. Rev.* 756 (2016)

"This article presents a cohort of cases that demonstrate this pattern in judicial decision-making and highlights the implications of relying on this finality interest to remedy the problems associated with forensic identification evidence. Part II describes the process of friction ridge analysis, the NAS Report's findings about friction ridge analysis, and some recent efforts to improve the discipline. Part III outlines relevant admissibility frameworks and judicial responses to challenges to fingerprint evidence between 2009 and 2014, illustrating the influence of finality on judicial decision making in these cases. Part IV discusses the implications of relying on finality to rationalize such decisions. It suggests that, in relying on the role of defense counsel and the adversarial system to rationalize their decisions, courts are overlooking the limitations of the adversarial system, specifically the difficulties lawyers have in engaging with scientific evidence and the problems encountered by their audience (i.e., the jury) when receiving such evidence. As Professor [David Faigman](#) stated, legal consumers of science (including lawyers, judges, jurors, and other legal personnel) "often have little understanding of the product they are buying." Part V concludes that the courts should consider taking new perspectives on finality in such cases, and give more meaningful consideration to the issues that arise when law consumes science in this way."

[Chronological Review of Fingerprint Forgery](#), 44 *J. Forensic Sci.* 963 (1999)

"More than 30 known cases of fingerprint forgery are considered. Various techniques of fingerprint forgery are described, as well as fingerprint forgery detection methods. The authors indicate that information is not always complete in fingerprint forgery cases. Sometimes,

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important details are omitted, such as the method of forgery, the way the forgery was detected, and circumstances of the case. The most widespread fingerprint forgery techniques are stamping, lifting, and photo montage. Stamping involves using a fingerprint replica made by casting or photolithography and lubricated. Lifting involves the transplant of inked, latent, or already developed fingerprints from one surface to another using a suitable sticky agent. A photo montage refers to a composite photograph made by super-imposing a number of images."

[Cognitive Issues in Fingerprint Analysis: Inter- and Intra-Expert Consistency and the Effect of a 'Target' Comparison](#), 208 *Forensic Sci. Int'l* 10 (2011)

"Deciding whether two fingerprint marks originate from the same source requires examination and comparison of their features. Many cognitive factors play a major role in such information processing. In this paper we examined the consistency (both between- and within-experts) in the analysis of latent marks, and whether the presence of a 'target' comparison print affects this analysis. Our findings showed that the context of a comparison print affected analysis of the latent mark, possibly influencing allocation of attention, visual search, and threshold for determining a 'signal'. We also found that even without the context of the comparison print there was still a lack of consistency in analysing latent marks. Not only was this reflected by inconsistency between different experts, but the same experts at different times were inconsistent with their own analysis. However, the characterization of these inconsistencies depends on the standard and definition of what constitutes inconsistent. Furthermore, these effects were not uniform; the lack of consistency varied across fingerprints and experts. We propose solutions to mediate variability in the analysis of friction ridge skin."

[Contextual Information Renders Experts Vulnerable to Making Erroneous Identifications](#), 156 *Forensic Sci. Int'l* 74 (2006)

"We investigated whether experts can objectively focus on feature information in fingerprints without being misled by extraneous information, such as context. We took fingerprints that have previously been examined and assessed by latent print experts to make positive identification of suspects. Then we presented these same fingerprints again, to the same experts, but gave a context that suggested that they were a no-match, and hence the suspects could not be identified. Within this new context, most of the fingerprint experts made different judgements, thus contradicting their own previous identification decisions. Cognitive aspects involved in biometric identification can explain why experts are vulnerable to make erroneous identifications."

[Dark and Stormy Night: The Mystery of the Missing Science in Fingerprint Identification](#), 75 *Def. Couns. J.* 47 (2008)

"In May of 2004, the FBI issued an unprecedented apology to Brandon Mayfield, the Portland, Oregon lawyer who was tied to the Madrid train bombings via an erroneous fingerprint identification. The print in question had been positively identified as Mayfield's by three highly qualified FBI examiners and confirmed by Mayfield's own expert. Yet it was ultimately shown to belong to a far more plausible suspect, an Algerian named Ouhane Daoud, who was linked to the bombings through other evidence. Especially perplexing to the casual observer was the fact that Mr. Mayfield was arrested even though the fingerprint match had been disputed by police in Spain. An even greater mystery, however, was raised by Dr. [Simon Cole](#), Professor of

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Criminology at U.C. Irvine, who was quoted in news coverage of the apology as stating that fingerprinting methodology has never been scientifically validated.

This article argues that fingerprint methodology should become more science-based in the future because the adversary system is not structurally suited to prevent or correct the types of mistakes that led to the Mayfield fiasco. It is already slowly evolving in that direction, in response both to the pressures created by those same mistakes, and to the evolving relationship between courts and scientific evidence in general. Additionally, defense attorneys should adopt a more nuanced approach to challenging fingerprints than they have been doing if they want judges to take them seriously."

[Daubert Challenges to Fingerprints](#), 42 Crim. L. Bull. 624 (2006)

"The first reported fingerprint case, *People v. Jennings*, was decided in 1911, and the technique soon became firmly established in legal precedent. Like many other forensic sciences, fingerprint identification gained judicial acceptance decades before the U.S. Supreme Court decided *Merrell Dow Pharmaceutical, Inc. v. Daubert* in 1993. *Daubert* revolutionized how courts decide the admissibility of scientific evidence under Federal Rule 702, the principal provision governing the admissibility of expert testimony. Over time, *Daubert* has evolved into a far more stringent standard than many thought at the time the decision was handed down. In 1999, the Court extended the *Daubert* reliability test to non-scientific expert testimony in *Kumho Tire Co. v. Carmichael*, and by 2000, the Court was describing *Daubert* as imposing "exacting standards of reliability." Rule 702 was amended in the same year to reflect these decisions.

Lower courts soon began to read *Daubert* and *Kumho* as "plainly inviting a reexamination even of 'generally accepted' venerable, technical fields." Handwriting analysis was the first technique to be challenged. In 1995, a federal district court in [U.S. v. Starzecpyzel](#) [, 880 F. Supp. 1027 (1995)] concluded that "forensic document examination, despite the existence of a certification program, professional journals and other trappings of science, cannot, after *Daubert*, be regarded as 'scientific ... knowledge.'" The court further stated that "while scientific principles may relate to aspects of handwriting analysis, they have little or nothing to do with the day-to-day tasks performed by [Forensic Document Examiners]. ... [T]his attenuated relationship does not transform the FDE into a scientist." It was only a matter of time before fingerprint evidence would also be challenged. Numerous attacks, albeit unsuccessful, have since been launched against fingerprinting. This article briefly discusses fingerprint procedure, examines several significant cases, and then considers some recent developments."

[Daubert Rises: The \(Re\)applicability of the Daubert Factors to the Scope of Forensics Testimony](#), 96 Minn. L. Rev. 1581 (2012)

"On May 6, 2004, Brandon Mayfield's life was turned upside down. The thirty-eight-year-old attorney's home was raided by federal agents, and Mayfield was arrested pursuant to an FBI investigation of the March 2004 Madrid train bombings which killed ninety-one civilians. The basis for the FBI's interest in Mayfield was fingerprint evidence: Spanish police lifted prints from the scene of the bombing, which were then run through FBI and Interpol databases. The FBI told Mayfield that "his fingerprints matched those of the Madrid train bomber, and that he was the prime suspect in a crime punishable by death." Indeed, the FBI's affidavit underlying Mayfield's arrest claimed that Mayfield's fingerprints were a "100% positive identification" to the prints lifted from the scene of the bombing. However, the FBI's theory had one critical flaw: Mayfield was innocent. The fingerprint evidence on which the FBI relied was erroneous;

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Mayfield was not involved in the Madrid bombing. Mayfield was quickly exonerated, and no criminal trial was ever held. But if Mayfield's case had gone to trial, what might his fate have been if an FBI analyst had testified with certainty that Mayfield's fingerprints were a "100% match? . . . This Note presents a new framework for courts grappling with the treatment of forensics evidence and argues that the Daubert factors themselves hold the key to balancing courts' need to admit forensics testimony against well-founded concerns surrounding the scientific reliability and validity of forensic techniques."

[Defense Challenge to Fingerprints](#), 40 Crim. L. Bull. 213 (2004)

"The defense attorney has six ways to attack fingerprint evidence: (1) the recovered evidence--an examination of the procedure and chain of evidence to ensure that the recovered fingerprint is not a forgery. You can also make the usual challenges about whether the police properly seized or had access to the location from which the evidence was obtained. (2) the witness--a Daubert/Plaza challenge to the witness' training, experience, and certification. Get the expert's resume and check it for any credential inflation. Find out what the training and certifications require. Try to obtain training materials. (3) the science of fingerprint identification--a Daubert/Plaza challenge to the underlying science of fingerprint identification. Thus far unsuccessful, but still untried are challenges to the subjective nature of the evaluation, and on confirmation bias. Find out what organizations the expert belongs to and what treatises and journals he or she considers authoritative. Read them. Use the learned treatise rule if you want to impeach the expert with them. (4) methodology used in case on trial--related to the witness/science challenge. One must make a specific Daubert/Plaza challenge to the laboratory's methods and procedures. This may include a challenge that the expert was given overly suggestive information from the investigators. (5) the expert's opinion--a basic challenge about whether the prints match. If the challenge to the witness' credentials, science, and methodology has failed, then do not expect much success if you make this argument to the trial court. Normally, this will be an argument you make to the jury. It likely requires a defense expert to testify. (6) legitimate access--an argument that the defendant had legitimate access to the location and that the fingerprint was present for reasons unrelated to the crime. This may require the defendant to testify to succeed. This is most likely to work if the prosecution has a single print recovered from the sort of place a passerby might touch. This paper primarily talks about the Daubert/Plaza challenge because it is the one that will require the most technical knowledge about fingerprints. A challenge to the recovered evidence is a standard motion to suppress challenging the police department's right to enter the location where the print was found and seize the evidence containing the print. This should be part of your pre-trial checklist."

[Deference Mistakes](#), 82 U. Chi. L. Rev. 643, 683-684 (2015)

"For example, in a sample of twenty-five appellate cases discussing the admission or exclusion of latent fingerprint evidence, twenty-four were cases in which the defendant had appealed and the appellate court affirmed the admission of fingerprint evidence against the defendant. In every case, the appellate court reviewed the lower court's decision only for abuse of discretion. There are significant questions about the scientific reliability of fingerprint evidence, as summarized by the 2009 forensic-science report from the National Academy of Sciences. But a district court faced with this one-sided body of appellate fingerprint precedent might erroneously conclude that it has no discretion to exclude such evidence.

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For example, in *United States v. Cerna*, the district court stated that a method of latent fingerprint identification "specifically has undergone Daubert analysis by a number of courts and has been repeatedly upheld as sufficiently reliable." But the three cases cited for this proposition had held only that admitting such evidence was not an abuse of discretion. The first specifically acknowledged shortcomings in the method but concluded that "the district court did not abuse its discretion." The second explicitly held that abuse of discretion review was appropriate even when the district court made no findings of fact. And the third was very clear about the deferential standard of review: "Our task is not to determine the admissibility or inadmissibility of fingerprint analysis for all cases but merely to decide whether, on this record, the district judge in this case made a permissible choice in exercising her discretion to admit the expert testimony." It is a mistake to conclude from these deferential precedents that fingerprint evidence clearly should be admitted, but the Cerna court seemed to do exactly that."

[Emotional Experiences and Motivating Factors Associated with Fingerprint Analysis](#), 55 J. Forensic Sci. 385 (2010)

"In this study, we investigated the emotional and motivational factors involved in fingerprint analysis in day-to-day routine case work and in significant and harrowing criminal investigations. Thematic analysis was performed on interviews with 13 experienced fingerprint examiners from a variety of law enforcement agencies. The data revealed factors relating to job satisfaction and the use of skill. Individual satisfaction related to catching criminals was observed; this was most notable in solving high profile, serious, or long-running cases. There were positive emotional effects associated with matching fingerprints and apparent fear of making errors. Finally, we found evidence for a need of cognitive closure in fingerprint examiner decision-making."

[Erroneous Fingerprint Identification of Lana Canen](#), *Champion*, Dec. 2013, at 44

"Fingerprint evidence has been used by the criminal justice system for over 100 years and remains one of the most important forms of forensic identification. While fingerprint evidence is a highly reliable means of identification, no conclusion of a fingerprint expert (or any other forensic expert) should be accepted without proper verification. It is imperative that defense attorneys make sure that the fingerprint expert testifying at trial has the appropriate training and experience. Defense attorneys must confirm that fingerprint experts used the correct methodologies and best practices currently accepted by the forensic community. While cost is always a consideration, whenever fingerprint evidence is a critical factor in the prosecution of a client, the defense attorney should consider having the evidence reviewed by the defense's own qualified fingerprint expert, preferably one who has earned the certified latent print examiner designation by the International Association for Identification. A certified latent print examiner will be able not only to verify the comparison but also review transcripts and reports to more easily recognize if something is amiss. [Dorothy Clay Sims](#) stated: "If attorneys train members of the defense team to conduct deep research on an expert, and if attorneys put effort into understanding the science, they will be able to stand their ground and expose bad experts .... This is a professional and ethical obligation. A client's life may depend on it.""

[Etiology of ACE-V and Its Proper Use: An Exploration of the Relationship Between ACE-V and the Scientific Method of Hypothesis Testing](#), 56 J. Forensic Identification 345 (2006)

"ACE-V is commonly described as the scientific methodology that fingerprint practitioners use

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to individualize friction skin impressions, including both tenprint and latent print examinations. This paper looks at the history of ACE-V, analyzes whether a clear understanding of ACE-V exists, gives a brief description of how ACE-V should be used, and looks at the repercussions of incorrectly using ACE-V. Recognizing the misconceptions about ACE-V is the first step in establishing a comprehensive grasp of this process, which in turn will result in practitioners reaching the best possible conclusions."

[Expectations and Practical Results in Fingerprinting Technology: Where Is the Line Drawn?](#), 31 J. Legis. 397 (2005)

"Throughout this Note, it will examine a piece of federal legislation, which deals not only with new technology, but more specifically with new fingerprinting technology. Thus, the new advances in fingerprinting technology will take up the major focus of this Note. A discussion of such legislation and its immediate ramifications takes place in Part II. In Part III, this Note discusses the new criminal identification technology in general and its significance on the current court system. Yet, there is a downside to these new technologically advanced fingerprinting programs. Issues arise when new advances in technology are used to take partial fingerprints in order to generate a full print. Defense attorneys argue that individuals are being convicted on information that is partially produced by a machine. Thus, they see this information as fabricated evidence. This leads to the conclusion that using technology in this way is unconstitutional and inaccurate. Therefore, a discussion of the negative ramifications and possible challenges to new fingerprinting legislation and the technology behind it is put forth in Part IV.

Finally, the way this new technology is portrayed in the media, and its effect on the public perception, which has ramifications for the justice system, is discussed in Part V. For example, since this technology is operated by computers, it allows experts to introduce fingerprinting evidence in a 3D color view, rather than the traditional flat black and white perspective. Many jurors now expect to see these advancements in technology utilized both in the criminal investigation and in the courtroom. But what if their expectations are too high? Perhaps because of popular television shows such as CSI and the ever expanding Law and Order franchise, jurors expect the partial print computer-generated analysis of which the statute may not even allow. What happens when the prosecution is barred from giving the jury what they expect? Is a result of this simply that criminals go free? These questions should be thoroughly investigated when evaluating statutes which call for advancements in technology in the criminal field. In conclusion, this Note argues that instead of barring this technology from the courtroom, legislators must take the important step of setting standards to ensure that all fingerprints admitted into evidence are verifiably unaltered. Only then can we ensure that justice will prevail, and this proposed law will work to reign in jurors' exorbitant expectations of technology in the courtroom."

[Experimental Results of Fingerprint Comparison Validity and Reliability: A Review and Critical Analysis](#), 54(5) Sci. & Just. 375 (2014)

"Our purpose in this article is to determine whether the results of the published experiments on the accuracy and reliability of fingerprint comparison can be generalized to fingerprint laboratory casework, and/or to document the error rate of the Analysis–Comparison–Evaluation (ACE) method. We review the existing 13 published experiments on fingerprint comparison accuracy and reliability. These studies comprise the entire corpus of experimental research published on the accuracy of fingerprint comparisons since criminal courts first admitted forensic fingerprint

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evidence about 120 years ago. We start with the two studies by Ulery, Hicklin, Buscaglia and Roberts (2011, 2012), because they are recent, large, designed specifically to provide estimates of the accuracy and reliability of fingerprint comparisons, and to respond to the criticisms cited in the National Academy of Sciences Report (2009).

Following the two Ulery et al. studies, we review and evaluate the other eleven experiments, considering problems that are unique to each. We then evaluate the 13 experiments for the problems common to all or most of them, especially with respect to the generalizability of their results to laboratory casework. Overall, we conclude that the experimental designs employed deviated from casework procedures in critical ways that preclude generalization of the results to casework. The experiments asked examiner-subjects to carry out their comparisons using different responses from those employed in casework; the experiments presented the comparisons in formats that differed from casework; the experiments enlisted highly trained examiners as experimental subjects rather than subjects drawn randomly from among all fingerprint examiners; the experiments did not use fingerprint test items known to be comparable in type and especially in difficulty to those encountered in casework; and the experiments did not require examiners to use the ACE method, nor was that method defined, controlled, or tested in these experiments.

Until there is significant progress in defining and measuring the difficulty of fingerprint test materials, and until the steps to be followed in the ACE method are defined and measurable, we conclude that new experiments patterned on these existing experiments cannot inform the fingerprint profession or the courts about casework accuracy and errors."

[Expert Testimony on Fingerprints: An Internet Exchange](#), 43 *Jurimetrics J.* 91 (2002)

"In *United States v. Llera Plaza*, 188 F. Supp. 2d 549 (E.D. Pa. 2002), a federal district initially limited expert opinion testimony on fingerprint identifications because the government was unable to show that such identifications were sufficiently valid and reliable under Federal Rule of Evidence 702. Then, the court withdrew the opinion. This article reproduces an exchange of notes on the initial opinion submitted by five law professors."

[Factors Associated with Latent Fingerprint Exclusion Determinations](#), 275 *Forensic Sci. Int'l* 65 (2017)

"Exclusion is the determination by a latent print examiner that two friction ridge impressions did not originate from the same source. The concept and terminology of exclusion vary among agencies. Much of the literature on latent print examination focuses on individualization, and much less attention has been paid to exclusion. This experimental study assesses the associations between a variety of factors and exclusion determinations. Although erroneous exclusions are more likely to occur on some images and for some examiners, they were widely distributed among images and examiners. Measurable factors found to be associated with exclusion rates include the quality of the latent, value determinations, analysis minutia count, comparison difficulty, and the presence of cores or deltas. An understanding of these associations will help explain the circumstances under which errors are more likely to occur and when determinations are less likely to be reproduced by other examiners; the results should also lead to improved effectiveness and efficiency of training and casework quality assurance. This research is intended to assist examiners in improving the examination process and provide information to the broader community regarding the accuracy, reliability, and implications of exclusion decisions."

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[Fingerprint Error Rates and Proficiency Tests: What They Are and Why They Matter](#), 59

Hastings L.J. 1077 (2008)

"When a fingerprint examiner declares a match between a print from a known source and a latent print recovered from a crime scene, his word may seal a defendant's fate like no other form of evidence save, perhaps, DNA. At trial, the fingerprint examiner will offer little in the way of data, statistical tests, or uncertainty. Instead, he will say that latent print could only have been made by the source of the known print, that he is 100% certain, and that the method he used to make this and other identifications has an error rate of zero. In recent years, the broader scientific community has objected to this form of testimony. Critics charge that fingerprint analysis lacks an empirical foundation and that examiners make exaggerated claims that are likely to mislead jurors. In this Article, I [[Jonathan J. Koehler](#)] use a question and answer style to address key issues related to fingerprint error rates and the proficiency tests that are sometimes used to estimate those rates. My focus throughout is on how to assess the various error rates, why they matter, and how we might go about collecting the requisite data. In Part I, I identify the different types of errors and error rates and explain why knowledge of error rates is important. In Part II, I discuss the connection between proficiency tests and estimated error rates. In Part III, I identify the features proficiency tests must include to ensure that the resultant data can help estimate casework error rates."

[Fingerprint Evidence](#), 13 J.L. & Pol'y 143 (2005)

"Recent years have seen an increasing number of challenges to fingerprint evidence. Given its long standing as the "gold standard" of human identification, this may seem surprising, but there are, in fact, several natural reasons for this unexpected development. The first and most important of these is undoubtedly the spectacular rise to prominence of DNA technologies in the forensic arena. DNA identification has not only transformed and revolutionized forensic science, it has also created a new set of standards that have raised expectations for forensic science in general. Traditional areas of criminalistics that have large subjective and judgmental components, such as bite mark analysis, are now subject to much greater skepticism and more searching scrutiny.

Even given these new expectations, however, how can fingerprint analysis, so long the paradigm for human identification and so apparently simple in concept, be subject to serious question? The answer to this apparent paradox lies in recognizing the distinction between a latent print (one taken from a crime scene), and a rolled or inked print (a print taken under controlled conditions, such as at a police station). Latent prints may exhibit only a small portion of the surface of the finger and may be smudged, distorted, or both, depending on how they were deposited. For these reasons, latent prints are an "inevitable source of error in making comparisons," as they generally "contain less clarity, less content, and less undistorted information than a fingerprint taken under controlled conditions, and much, much less detail compared to the actual patterns of ridges and grooves of a finger."

Another important reason for the increased scrutiny of fingerprint evidence is the increasing number of documented misidentifications based on fingerprint analysis. Such misidentifications are of interest for several reasons: they illustrate the subjective nature of fingerprint evidence; they directly contradict a number of claims advanced by the fingerprint profession; and they provide concrete illustrations of just what can go wrong."

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[Fingerprint Evidence in an Age of DNA Profiling](#), 67 Brook. L. Rev. 13 (2001)

"This Article, part of a symposium on the past, present and future of DNA profiling, examines the history of an earlier identification technology, fingerprinting. This Article shows that fingerprinting was accepted as legal evidence remarkably rapidly and with very limited scrutiny or skepticism. It investigates why fingerprinting received such a favorable reception in court, and why fingerprinting -- unlike nearly every other form of expert evidence -- never developed the common 'battles of the expert,' with conflicting, contradictory testimony offered by both sides. The Article also develops some significant parallels between the history of fingerprint evidence and the early use of DNA profiling evidence in court. Finally, the Article examines a very recent development with respect to fingerprinting: the rise, in the last two years, of challenges to its admissibility on the grounds that it is insufficiently reliable. (So far, none of these efforts to exclude fingerprint evidence has been successful.) The Article argues that the challenges that emerged with respect to DNA profiling turned out to provide a road map for attacking fingerprinting, and examines why judges have been so reluctant to recognize the problems and limits to fingerprinting evidence. More generally, the Article argues that whatever the formal standard governing the admissibility of expert evidence, scrutiny does not take place in a vacuum. What seems obvious, what is taken for granted and what is viewed as problematic all depend on cultural assumptions and shared beliefs that change over time in noticeable and dramatic ways. When forms of evidence comport with broader understandings of what is plausible, they may escape careful scrutiny as legal evidence. While commentators have often criticized the legal system for being too conservative in admitting novel forms of expert evidence, the problem may be the reverse: we may need to be at least as worried about quick acceptance of a new technique leading to its deep and permanent entrenchment. Similarly, while attacks on the spectacle of clashing expert witnesses are legion, this historical study of fingerprint evidence suggests that there may, in fact, be a useful and productive aspect to the battles of the expert."

[Fingerprint Evidence Part I: Tracing Friction Ridges Through History](#), SSRN (2012)

"This paper constitutes a substantive history of fingerprint evidence and how fingerprints became heralded as an infallible tool for investigators and attorneys. First, the paper will survey the history of fingerprint identification techniques and evidence. Second, is the examination of fingerprints themselves, as well as the tools used to analyze and compare fingerprints, questioning claims of both uniqueness and permanence."

[Fingerprint Forgery--A Survey](#), 46 J. Forensic. Sci. 731 (2001)

"The article describes and analyzes the international survey of fingerprint and laboratory personnel about fingerprint forgery, conducted in four countries during the years 1998 through 1999. The awareness and the attitude of the professionals to the problem of fingerprint forgery was tested."

[Fingerprint Identification: A Valid, Reliable "Forensic Science"](#), 18 Crim. Just. 30 (2003)

"The article outlines the history of challenges to the use of fingerprint evidence in court by examining court decisions, especially the case of *Daubert v. Merrell Dow Pharmaceuticals*, which set standards for the use of scientific or other expert evidence in court. The uniqueness and permanence of fingerprints, or more technically -- friction ridge details -- is without question. The process of prenatal development causes an infinite variation of lines on the surface

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of the hands and the soles of the feet. Moreover, courts worldwide accept as evidence the uniqueness of friction ridge details. The problem for the court, which was laid out in Daubert, becomes deciding whether the process of examining latent prints is scientific and reliable. The article describes the three levels of impression details and then examines the use of the ACE-V method of examining friction ridge impressions, which is the standard methodology in use today. The question of whether subjectivity plays a part in the determination of a match of a latent fingerprint is discussed, as are the technical questions that remain about matching fingerprints at a crime scene to a particular individual. The courtroom challenges to the use of fingerprint identification forced the forensic science population to better articulate the process by which fingerprint individualization is achieved. The article also notes that the error rate and mistaken identifications made with fingerprint analysis is fairly small given the millions of fingerprint comparisons that are conducted worldwide on a daily basis. As such fingerprint analysis has reached a level of scientific sophistication that should render it acceptable in a court of law."

[Fingerprint Identification: How "The Gold Standard of Evidence" Could Be Worth Its Weight](#), 32 Am. J. Crim. L. 265 (2005)

"Fingerprint identification, long regarded as "the gold standard for identifying criminals," might be better analogized as an "emperor with no clothes." The reliability of fingerprint identification has never been comprehensively tested. The foundational premise on which fingerprint identification rests - that no two individuals have the same fingerprint - has never been proven. Nor has the fingerprint-identification process's error rate been established or even estimated. Yet for the better part of a century, fingerprint identification has been accepted and admitted in court, remarkably without question. This article starts with a brief overview of fingerprints themselves and explains how fingerprint identification is performed. The article then addresses, in more detail, the origin and history of fingerprint identification, explaining how the current status of fingerprinting came to be and highlighting problems through the experiences of two individuals: [Steven Cowans](#)<sup>26</sup> and [Brandon Mayfield](#). In conclusion, this article offers recommendations on how the scientific validity and reliability of fingerprint identification evidence could be improved."

[Fingerprint Problems: Laden with Historical Misconceptions](#), 18 W. Mich. U. Cooley J. Prac. & Clinical L. 199 (2017)

"Fingerprints have been in existence and documented since the beginning of time. Fingerprints, and the ridges creating such a print, can easily be seen by looking at one's own palm or finger tips. It is this simplicity that led to the acceptance of fingerprint identification in criminal trials. The use of technical terminology and a process of differentiating, matching, and comparing various collected fingerprints was engaging and eye-catching for a jury and a judge. As time progressed and the understanding of fingerprint ridges excelled, fingerprint evidence became the golden standard for identification in criminal trials. With the advent of technology and change in legal analysis, fingerprint evidence has come under attack. Several public showings of error have occurred in the last decade, which has led to increased skepticism of using fingerprint evidence in criminal trials. The purpose of this paper is to show that fingerprint examination testimony and evidence needs to be limited within, and possibly eliminated from, criminal trials occurring in

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<sup>26</sup> See [Stephan Cowans](#) (Innocence Project) ("After reviewing the DNA test results, the Suffolk County District Attorney re-analyzed the fingerprint that had been used to convict Cowans. This re-examination showed that the fingerprint did not actually belong to Cowans." Id.).

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the United States. This is because its principles, methods, and applications are based upon uncorroborated conclusions. This makes any testimony, evidence, or opinions presented to a trier of fact unreliable, invalid, and inaccurate."

[Fingerprinting: The First Junk Science?](#), 28 Okla. City U.L. Rev. 73 (2003)

"The small number of known cases of fingerprint fabrication almost undoubtedly point to a larger problem. While virtually everyone who writes on the subject notes that the true scope of the problem simply cannot be known, anecdotal evidence suggests that "a disturbing percentage of experienced examiners polled by [[Pat A. Wertheim](#)] described personal exposure to at least one of these cases during their careers." Since detection mechanisms are very poor, the actual incidence may be quite high. A recent survey of 152 police officers engaged in forensic work from four countries points to two remarkable conclusions. The combination of these two conclusions has the potential to be quite dangerous. First, a full twenty percent of respondents believed that fingerprint forgery does not exist, and twenty-three percent responded that they did not know whether fingerprint forgery exists. Only fifty-seven percent of respondents even believed in the phenomenon. Second, a full forty-five percent believed they would not be able to recognize a fingerprint forgery, and thirty-five percent responded that they simply "don't know whether they would be able to detect a forgery." Only twenty percent believed they would be able to detect a fingerprint forgery. Note that only twenty percent of respondents believe themselves capable of detecting forgeries. The proportion of examiners actually capable of detecting forgeries is probably significantly lower. The results of this survey, rudimentary though it is, suggests an explosive mixture--significant ignorance or denial of even the existence of forgery and a woeful lack of training and preparation to detect it. As the authors noted, "this visible gap between the confidence about the phenomenon of forgery, and the lack of preparation to detect it, reflects deficiencies of training programs in the field of fingerprint detection and identification."

Another difference between the Oklahoma scandal and the challenges presented by fingerprint identification is that in Oklahoma it was alleged that accepted forensic techniques were misused, whereas in the fingerprint controversy, it was alleged that the acceptance of the technique itself is unwarranted. Thus, while acknowledging that Law and Order's deception of [Joyce Gilchrist](#) was perhaps somewhat unfair to fingerprint examiners, in this paper, however, I [[Simon Cole](#)] want to take Law and Order's dramatic conceit seriously in other way. I want to suggest that Daubert's challenge to fingerprint identification has exposed many of what I think are the historical root causes of the forensic science scandals that are being revealed today."

[Fingerprints and the Daubert Standard for Admission of Scientific Evidence: Why Fingerprints Fail and a Proposed Remedy](#), 46 Ariz. L. Rev. 519 (2004)

"While a variety of critics have taken up the mantle of attacking fingerprint evidence, far fewer have focused on salvaging it. It is indisputable that fingerprints, when properly employed, can play a vital role in the justice system, both "to implicate guilty defendants, and to exonerate innocent suspects." It would be destructive folly to eliminate their usage entirely simply because of current methodological problems. But at the same time, courts should not be forced to ignore or manipulate the clear language of *Daubert v. Merrell Dow Pharmaceuticals Inc.* to justify their admission. This Note attempts to provide a partial solution to the problem established by *Daubert*, whose language seems to mandate the exclusion of fingerprint evidence. Parts II and III provide a brief history of the rules for the admissibility of scientific evidence over the past

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century, including a description of the five Daubert factors. Part IV examines how fingerprint evidence fares under each of the factors. Part V considers judicial treatment of fingerprint evidence. Finally, Part VI analyzes the science behind fingerprints and proposes changes and developments that could bring such evidence in line with Daubert without being so overly burdensome as to entail their demise."

[Fingerprints at the Crime-Scene: Statistically Certain, or Probable?](#), Significance (Royal Statistical Society), Feb. 2012, at 21

"Fingerprints have been used for a century to identify criminals. But, astonishingly, fingerprint experts rely on subjective opinion, not on objective science. Yet they are required to claim absolute certainty for their judgements – a certainty that is mythical. [Cedric Neumann](#) brings probabilities and the hope of better justice to the courtroom; with [Julian Champkin](#) he explains the idea."

[Fingerprints, Iris and DNA Features Based Multimodal Systems: A Review](#), 5(2) Int'l J. Info. Tech. and Computer Sci. (IJITCS) 88 (2013)

"Biometric systems are alternates to the traditional identification systems. This paper provides an overview of single feature and multiple features based biometric systems, including the performance of physiological characteristics (such as fingerprint, hand geometry, head recognition, iris, retina, face recognition, DNA recognition, palm prints, heartbeat, finger veins, palates etc) and behavioral characteristics (such as body language, facial expression, signature verification, speech recognition, Gait Signature etc.). The fingerprints, iris image, and DNA features based multimodal systems and their performances are analyzed in terms of security, reliability, accuracy, and long-term stability. The strengths and weaknesses of various multiple features based biometric approaches published so far are analyzed. The directions of future research work for robust personal identification is outlined."

[Fingerprints Meet Daubert: The Myth of Fingerprint "Science" Is Revealed](#), 75 S. Cal. L. Rev. 605 (2002)

"For the past ninety years, law enforcement fingerprint examiners have been matching partial latent fingerprint fragments detected at crime scenes to inked fingerprints taken directly from suspects. In many, if not most of these cases, the fingerprint identifications have been seen as dispositive of the defendant's guilt. From the very outset, law enforcement has claimed that latent fingerprint identification is a science. Over the years, this claim has achieved almost universal acceptance. Recently, however, some of the leading voices in the forensic science community have begun to question the scientific foundation of the fingerprint field and suggest that latent fingerprint identifications may not be nearly as reliable as people have long assumed. Indeed, some commentators have even gone so far as to suggest that fingerprint experts are vulnerable to challenge pursuant to the Supreme Court's seminal decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.* Defense attorneys have started to pick up on these suggestions. To date, there have been at least ten Daubert challenges filed in federal courts seeking to preclude fingerprint examiners from testifying. But, while these challenges have been the subject of much recent media attention, there has not yet been a comprehensive treatment of this issue in the academic literature. This Article constitutes a first attempt at filling that void.

Part II of this Article will examine the basics of latent fingerprint identification evidence. Part III explores the legal history of its acceptance. A brief discussion of the Supreme Court's decisions

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in *Daubert and Kumho Tire Co. v. Carmichael* will follow in Part IV, along with a thorough analysis in Part V as to how fingerprint evidence stands up under the test for admissibility set forth in those decisions. As this Article will demonstrate, fingerprint analysis fails each and every one of the Supreme Court's suggested criteria for admission. The myth that there is a "science of fingerprints" will thus be exposed for what it really is: an unfounded creation of law enforcement fingerprint examiners. Finally, Part VI examines some of the recent cases that have considered the admissibility of fingerprint evidence."

[Forensic Fallacies and a Famous Judge](#), 54 *Jurimetrics J.* 211 (2014)

"Judge [Richard Posner](#), one of the great quantitative legal minds of our time, relied on flawed and illogical arguments in several recent forensic science appellate decisions. He equated non-equivalent probabilities and offered non sequiturs to support his belief that fingerprint errors are rare. I [[Jonathan J. Koehler](#)] speculate that his errors spring from cognitive biases that are activated when people are asked to support or prove that which we "know" to be so."

[Grandfathering Evidence: Fingerprint Admissibility Rulings from Jennings to Llera Plaza and Back Again](#), 41 *Am. Crim. L. Rev.* 1189 (2004)

"This Article treats post-Daubert rulings on the admissibility of forensic fingerprint identification as a "demanding test" of the courts' ability to apply Daubert consistently and coherently. The article begins with a discussion of early admissibility decisions in the United States, beginning with *People v. Jennings* (1911). It shows that courts did not demand, and fingerprint experts did not provide, evidence of the reliability of forensic fingerprint identification. It argues that courts were seduced by the "fingerprint examiner's fallacy," in which the uniqueness of all human fingerprints is taken as evidence of the accuracy with which human fingerprint examiners could attribute crime-scene prints to their correct source fingers. This fallacy also pervades other forensic identification techniques. The article then shows that early post-Daubert decisions continued to avoid demanding validation of forensic fingerprint evidence. The main focus of the article is the two, highly publicized, Llera Plaza decisions, one restricting the admissibility of fingerprint evidence, the other reversing that decision ten weeks later. The article refutes a common mythology that the Llera Plaza court reversed itself based on "new evidence" and shows that the new evidence presented to the Llera Plaza court was alarming rather than reassuring. It concludes that Llera Plaza II actually reverted back to the pre-Daubert reasoning adopted in *Jennings*: fingerprint evidence is admitted because it is admitted in Britain. Finally, the article explores the paradox posed by the courts' own role in legitimating fingerprint evidence. Since fingerprint evidence has largely earned its legitimacy from legal acceptance, rather than scientific validation, courts are put in a difficult position when asked to rule on its admissibility. This is a problem that also exists for other forensic identification techniques."

[How Can We Improve the Reliability of Fingerprint Identification](#), 90(2) *Judicature* 55 (2006)

"The main problem with the current fingerprint examination system is that it cannot handle the enormous influx of new fingerprints that have hit the system in the past several years. Currently there are approximately 500 million criminal fingerprints in the Federal Bureau of Investigation's Integrated Automated Fingerprint Information System (IAFIS) Fingerprint Repository. The world population of fingerprints currently exceeds 60 billion. The current fingerprint examination system is tasked with the daily examination of approximately 130,000 arrest booking, watch list, employment background, and criminal checks and its potential "matches"

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lack the corroboration of neighboring fingers. Recommendations for improving the fingerprint examination system are offered and include the reinstatement of the Henry 10 Finger Classification System, which used all 10 fingers and their interrelationships in classifying an individual in the times when it was still possible to manually maintain and search inked fingerprint cards. The author also recommends conducting more research on the best way to work with fingerprints and the best way to sort and maintain the fingerprint examination system. Data mining is presented as a computer-based analysis technique that can look for patterns, trends, and associations within the fingerprint repository, which can then be used to identify the best ways to use ridge information, pores, and other elements as identifying characteristics. In the absence of a major reinvention of the fingerprint examination system, the reliability of fingerprint "matches" will come under increasing scrutiny."

[How I Created a Monster](#), Litig. (ABA), Winter 2015, at 46

"In my case, a 2009 pro bono court appointment in a federal drug prosecution, I dared to challenge a gold standard of so-called "scientific" evidence. I [[Gabriel A. Fuentes](#)] dared to argue that everything we have been told about fingerprint examiners' ability to claim a match between a fingerprint deposited on a surface somewhere and a particular individual is without any real scientific basis, and that without an adequate showing of validity or reliability these claims should not be admitted as proper expert testimony. Immersed in the task and thrill of the exploration, I thought I was pioneering, and in many senses, I was. I thought I was on the cutting edge of science or law, or even both. Only after my creation came to life and began terrorizing the countryside did I realize the horror I had wrought."

[How Jurors Evaluate Fingerprint Evidence: The Relative Importance of Match Language, Method Information, and Error Acknowledgment](#), 10 J. Empirical Legal Stud. 484 (2013)

"Fingerprint examiners use a variety of terms and phrases to describe a finding of a match between a defendant's fingerprints and fingerprint impressions collected from a crime scene. Despite the importance and ubiquity of fingerprint evidence in criminal cases, no prior studies examine how jurors evaluate such evidence. We present two studies examining the impact of different match phrases, method descriptions, and statements about possible examiner error on the weight given to fingerprint identification evidence by laypersons. In both studies, the particular phrase chosen to describe the finding of a match—whether simple and imprecise or detailed and claiming near certainty—had little effect on participants' judgments about the guilt of a suspect. In contrast, the examiner admitting the possibility of error reduced the weight given to the fingerprint evidence—regardless of whether the admission was made during direct or cross-examination. In addition, the examiner providing information about the method used to make fingerprint comparisons reduced the impact of admitting the possibility of error. We found few individual differences in reactions to the fingerprint evidence across a wide range of participant variables, and we found widespread agreement regarding the uniqueness of fingerprints and the reliability of fingerprint identifications. Our results suggest that information about the reliability of fingerprint identifications will have a greater impact on lay interpretations of fingerprint evidence than the specific qualitative or quantitative terms chosen to describe a fingerprint match."

[Impact of Human-Technology Cooperation and Distributed Cognition in Forensic Science: Biasing Effects of AFIS Contextual Information on Human Experts](#), 57 J. Forensic Sci. 343

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(2012)

"Experts play a critical role in forensic decision making, even when cognition is offloaded and distributed between human and machine. In this paper, we investigated the impact of using Automated Fingerprint Identification Systems (AFIS) on human decision makers. We provided 3680 AFIS lists (a total of 55,200 comparisons) to 23 latent fingerprint examiners as part of their normal casework. We manipulated the position of the matching print in the AFIS list. The data showed that latent fingerprint examiners were affected by the position of the matching print in terms of false exclusions and false inconclusives. Furthermore, the data showed that false identification errors were more likely at the top of the list and that such errors occurred even when the correct match was present further down the list. These effects need to be studied and considered carefully, so as to optimize human decision making when using technologies such as AFIS."

[Individualization Fallacy in Forensic Science Evidence](#), 61 Vanderbilt L. Rev. 199 (2008)

"Forensic identification science involves two fundamental steps. The first step is to compare a questioned item of evidence to an exemplar from a known source and judge whether they appear so alike that they can be said to match. The second step is to assess the meaning of that reported match: What is the probability that the questioned and the known originated from the same source? Part II of this Essay explains what we mean by the term 'individualization fallacy' and describes the origins of individualization in criminalistics. Part III critically examines the arguments offered in support of the individualization hypothesis. This Part also addresses the second step in forensic identification: What inferences can be drawn from a forensic scientist's conclusion that an exemplar (such as a partial fingerprint, handwriting sample, or tireprint) matches a known source? Forensic scientists across a broad array of sub-specialties long have maintained that such a finding is synonymous with a conclusion that the exemplar marking is produced by the known source. Part IV gives a historical account of scientists who have recognized the problem of individualization in forensic science. Part V offers suggestions for ways to improve the scientific foundation of identification in criminalistics. Finally, Part VI concludes that forensic scientists must provide sound evidence for their conclusions and should avoid exaggerating their results."

[Individualization Is Dead, Long Live Individualization! Reforms of Reporting Practices for Fingerprint Analysis in the United States](#), 13(2) Law, Prob. & Risk. 117 (2014)

"Individualization, the claim to be able to reduce the potential donor pool of a forensic trace to a single source, has long been criticized. This criticism was echoed by a 2009 U.S. National Research Council report, which called such claims unsupportable for any discipline save nuclear DNA profiling. This statement demanded a response from those disciplines, such as fingerprint analysis, that have historically designated 'individualization' one of their approved testimonial conclusions. This article analyses three serial responses to this challenge by the U.S fingerprint profession. These responses posited new terms for testimonial reports or modified the definition of individualization. The article argues that these reforms have yet to 'fix' individualization and that all three reforms suffered semantic and conceptual difficulties. The article concludes by suggesting that these difficulties may be traced to the insistence on retaining, and somehow justifying, the term and concept 'individualization', instead of developing new terms and concepts from a defensible reasoning process."

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[Invincible Fingerprint: Understanding the Basics, Defeating the Myths](#), NYSBA Crim. Just. Sect. Fall Meeting, Oct. 2013

"Fingerprint practitioners have historically been hired by law enforcement to aid the prosecution with convictions. Defense attorneys have had little access to essential information. Even with the ability to interview fingerprint practitioners, information has been limited due to the adversarial relationship between the prosecution and the defense. Attorneys must understand basic information about the evidence in a case before they can assess its relevance and weight. This presentation will discuss how fingerprints are formed, how latent impressions are deposited, how images are compared and how conclusions are arrived at. Common misconceptions will be discussed which will give attorneys the knowledge needed to evaluate the weight of the evidence and the expertise of the practitioner. This information can be applied to all pattern evidence practitioners and conclusions."

[Is Fingerprint Identification Valid? Rhetorics of Reliability in Fingerprint Proponents' Discourse](#), 28 Law & Policy 109 (2006)

"Beginning around 1999, a growing number of scholars have claimed that validation studies for forensic fingerprint identification do not exist. This article revisits that claim by reviewing literature produced by proponents of fingerprint identification in response to that charge. It shows that fingerprint proponents employ rhetorical tricks in which they claim to address the validity question, but then subtly shift the question to ones that are easier to address. The article explores several different rhetorical strategies fingerprint proponents use to appear to be demonstrating validity, while in fact demonstrating other things. These include the fingerprint examiner's fallacy and the casework fallacy. The inability of fingerprint proponents to refute the charge that validity studies are lacking is further evidence that the charge is, in fact, correct."

[Latent Fingerprint Evidence: Fabrication, Not Error](#), Champion, Nov./Dec. 2008, at 16

"Many fingerprint experts may believe it improper to discuss the topic of fingerprint fabrication, seeing occurrences as isolated incidents rather than a pattern of dishonesty. But a simple accounting of known cases of fingerprint fabrication shows it to be a serious problem, more serious than that of misattribution, or "erroneous identification" as fingerprint experts themselves call it. Honest mistakes do occur and, unfortunately, some go undetected for years, maybe forever. But the number of such erroneous identifications shown to have actually occurred is much smaller than the number of cases of fingerprint fabrication known to have been committed. In this specialized discussion, the terms "forgery" and "fabrication" have very different and unrelated meanings. A forged fingerprint is a fingerprint that actually exists on a surface, but was deposited there by some person other than the one to whom it can be correctly identified. For example, if a safe burglar had a small rubber stamp with a reproduction of someone else's fingertip and used that little rubber stamp to leave a fingerprint impression on a safe he was burglarizing, that would be a forged fingerprint. The police might innocently dust and lift that fingerprint and, believing it to be genuine, use it unwittingly as evidence against an innocent person. In that sense, a forged fingerprint is sometimes referred to as "planted." A fabricated fingerprint is one that never existed on the surface from which it is purported to have come. For example, a police officer might tell a vagrant to place his hands on the fender of the police car and pat him down for weapons before talking to him. The officer might then release the vagrant, drive off, stop a few blocks away, then dust and lift the fingerprints from the fender of his car. If the officer saved that lift and later mislabeled it as having come from the safe at the burglary

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mentioned in the previous paragraph, that would be a fabricated fingerprint. Fabrication of fingerprint evidence is a criminal act committed by police personnel."

[Latent Fingerprints: Fighting Unreliable Scientific Evidence](#), For the Defense, Feb.-Apr. 2016, at 1  
"The disconnect between the public perception and scientific reality of the reliability of latent fingerprints is incredibly vast. So many pervasive and severe issues abound with latent fingerprints that they arguably do not pass our standards for scientific evidence. The defense community thus must be prepared to educate both the judge and jury about latent prints in order to minimize the impact of or even exclude this evidence."

[Latent Justice: Daubert's Impact on the Evaluation of Fingerprint Identification Testimony](#), 70 Fordham L. Rev. 2819 (2002)

"This Note attempts to connect the scientific techniques used in fingerprinting, as well as the scientific premises that underlie these techniques, with the judicial evaluation of fingerprint evidence in the courtroom. As a closer analysis of Judge Pollak's decisions in Llera Plaza will show, Daubert fails to provide sufficient assistance to judge's ruling on expert scientific testimony. Daubert is the reality with which courts must work; within that reality, however, courts are struggling. The decisions rendered in Llera Plaza on January 7, 2002, and March 13, 2002, highlight the confusion over the Daubert standard as well as the areas where courts should more thoroughly analyze the reliability of scientific techniques and the admission of testimony about these techniques in the courtroom."

[Legal and Scientific Evaluation of Forensic Science \(Especially Fingerprint Expert Testimony\)](#), 33 Seton Hall L. Rev. 1167 (2003)

"I [[Michael J. Saks](#)] want to address two issues. First, I will state what I believe is the most essential test, the heart and soul of Dauber and its progeny. In light of that essential test, I then discuss how all courts that have considered challenges to fingerprint expert testimony have concluded that the expert testimony is admissible by failing to perform that essential test."

[More Than Zero: Accounting for Error in Latent Fingerprint Identification](#), 95 J. Crim. L. & Criminology 985 (2005)

"The recent exposure of an erroneous latent print identification by the FBI that led to the false arrest of Oregon attorney Brandon Mayfield has punctured the myth of the "infallibility" of fingerprint identification and generated renewed interest in the "error rate" of fingerprint identification. This article undertakes a comprehensive review of what is known about the potential error rate of latent print identification. The article first presents a compilation of all known exposed cases of fingerprint misattributions. Although only twenty such cases have been documented, an analysis of these cases suggests that these cases likely represent only a small portion of the true set of latent print misattributions. Then, the article compiles and analyzes proficiency test data that sheds some light on the potential error rate of fingerprint identification. The second half of the article is devoted to the fingerprint profession's and courts' rhetorical accounts of the potential error rate of latent print identification. This section analyzes efforts to minimize, dismiss, or otherwise account for fingerprint error. Fingerprint examiners make claims of error-free practice that belie the reality of error. The article concludes that we must confront, analyze, and seek to understand error if we want to reduce it."

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[Myth of Fingerprints](#), Champion, Sept.–Oct. 2003, at 37

"There was a time — not very long ago — when we considered fingerprints to be the gold standard of scientific evidence. We assumed that fingerprint analysts were virtually infallible. Defense counsel not only rarely challenged the admissibility of fingerprint testimony; but on many occasions, they also stipulated to the admission of the findings of fingerprint examiners. However, in the past few years we have become more skeptical about the opinions of fingerprint examiners. The initial shock came when proficiency tests revealed a substantial margin of error, including false positives, in examiners' findings. Finally, in 2002, the forensic science community was stunned when Judge Pollak excluded fingerprint testimony in *United States v. Llera Plaza*, before changing his mind."

[Prevalence and Potential Causes of Wrongful Conviction by Fingerprint Evidence](#), 37 Golden Gate U. L. Rev. 39 (2006)

"This paper discusses a problem that might at first glance appear to be either non-existent or unimportant: wrongful conviction by fingerprinting. Latent print individualization, more commonly known as "fingerprint identification," has long enjoyed a reputation as one of the most powerful and trustworthy forms of evidence available to the criminal law. For most of the past century, in which latent print evidence was used in criminal justice systems of the United States and the rest of the world, it was widely assumed that wrongful convictions by fingerprint were either impossible or so rare that the problem could be safely ignored. To be sure, wrongful convictions by fingerprint appeared in case law not long after the introduction of latent print evidence into the U.S. criminal justice system in 1906, the earliest known such case appearing in 1920. But such cases were quite rare. In addition, in many cases the erroneous evidence was explained as more a product of expert testimony by an incompetent or unscrupulous latent print examiner rather than a flaw in latent print evidence itself. These two arguments sustained the belief that wrongful conviction by fingerprint was so rare that it could be safely ignored. They explain the apparent oxymoron by which latent print examiners pronounced fingerprinting "infallible" even as latent print errors were known to them. . . .

That situation changed in 2004 when [Steven Cowans](#) became the first - and thus far the only - person to be exonerated by DNA evidence for a wrongful conviction in which fingerprint evidence was a contributing factor. Cowans's wrongful conviction in Boston in 1997 for the attempted murder of a police officer was based almost solely on eyewitness identification and latent print evidence. The Cowans case not only provided dramatic additional support for the already established proposition that wrongful conviction by fingerprint was possible, it also demonstrated why the exposure of such cases, when they do occur, is exceedingly unlikely. These points have already been made in a comprehensive 2005 study of exposed cases of latent print misattributions. In this article, I [[Simon A. Cole](#)] discuss some additional things that we have learned about the prevalence and potential causes of wrongful conviction by fingerprint in the short time since the publication of that study."

[Out of the Daubert Fire and into the Fryeing Pan? Self-Acceptance Versus Meta-Expertise and the Admissibility of Latent Print Evidence in Frye Jurisdictions](#), 9 Minn. J.L. Sci. & Tech. 453 (2008)

"While a fair amount of judicial and scholarly attention has been devoted the admissibility of latent print evidence under the Daubert standard for expert evidence, there has been no evaluation of its admissibility under the Frye standard. This is due the widespread assumption

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that latent print evidence is obviously admissible under Frye. This, in turn, is based on two assumptions: that latent print individualization is generally accepted in the relevant scientific community and that non-novel evidence is immune to the Frye test. Both assumptions are shown to be false. The article introduces the concept of meta-expertise to denote scientists and scholars who evaluate the knowledge claims of other experts. An analysis of the state of opinion in the scientific community shows that latent print individualization is not generally accepted. This lack of general acceptance points to a broader issue beyond the admissibility of the evidence: the continuing dramatic disconnect between the legal and scientific communities regarding the validity of latent print individualization."

[Pattern Evidence Witnesses: Questions That Should Be Asked, But Rarely Are](#), NYSBA Crim. Just. Sect. Fall Meeting, Oct. 2013

"Working in a particular discipline for a long period of time may sound impressive. Working in an accredited lab may sound equally impressive. Are length of services and accreditation factors of competency and accuracy? How are conclusions arrived at in different forensic disciplines? Are there specific criteria practitioners must adhere to? Where are these criteria listed and how was the criteria established? Is it possible that another practitioner would arrive at a different conclusion? This presentation will explore a range of questions that should be asked of all pattern evidence witnesses. The importance of the questions and the meaning behind the answers will be discussed."

[Perspective on the Appropriate Weight to Be Given to the National Academy of Sciences' Report on Forensics in Evidentiary Hearings: The Significance of Continued Court Acceptance of Fingerprint Evidence](#), 42 Sw. L. Rev. 605 (2012-2013)

"The United States Congress commissioned the National Academy of Sciences to broadly examine (among other related issues) the needs of the forensic science community. On February 18, 2009, after more than two years of work, the Committee on Identifying the Needs of the Forensic Science Community at the National Academy of Sciences (hereinafter "NAS Committee") issued a report, Strengthening Forensic Science in the United States: A Path Forward (hereinafter "NAS Report"). This report and post-publication clarifications by the co-chairs of the committee were very critical of many of the forensic disciplines. Discussed in detail were their findings of major weaknesses in essential aspects of fingerprint identification analyses and in court testimony given by latent print examiners. The NAS Committee was of the opinion that the situation was so prejudicial that the situation was in need of immediate change."

[Probability, Individualization, and Uniqueness in Forensic Science Evidence: Listening to the Academies](#), 75 Brook. L. Rev. 1163 (2010)

"Day in and day out, criminalists testify to positive, uniquely specific identifications of fingerprints, bullets, handwriting, and other trace evidence. A committee of the National Academy of Sciences, building on the writing of academic commentators, has called for sweeping changes in the presentation and production of evidence of identification. These include some form of circumscribed and standardized testimony. But the Academy report is short on the specifics of the testimony that would be legally and professionally allowable. This essay outlines possible types of testimony that might harmonize the testimony of criminalists with the actual state of forensic science. It does so through a critical analysis of the arguments and proposals of two critics of "individualization" testimony in forensic science. By clarifying the relationship

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between uniqueness and individualization, the essay advances a slightly less skeptical view of individualization than that expounded by Professors [Michael Saks](#) and [Jay Koehler](#). Among other things, the essay argues that there is no rule of probability, logic, or ontology that prevents individualization and that testimony of uniqueness or individualization is scientifically acceptable in some situations. Recognizing that these situations are unusual, however, it also surveys some evidentiary rules and practices that could curb the excesses of the current form of testimony."

[Reliability and Admissibility of Fingerprint and Bitemark Analyses](#), 32 Buff. Pub. Int. L.J. 41 (2013-2014)

"Cases like those of Brandon Mayfield and [Ray Krone](#) raise the question of how courts decide to admit such forensic techniques into evidence. Rules of evidence govern the admissibility of expert testimony regarding scientific and technical matters, such as forensic analyses. Such rules differ depending on the jurisdiction, but they generally come from case law and/or statutory law. This article will focus on federal rules of evidence and New York's rules of evidence, particularly in the context of fingerprint and bitemark analyses."

[Reliability of Latent Print Individualization: Brief of Amici Curiae Submitted on Behalf of Scientists and Scholars by the New England Innocence Project, Commonwealth v. Patterson](#), 42 Crim. L. Bull. 21 (2006)

"In Commonwealth v. Patterson, Massachusetts' highest court sought amicus curiae briefs on this question: has the Commonwealth met its burden under Commonwealth v. Lanigan, 419 Mass. 15 (1994), and Daubert v. Merrell Dow Pharmaceuticals, 509 U.S. 579 (1993), to establish the reliability of latent fingerprint individualization applying ACE-V methodology to simultaneous impressions. This marks the first time in the debate over the reliability of latent print evidence, dating from a 1999 hearing in United States v. Mitchell, 365 F.3d 215 (3d Cir. 2004), that a court has issued such a solicitation. Patterson involved an extensive Daubert challenge to both the general reliability of latent fingerprint individualization using the ACE-V (Analysis, Comparison, Evaluation-Verification) "methodology" and its reliability as specifically applied to so-called "simultaneous impressions." When no single latent print contains sufficient information to warrant a conclusion of individualization, latent print examiners sometimes aggregate information across multiple impressions if they think they can determine that the impressions were deposited simultaneously, thus attributing the impressions to a single donor. This amicus curiae brief was filed by the New England Innocence Project on behalf of fifteen scientists and scholars from a variety of disciplines (biology, forensic science, law, linguistics, mathematics, political science, psychology, science and technology studies, and statistics). It represents the clearest expression to date of "the consensus view of the scientific community," namely, that the reliability of latent fingerprint individualization has not been established, that the community of latent fingerprint examiners is neither sufficiently independent nor objective to establish this reliability, and that the reliability of latent print individualization in general should be established before a more controversial technique (simultaneous impressions) is accepted."

[Scandal, Fraud, and the Reform of Forensic Science: The Case of Fingerprint Analysis Standards for Examining Friction Ridge](#), 119 W. Va. L. Rev. 523 (2016)

"The purpose of this Article is to explore the role of scandal in bringing about the reform of forensic science. It uses the forensic discipline of latent print (fingerprint) analysis as a case

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study. It further confines itself to two countries: the United States and the United Kingdom. Each country hosted a major scandal with regard to fingerprint analysis within the past two decades. These scandals, commonly known by the names of the victims of misidentification are the "Mayfield case" in the U.S. and the "[McKie case](#)" in the United Kingdom. This Article seeks to assess the impact of these two scandals on the reforms to fingerprint analysis that have occurred since the McKie case in 1997. It does so using the historian's technique of posing a counterfactual: what would fingerprint analysis look like today had these two scandals not occurred, or, more realistically, had they occurred, but not been exposed? This Article finds that these two scandals played important roles in bringing about the reforms in fingerprint analysis that have occurred in the past two decades. This Article concludes with some reflections on the implications of this finding: that the discipline of forensic science and the institutions that are its clients (courts, police, attorneys, government, the public, etc.) are so heavily dependent on scandal as an engine for bringing about what few dispute were necessary and positive reforms. It suggests that we need to seek more stable and less volatile means of bringing about necessary and positive reforms."

[Scientific Validation of Fingerprint Evidence Under Daubert](#), 7 Law, Prob. & Risk. 87 (2008)  
"When a scientific method is used by an expert to reach a conclusion offered in court, the Frye ruling in 1923 and particularly the Daubert ruling in 1993 requires that the method itself has been shown to be valid. When applied to fingerprint methods, valid means accurately distinguishing between pairs of prints made by one and by two donors. Courts have ruled uniformly in more than 40 Daubert hearings since 1999 that fingerprint evidence rests on a valid method, referred to as the Analysis-Comparison-Evaluation-Verification (ACE-V) method. In this article, we discuss the scientific evidence needed to document the validity of ACE-V. We describe examples of experiments that would provide this evidence, and review the available published research. We briefly describe the testimony presented by fingerprint examiners in these hearings, intended to show that ACE-V meets the Daubert criteria for validity. We analyze evidence for the validity of the standards underlying the conclusions made by fingerprint examiners. We conclude that the kinds of experiments that would establish the validity of ACE-V and the standards on which conclusions are based have not been performed. These experiments require a number of prerequisites, which also have yet to be met, so that the ACE-V method currently is both untested and untestable."

[Sleeping Gatekeepers: United States v. Llera Plaza and the Unreliability of Forensic Fingerprinting Evidence Under Daubert](#), 14 Alb. L.J. Sci. & Tech. 171 (2003)

"The potential utility of fingerprints is abundant both in and out of the criminal context. Nonetheless, forensic science has not been subjected to the independent, intensive scrutiny that most other scientific and technical fields endure. Although most of the public does not currently question the accuracy of forensic fingerprint identification evidence, its shortcomings are slowly surfacing. Public confidence in our criminal justice system will be undermined and will deteriorate if questionable science continues to determine the guilt or innocence of the accused. Judges in future cases involving latent fingerprint identification evidence are faced with a weighty challenge, implicating very high stakes. In assessing the reliability of such evidence, judges should follow the initial course charted by Judge Pollak, and prohibit experts from testifying as to their conclusions on whether a latent and rolled print "match." Until the theoretical underpinnings and ACE-V technique are validated through rigorous basic scientific

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research, and until the fingerprinting field is unified, independent, and regulated for quality assurance, qualified experts should only testify as to the similarities and differences between latent and rolled fingerprints. Additionally, the success of this approach requires that trial judges grant defense requests for the appointment of fingerprint experts to aid in an indigent's defense."

[Swirls and Whorls: Litigating Post-Conviction Claims of Fingerprint Misidentification After the NAS Report](#), 2010 Utah L. Rev. 267

"The National Research Council of the National Academies' 2009 report, *Strengthening Forensic Science in the United States: A Path Forward* ("NAS Report"), noted that "[t]he number of exonerations resulting from the analysis of DNA has grown across the country in recent years, uncovering a disturbing number of wrongful convictions — some for capital crimes — and exposing serious limitations in some of the forensic science approaches commonly used in the United States." The evidence can include the comparisons of bite marks, hairs, voiceprints, earprints, and fingerprints. This article provides a brief outline of latent fingerprint evidence as it is currently presented in courts. Latent fingerprint individualization was rapidly accepted as forensic identification evidence, largely without question — and before being validated through scientific research. Legal challenges only began in the 1990s. Although the NAS Report's discussion of fingerprint identification raises many questions, petitioners who claim to have been wrongly convicted because of it will still face substantial hurdles."

[Techniques for Mitigating Cognitive Biases in Fingerprint Identification](#), 59 UCLA L. Rev. 1252 (2011–2012)

"Since the U.S. Supreme Court's holdings in *Daubert v. Merrell Dow Pharmaceuticals, Inc.* and *Kumho Tire Co. v. Carmichael*, which articulated that judges have a gatekeeping responsibility to ensure that all expert testimony is sufficiently reliable, academic critics have reviewed forensic science evidence with greater scrutiny. While fingerprint identification has historically been touted as infallible, recent empirical research has revealed that this is far from the case. Fingerprint examiners do make mistakes—some of which can be attributed to a set of inherently human cognitive biases that we all share. Scholars have increasingly studied the role that cognitive biases can play in fingerprint examiner decisionmaking. Until now, however, scant attention has been paid to ways in which these biases can be mitigated. In this Comment, I [[Elizabeth J. Reese](#)] contribute to filling that void by identifying and examining debiasing techniques that could be used to combat cognitive biases in the fingerprint identification domain, as well as by suggesting ways in which these techniques could potentially be implemented in forensic science laboratories."

[Toward a More Critical Application of Daubert in Criminal Cases: Fingerprint Opinion Testimony After the National Academy of Sciences Report](#), 12 Expert Evidence Rep. (Bloomberg BNA) 549 (2012)

"The sea change in our understanding of fingerprint identification testimony, and of its very real limits, requires lawyers and courts to look beyond the inadequate guidance past judicial decisions have provided, says attorney [Gabriel A. Fuentes](#) in this BNA Insight. The author examines the fingerprint identification landscape, and concludes when *Daubert* or *Frye* is appropriately applied, there should be no place in the courtroom for fingerprint examiners to make individualization claims, at least until research exists to back up the validity of an opinion that

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will be so compelling to jurors who have been told for their entire lives that fingerprint identification is infallible."

[Use of Technology in Human Expert Domains: Challenges and Risks Arising from the Use of Automated Fingerprint Identification Systems in Forensic Science](#), 9 Law, Prob. & Risk. 47 (2010)

"Cognitive technologies have increased in sophistication and use, to the point of interactively collaborating and distributing cognition between technology and humans. The use of Automated Fingerprint Identification Systems (AFIS), computerized databases of fingerprints, by latent fingerprint experts, is a par-excellence illustration of such a partnership in forensic investigations. However, the deployment and use of cognitive technology is not a simple matter. If a technology is going to be used to its maximum potential, we must first understand the implications and consequences of using it and make whatever adaptations are necessary both to the technology and to the way humans work with it. As we demonstrate with AFIS, latent fingerprint identification has been transformed by technology, but the strategies used by humans who work with this technology have not adequately been modified and adjusted in response to these transformations. For example, the chances that an AFIS search will produce prints with incidental similarities-i.e. that highly similar, look-alike, prints from different sources will result from an AFIS search-has not been sufficiently investigated or explored. This risk, as well as others, may mean that the use of AFIS introduces new concerns into the process of latent fingerprint identification, some of which may even increase the chances of making erroneous identifications. Only by appropriate and explicit adaptation to the new potential and the new challenges posed by the new technology will AFIS and other cognitive technologies produce efficient and effective partnerships."

[Validity of Latent Fingerprint Identification: Confessions of a Fingerprinting Moderate](#), 7 Law, Prob. & Risk. 127 (2008)

"The validity of latent fingerprinting identification as a science has been receiving growing scholarly attention. The courts, however, have almost uniformly not only held that fingerprint identification withstands scrutiny under Daubert, but have largely ignored or sidestepped the scholarly arguments on the other side. In this essay, I [[Jennifer Mnookin](#)] argue that fingerprint evidence ought to fail Daubert, but not for the reasons that many might think. This essay is written in response to a forthcoming article in Law, Probability and Risk, which argues that latent fingerprint identification has not only never been subjected to genuinely scientific testing, but that at present, such testing would literally be impossible, given the state of latent fingerprint identification as a technique. I agree with the claims this article makes about the lack of testing (and the impossibility of certain kinds of testing, given our present state of knowledge), but challenge the conclusion that these failures ought necessarily to mean it fails Daubert. Rather, latent fingerprint identification fails Daubert for the failure to do various other, more modest, kinds of testing - especially proficiency testing of examiners; research into biases and observer effects; and scaling back claims about the certainty of identifications. Daubert, I suggest, should be understood not to require the impossible, but instead, should merely require that evidence of validity that can reasonably be produced under the circumstances. Unfortunately, even under this more modest and moderate understanding of what ought to be required, fingerprinting still fails."

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[Why Experts Make Errors](#), 56 J. Forensic Identification 600 (2006)

"Expert latent fingerprint examiners were presented with fingerprints taken from real criminal cases. Half of the prints had been previously judged as individualizations and the other half as exclusions. We re-presented the same prints to the same experts who had judged them previously, but provided biasing contextual information in both the individualizations and exclusions. A control set of individualizations and exclusions was also re-presented as part of the study. The control set had no biasing contextual information associated with it. Each expert examined a total of eight past decisions. Two-thirds of the experts made inconsistent decisions. The findings are discussed in terms of psychological and cognitive vulnerabilities."

## AMERICAN LAW REPORTS

[Admissibility and Weight of Fingerprint Evidence Obtained or Visualized by Chemical, Laser, and Digitally Enhanced Imaging Processes](#), 110 A.L.R.5th 213 (2003)

"Fingerprint examiners compare exemplar prints with unknown prints left on items of evidence or at a crime scene. Some of the more common, recently developed methods of fingerprint acquisition and visualization include chemical processes involving the use of ninhydrin and superglue, laser illumination and scanning, and digitally enhanced imaging. Courts have considered challenges to the admissibility of fingerprint evidence based on the reliability of techniques and devices employed to obtain and visualize fingerprints. For example, in *U.S. v. Patterson*, 277 F.3d 709, 57 Fed. R. Evid. Serv. 1319, 110 A.L.R.5th 681 (4th Cir. 2002), a drug prosecution where a fingerprint on a bag of cocaine was matched to a fingerprint from the defendant produced by a laser-scanning device, the court concluded that the government provided sufficient authentication that the laser device reliably depicted the defendant's fingerprints, despite the fact that no government witness had examined the defendant's fingers and could verify that they were accurately rendered on the images, and despite the fact that the deputy who operated the machine lacked the necessary expertise to establish its reliability. This annotation collects and analyzes those state and federal cases discussing the admissibility and weight of fingerprint evidence obtained or visualized by chemical, laser, and digital imaging enhancement processes."

[Failure of State Prosecutor to Disclose Fingerprint Evidence as Violating Due Process](#), 94 A.L.R.5th 393 (2001)

"The police and the prosecution are often accused by the defense of suppressing, losing, destroying, or otherwise failing to produce exculpatory evidence, including fingerprints, despite statutory or constitutional requirements that all such evidence be turned over to the defense on request. Such requirements are embodied in the landmark case of *Brady v. Maryland*, 373 U.S. 83, 83 S. Ct. 1194, 10 L. Ed. 2d 215 (1963), in which the United States Supreme Court held that the suppression by the prosecution of evidence favorable to the accused on request violates due process where the evidence is material, defined as being exculpatory. Whether evidence consisting of fingerprints is in fact material and exculpatory depends on the facts of individual cases. For example, in *State v. Cager*, 732 So. 2d 97, 94 A.L.R.5th 705 (La. Ct. App. 4th Cir. 1999), the court held that the failure to timely disclose a police report showing that there were no fingerprints on the gun found in the shooting victim's possession and that the gun was functional did not prejudice the defendant for purposes of *Brady*, where the defendant made no claim of self-defense, no witness saw the victim fire the gun even though they saw him reach for it, and

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there were no spent casings found in the gun. This annotation collects and discusses the cases adjudicating whether the failure of a state prosecutor to disclose fingerprint evidence violated the constitutional protection of due process."

### Fingerprints as Signature, 72 A.L.R.2d 1267 (1960)

"From the annotation in 114 A.L.R. 1110 on the subject, "Manner of signing as affecting sufficiency of signature of testator," the present annotation takes such cases as pertain to fingerprints as constituting a signature."

### Fingerprints, Palm Prints, or Bare Footprints as Evidence, 28 A.L.R.2d 1115 (1953)<sup>27</sup>

"The use of fingerprints as a means of identification is comparatively recent in the United States although it is of very ancient origin. It was probably discovered by the Chinese and the origin has been traced back to a hundred years before the Christian era. The fact that identification by such means presents novel questions to the court does not preclude the admission of the evidence upon common-law principles. In fact, the method of identification of a person by correspondence of fingerprints has become widely recognized as a relatively accurate system of establishing identity and has become a fixed part of our system of jurisprudence."

### Identification by Palm-Print Impressions, 3 A.L.R. 1706 (1919)

"That evidence as to the correspondence of finger prints is admissible to prove identity is affirmed in all the cases which have considered the question. See *People v. Jennings* (1911) 252 Ill. 534, 43 L.R.A.(N.S.) 1206, 96 N.E. 1077; *State v. Cerciello* (1914) 86 N.J.L. 309, 52 L.R.A.(N.S.) 1010, 90 Atl. 1112; *State v. Connors*, 87 N.J.L. 419, 94 Atl. 812; *People v. Roach* (1915) 215 N.Y. 592, 100 N.E. 618, Ann. Cas. 1917A, 410; *Castleton's Case* (1909) 3 Crim. App. (Eng.) 74; *Parker v. Rex* (1912) 14 C. L. R. (Austr.) 681, 3 B. R. C. 68; *Rex v. Morris* [1914] St. R. Qd. 274; *Emperor v. Sahdeo* (1904, India) 3 Nagpur L. Rep. 1, cited in 3 Chamberlayne, Ev. § 2072. And while the weight of the evidence of identity of the prisoner with the person who committed the crime, thus adduced, is a question for the jury (see *People v. Jennings* (Ill.) supra; *State v. Cerciello* (1914) 86 N.J.L. 309, 52 L.R.A.(N.S.) 1010, 90 Atl. 1112; *Emperor v. Abdul Hamid* (1905) 32 Indian L. Rep. (Calcutta Series) 759, cited in 3 Chamberlayne, Ev. § 2561, note 3), such evidence is sufficient to support a conviction (*Castleton's Case* (1909) 3 Crim. App. (Eng.) 78; *Parker v. Rex* (1912) 14 C. L. R. (Austr.) 681, 3 B. R. C. 68; *Rex v. Morris* [1914] St. R. Qd. 274). The reported case (*State v. Kuhl*, ante, 1694) seems to be one of first impression upon the question whether evidence as to the identity of palm-print impressions is admissible, as tending to connect the accused with the commission of the crime."

### Right of Exonerated Arrestee to Have Fingerprints, Photographs, or Other Criminal Identification or Arrest Records Expunged or Restricted, 46 A.L.R.3d 900 (1972)

"This annotation gathers and analyzes those cases wherein courts have considered the right of one who has been arrested, but subsequently exonerated, to require that his fingerprints, photographs, or other criminal identification or arrest records be expunged, or that their dissemination be restricted. Since the annotation is strictly limited to an examination of the effect of subsequent exoneration on the state's right to retain such records, the scope does not extend to

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<sup>27</sup> N.B. Admissibility of Bare Footprint Evidence, 45 A.L.R.4th 1178 (1986) supersedes § 5.

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a discussion of those cases wherein the right to expungement or restriction is based on the grounds that the compilation of such records was unauthorized in the first instance."

Right of Indigent Defendant in State Criminal Case to Assistance of Fingerprint Expert, 72 A.L.R.4th 874 (1989)

"This annotation collects and discusses the state and federal cases which have specifically considered the issue of an indigent defendant's right to be furnished with an independent fingerprint expert, at the expense of the state or locality, when requested by the defendant to assist in the preparation and presentation of his or her defense in a state criminal case. This annotation deals only with the appointment of an expert, not the granting or denial of a continuance to allow the defendant to secure an expert or to allow the expert time to conduct his or her investigation. In this annotation, references are made to statutes providing for expert assistance only insofar as the construction of such statutes is reflected in the reported cases. Hence, the reader is advised to consult the statutory law of the jurisdictions in which he or she is interested regarding the application of such statutes to issues not addressed within this annotation."

Right to Take Finger Prints and Photographs of Accused Before Trial, or to Retain Same in Police Record After Acquittal or Discharge of Accused, 83 A.L.R. 127 (1933)<sup>28</sup>

"Although the use of finger prints for identification is said to have been known to the ancient Egyptians, its place in Anglo-Saxon jurisprudence was not established until after the middle of the nineteenth century. The Bertillon system of identification, which includes photographs, finger prints, and measurements of the body, is of a still more recent date. This system in criminal law has two main purposes. The first is the identification of an accused as the person who committed the crime with which he is charged, and the second is the identification of an accused as the same person who has been charged with, or convicted of, other crimes. For this second purpose the police of most of the cities of this country and Europe attempt to keep the description of every person arrested by them, in permanent records. These records are popularly known as "rogues' galleries." As the records are made up largely of descriptions of criminals, innocent persons who have been arrested occasionally attempt to have their descriptions removed from the police records. It is with these attempts that this annotation is concerned."

## BIBLIOGRAPHIES

[Fingerprint Evidence Challenges](#), LLRX, Apr. 4, 2008

"In 1911, the first American court upheld a murder conviction based on fingerprint identification evidence. *People v. Jennings*, 252 Ill. 534. Nearly a hundred years later, confidence in that identification technique has been eroded by new research and litigation. See, e.g., *Maryland v. Rose*, No. K06-0545 (MD Cir. Ct. Oct. 19, 2007). See generally Ken Strutin, *Criminal Law Forensics: Century of Acceptance May Be Over*, *New York Law Journal*, Jan. 8, 2008, at 5, col. 1. Recent legal scholarship, forensic studies and Frye/Daubert hearings are adding to our understanding of the nature and limits of this commonly used identification method. The new picture that is emerging will impact the administration of justice and sound a tocsin as we move into the era of biometrics. This article is a collection of select resources published on the web

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<sup>28</sup> N.B. Right of Exonerated Arrestee to Have Fingerprints, Photographs, or Other Criminal Identification or Arrest Records Expunged or Restricted, 46 A.L.R.3d 900 (1972) supersedes Division III.

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concerning the reliability and admissibility of fingerprint evidence. Links to guides, standards and related materials are listed to provide some background on the processes and application of this identification technique."

## [National Clearinghouse for Science, Technology and the Law: Fingerprints](#) (NCSTL)

"NCSTL provides a searchable database of legal, forensic, and technology resources; a reference collection of law, science, and technology material; content-specific bibliographies; national conferences on science, technology, and the law; community acceptance panels; and training for defense counsel who are handling cases involving biological evidence on the applications and limitations of DNA evidence as stated in the President's DNA Initiative." See [Hot Topics - Questions About Fingerprint Identifications](#).

## [President's Council of Advisors on Science and Technology Casts Doubt on Criminal Forensics](#), LLRX, Mar. 19, 2017

"Picking up where "Strengthening Forensic Science in the United States: A Path Forward" left off in 2009, the PCAST Report shed much needed light on the shortfalls of forensic evidence: "PCAST concluded that there are two important gaps: (1) the need for clarity about the scientific standards for the validity and reliability of forensic methods and (2) the need to evaluate specific forensic methods to determine whether they have been scientifically established to be valid and reliable. This report aims to help close these gaps for the case of forensic "feature-comparison" methods—that is, methods that attempt to determine whether an evidentiary sample (e.g., from a crime scene) is or is not associated with a potential "source" sample (e.g., from a suspect), based on the presence of similar patterns, impressions, or other features in the sample and the source. Examples of such methods include the analysis of DNA, hair, latent fingerprints, firearms and spent ammunition, toolmarks and bitemarks, shoeprints and tire tracks, and handwriting.""

## [Strengthening Forensic Science: The Next Wave of Scholarship](#), LLRX, Nov. 23, 2009

"The National Academy of Sciences report, Strengthening Forensic Science in the United States: A Path Forward [NAS Report], is the most important, recent contribution to the ongoing reevaluation of forensic evidence. Since the release of the prepublication version in February 2009, its findings and conclusions have been steadily sinking into the collective consciousness of the legal and scientific communities. This article focuses on threads of scholarly literature citing and commenting on the NAS Report; and highlights discussions where experts and practitioners rethink the merits of a wide range of forensic issues. And on the horizon is the [Third Edition of the Reference Manual on Scientific Evidence](#), which will have its own impact on legal thinking about science in the courtroom."

## RESOURCES

### [Automated Fingerprint Identification Systems](#) (AFIS) (Wikipedia)

"Automated fingerprint identification is the process of automatically matching one or many unknown fingerprints against a database of known and unknown prints. Automated fingerprint identification systems are primarily used by law enforcement agencies for criminal identification initiatives, the most important of which include identifying a person suspected of committing a crime or linking a suspect to other unsolved crimes."

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## [Biometrics](#) (Homeland Security)

"Biometrics are unique physical characteristics, such as fingerprints, that can be used for automated recognition. At the Department of Homeland Security, biometrics are used to detect and prevent illegal entry into the U.S., grant and administer proper immigration benefits, vetting and credentialing, facilitating legitimate travel and trade, enforcing federal laws, and enabling verification for visa applications to the U.S. DHS provides biometric identification services to protect the nation through its Office of Biometric Identity Management (OBIM), which supplies the technology for matching, storing, and sharing biometric data. OBIM is the lead designated provider of biometric identity services for DHS, and maintains the largest biometric repository in the U.S. government. This system, called the Automated Biometric Identification System or IDENT, is operated and maintained by OBIM. IDENT currently holds more than 200 million unique identities and processes more than 300,000 biometric transactions per day."

## [Collaborative Testing Service: Latent Prints & Impressions](#) (CTS)

"High-quality samples and fast turnaround time of your results presented in clear and concise Individual Reports have made the CTS Latent Print and Impressions proficiency tests far superior to tests offered elsewhere. The Latent Print Processing test provides an opportunity for those who complete latent development to test their skills on a variety of substrates. The Latent Print Examination tests include all of the hand – palms to tips – and the large number of laboratories participating in these tests gives you a highly relevant comparison group. The Tenprint Examination test is ideal for any analyst who performs tenprint comparison. Our Footwear Imprint Evidence test is designed to truly challenge your personnel: a variety of substrates are combined with different imprint media for examination and comparison. A Tire Track Imprint Evidence test measures an examiner's proficiency in identifying tire marks. Best of all, CTS allows participants to choose the format that best meets their needs."

## [Contactless Fingerprint Capture](#) (NIST)

"Conventional fingerprint sensors require a person to touch the device platen or sensor. Disadvantages to this mode of acquisition include the time required to collect (particularly rolled) prints as well as hygiene concerns. The government has funded research for the development of fast-capture non-contact tenprint collection devices for over a decade. Viable solutions have proven difficult, and very few devices have made their way out the laboratory to market. NIST has been conducting standards and testing methodology research in order to support the entry of contactless fingerprint capture devices into the market place. Images produced by a contactless device are fundamentally different from conventional scanned ink and livescan fingerprints. They differ in both distortion characteristics and image sensor characteristics. New pathways for device certification must be developed for contactless fingerprinting, and these new contactless fingerprint images must be matchable to conventional fingerprints."

## [Fast Tenprint Capture](#) (NIST)

"The evaluation of Fast Tenprint Capture devices is threefold. The first is the absolute measurement, i.e., stipulating the specifications and designing targets to implement specifications. The second is the relative measurement for interoperability, namely, matching 2-d rolled-equivalent fingerprint images produced using FTC devices against those collected from certified live scanners. The third is the evaluation of the real time of completing one transaction

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carried out by an FTC device. The specifications set in the absolute measurement shall be supported by the results from the relative measurement. The interactions between the absolute measurement and the relative measurement shall take several iterations. Once it is done, only the absolute measurement shall be invoked to evaluate FTC devices."

### [Fingerprint](#) (NIST)

"We conduct evaluations of fingerprint matching technologies to support standards, measurement and evaluation methods, and technology capabilities."

### [Fingerprint](#) (Wikipedia)

"A fingerprint in its narrow sense is an impression left by the friction ridges of a human finger. The recovery of fingerprints from a crime scene is an important method of forensic science. Fingerprints are easily deposited on suitable surfaces (such as glass or metal or polished stone) by the natural secretions of sweat from the eccrine glands that are present in epidermal ridges. These are sometimes referred to as "Chanced Impressions". In a wider use of the term, fingerprints are the traces of an impression from the friction ridges of any part of a human or other primate hand. A print from the sole of the foot can also leave an impression of friction ridges. Deliberate impressions of fingerprints may be formed by ink or other substances transferred from the peaks of friction ridges on the skin to a relatively smooth surface such as a fingerprint card. Fingerprint records normally contain impressions from the pad on the last joint of fingers and thumbs, although fingerprint cards also typically record portions of lower joint areas of the fingers. Human fingerprints are detailed, nearly unique, difficult to alter, and durable over the life of an individual, making them suitable as long-term markers of human identity. They may be employed by police or other authorities to identify individuals who wish to conceal their identity, or to identify people who are incapacitated or deceased and thus unable to identify themselves, as in the aftermath of a natural disaster. Fingerprint analysis, in use since the early 20th century, has led to many crimes being solved. This means that many criminals consider gloves essential. In 2015, the identification of sex by use of a fingerprint test has been reported."

### [Fingerprint Division of the Chartered Society of Forensic Sciences](#) (UK) (formerly known as the Fingerprint Society)

"The Chartered Society of Forensic Sciences was originally founded as the Forensic Science Society back in 1959. Some 50 years later it now boasts a worldwide membership and is internationally recognised as the professional body for forensic practice. . . . At the recent 42nd Fingerprint Society Annual General meeting the merger with The Chartered Society of Forensic Sciences was formally completed to form the CSFS Fingerprint Division."

### [Fingerprint Recognition](#) (FBI)

"Overview of fingerprint recognition. Because of their uniqueness and consistency over time, fingerprints have been used for identification for over a century, more recently becoming automated (i.e. a biometric) due to advancements in computing capabilities."

### [Fingerprints](#) (Interpol)

"Fingerprint evidence plays a crucial role in criminal investigations. Since a person's fingerprints are unique and do not change during the course of their life, they can be used to quickly and

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efficiently confirm or disprove a person's identity, for example, in checking a suspect at a border crossing. In addition, finger marks can be collected at a crime scene and have the potential to link a series of crimes together, or to place a suspect at the scene. Fingerprints play an equally important role in identifying victims following a disaster such as a cyclone, earthquake, bombing or other attack. Interpol's fingerprints database. At Interpol, we manage a database of fingerprints, containing more than 162,000 fingerprint records (as of August 2016). Authorized users in member countries can view, submit and cross-check fingerprint records using I-24/7, Interpol's secure global police communications network, via a user-friendly automatic fingerprint identification system (AFIS)."

### [Fingerprints](#) (Interpol)

"At INTERPOL, we maintain databases of fingerprints, DNA profiles and facial images, allowing police across the world to make connections between criminals and crime scenes. We also provide training to police in our member countries, to ensure that frontline officers have the knowledge and skills necessary to assess, preserve and share evidence in line with best practices."

### [Fingerprints](#) (NIST Security Technologies Group)

"Fingerprints are the most commonly used biometric trait worldwide. Fingerprints are used to enroll populations into social services, allow individuals to access personal electronic devices, allow building and site access, and as a means for criminal investigation. Fingerprint recognition systems (verification (1:1 comparison) and identification (1:N comparison)) are a commodity, creating a need to develop the metrology to assess the performance of the different components of the fingerprint recognition/identification process. This will support the development and advancement of fingerprinting technology, promoting its further employment, and ensuring products meet the technical requirements of the end user. Fingerprinting technology comprises three primary functions: image capture, feature extraction, and matching. Image capture is provided by several different technologies, including electrical, optical, and the standard rolled ink prints. The optical readers can be both contact and noncontact. Feature extraction and matching are algorithmic. The Security Technologies Group initiated the development of the metrologies to address the performance of each of the three primary fingerprint functions of image capture, feature extraction, and matching. Fingerprinting was selected as test bed for this new metrology because of its worldwide prevalence and acceptance of this new metrology would provide a similar metrology model for other biometric recognition technologies, such as face, iris, palm print, etc. Future work includes the development of the measurement uncertainty analyses for image capture, feature extraction, and fingerprint matching; the development of electronic artifacts for assessment of feature extraction and matching algorithms; and the development of 3D physical artifacts for assessing image capture fidelity that can operate with any fingerprint capture device, thus supporting the assessment of the interoperability between reader modalities."

### [Fingerprints](#) (Reddy's Forensic Page)

"This list of books is for Fingerprints only. For [latest books in forensic science and books of general forensic interest for students and professionals](#) and for books in specialty areas like [Forensic DNA](#), visit individual pages or visit [Forensic Science Book Store](#)."

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## [Fingerprints and Other Biometrics](#) (FBI)<sup>29</sup>

"The FBI provides a variety of services, information, and training involving biometrics—the measurable biological (anatomical and physiological) or behavioral characteristics used for identification of an individual. Fingerprints are a common biometric modality, but others include things like DNA, irises, voice patterns, palmprints, and facial patterns. In an effort to harness new technologies and improve identifications, the Bureau developed its Next Generation Identification (NGI) system, which provides the criminal justice community with the world's largest and most efficient electronic repository of biometric and criminal history information. Over the years, the FBI and its partners in the law enforcement and intelligence communities have used biometrics not only to authenticate an individual's identity (you are who are say you are), but more importantly, to figure out who someone is (by a fingerprint left on a murder weapon or a bomb, for example), typically by scanning a database of records for a match. The FBI has long been a leader in biometrics. It has used various forms of biometric identification since our earliest days, including assuming responsibility for managing the national fingerprint collection in 1924. More recently, the Bureau's Science and Technology Branch created the Biometric Center of Excellence (BCOE) to strengthen our ability to combat crime and terrorism with state-of-the-art biometrics technology. In addition to the BCOE, our Criminal Justice Services Division—with its vast repositories of fingerprints and biographical data—is the FBI's natural focus for identity management activities. However, important additional biometrics-related work is being undertaken by the FBI Laboratory, such as DNA activities, while voice and face recognition initiatives are being pursued in our Operational Technology Division."

## [Forensic Fraud Archive](#) (Forensic Solutions)

"This is an archive of more than a hundred cases involving alleged, admitted, and/ or demonstrable forensic fraud. That is, it is an archive of cases where forensic science and law enforcement experts have provided sworn testimony, documents, or reports intended for the court that contain deceptive or misleading information, findings, opinions, or conclusions. Such information, findings, or conclusions have been deliberately offered by the expert in order to secure an unfair or unlawful gain as determined by their employers, by the courts, and in many cases by their own admission. Subsequently, no opinions have been added to the referenced sources."

## [Friction Ridge Community Resource Page](#) (SWGFAST)

"This resource is designed to provide credible responses to questions about friction ridge examination. This information is not presented as exhaustive and does not address all aspects of the below topics."

## [Integrated Automated Fingerprint Identification System](#) (IAFIS) (Wikipedia)

"The Integrated Automated Fingerprint Identification System (IAFIS) is a national automated fingerprint identification and criminal history system maintained by the Federal Bureau of

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<sup>29</sup> See Eric Markowitz, [The FBI Now Has the Largest Biometric Database in the World. Will It Lead to More Surveillance?](#), Int'l Business Times, Apr. 5, 2016 ("But what happens when the match turns out to be wrong? In fact, it's exactly that 20 percent error rate — the rate at which the system produces false positives — that has privacy advocates so worried. German Federal Data Protection Commissioner Peter Schaar, for instance, recently noted: "In the event of a genuine hunt, [false positives] render innocent people suspects for a time, create a need for justification on their part and make further checks by the authorities unavoidable." In other words, what happens if the computer makes a mistake, and someone innocent ends up in jail?").

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Investigation (FBI). IAFIS provides automated fingerprint search capabilities, latent searching capability, electronic image storage, and electronic exchange of fingerprints and responses. IAFIS houses the fingerprints and criminal histories of 70 million subjects in the criminal master file, 31 million civil prints and fingerprints from 73,000 known and suspected terrorists processed by the U.S. or by international law enforcement agencies."

### [International Association for Identification](#) (IAI)

"We are the oldest and largest forensic association in the world. This professional forensic association represents a diverse, knowledgeable and experienced membership that are assembled to educate, share, critique and publish methods, techniques and research in the physical forensic science disciplines."

### [International Fingerprint Research Group](#) (IFRG)

"The International Fingerprint Research Group is made up of active researchers investigating various aspects of fingerprint evidence, including development techniques and fingerprint identification. It has been developed under similar principles to those underpinning the Gordon Research Conferences. The Gordon Research Conferences provide an international forum for the presentation and discussion of frontier research in the biological, chemical, and physical sciences, and their related technologies. It assures a format and site locations that encourage extensive formal and informal discussions, and a sense of community among the attendees. It supports and encourages young scientists as they establish initial scientific and personal contacts."

### [Latent Fingerprint Fabrication](#) (Iowa IAI)

"Types of latent print fabrication are discussed briefly. Concerns are raised over two issues. First, examiners should be aware of the clues to fabrication in order to expose the dishonest police personnel who would fabricate such evidence. Second, examiners should use conclusive methods of documentation to prevent a disruptive challenge to the validity of their latent print evidence in court."

### [Latent Print](#) (FBI)

"The Latent Print Unit (LPU) consists of the Latent Print Operations Unit (LPOU) and the Latent Print Support Unit (LPSU). The LPOU conducts timely, high-quality forensic examinations pertaining to friction ridge analysis in support of the FBI's national security and law enforcement missions. The LPSU ensures the quality and advancement of the latent print discipline by providing tools, training, and support for investigative, humanitarian, and intelligence programs."

### [Latent Print Examination](#) (ONIN)

"Onin.com is a non-profit website maintained for professional and personal interests by a forensic scientist with over 40 years experience working in government crime laboratories on three continents." See also [Latent Print Examination](#) and [Legal Challenges to Fingerprints](#).

### [Next Generation Fingerprint Technologies](#) (NIST)

"Conventional fingerprint capture technologies for criminal justice have steadily evolved over the past 3 decades in the following progression: inked fingers on cards -> inked cards on flatbed scanners -> livescan of fingers -> fast tenprint capture of slaps. Meanwhile civilian use of

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fingerprints and applications of Mobile ID have spawned numerous types of optical, solid state, swipe, and other novel fingerprint sensors. This effort strategically focusses on new trends and innovations in fingerprint capture technologies looking to address standards, performance, and interoperability requirements."

## [Next Generation Identification \(NGI\) \(FBI\)](#)

"Today, the term "biometrics" is not limited to fingerprints. It also includes palm prints, irises, and facial recognition. In an effort to harness new technologies, and to improve the application of tenprint and latent fingerprint searches, the FBI's Criminal Justice Information Services (CJIS) Division developed and incrementally integrated a new system to replace the Integrated Automated Fingerprint Identification System (IAFIS). This new system, the Next Generation Identification (NGI), provides the criminal justice community with the world's largest and most efficient electronic repository of biometric and criminal history information. Biometrics has been incredibly useful to the FBI and its partners in the law enforcement and intelligence communities, and the Bureau continues to look to new scientific advancements to increase the range and quality of its identification and investigative capabilities. The NGI System offers services that provide a platform for multimodal functionality that will continue to evolve with new technologies and user requirements. "

## [Organization of Scientific Area Committees \(OSAC\) Friction Ridge Subcommittee \(FRS\)](#)

"The Friction Ridge Subcommittee will focus on standards and guidelines related to the forensic examination of friction ridge detail from the hands and feet."

## [Scientific Working Group on Friction Ridge Analysis, Study and Technology \(SWGFAST\)](#)

"The transition from the Scientific Working Group on Friction Ridge Analysis, Study and Technology (SWGFAST) to the [Organization of Scientific Area Committees \(OSAC\) Friction Ridge Subcommittee \(FRS\)](#) is well underway. Recognizing the value in having a single consensus body developing best practices for the friction ridge discipline, SWGFAST operations came to a close in 2014 with the transfer of all documents to the OSAC FRS. Existing SWGFAST standards and guidelines should remain in effect until new OSAC documents become available. Both active and archived SWGFAST documents will remain available on the SWGFAST website until they are posted on the OSAC website. Please refer to the OSAC website for updates and additional information." See also [SWGFAST Documents](#).

## [Statistical Friction Ridge Analysis \(SFRA\) \(NIST\)](#)

"This project aims to develop a statistical measure of the uncertainty of the decisions made on the friction ridge evidence (i.e., evidential value of fingerprint comparison), which ultimately can be referred to as a scientific basis of the identification decisions made in friction ridge analysis."

## **NY FEDERAL CASES**

### [United States v. Stevens](#), 219 Fed. Appx. 108, 109 (2nd Cir. 2007)

"The district court did not abuse its discretion by refusing to conduct a hearing pursuant to *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993), on the reliability of fingerprint evidence. Such a hearing is not required "in ordinary cases where the reliability of an expert's methods is properly taken for granted." *Kumho Tire Co.*

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v. Carmichael, 526 U.S. 137, 152, 119 S.Ct. 1167, 143 L.Ed.2d 238 (1999). Stevens points to no evidence that would compel the conclusion that the testimony of a fingerprint expert is a "less usual or more complex case[] where cause for questioning the expert's reliability arises." *Id.*; see also *United States v. Salameh*, 152 F.3d 88, 128-29 (2d Cir. 1998) (approving of admission of fingerprint evidence)."

[United States v. Salameh](#), 152 F.3d 88, 129 (2d Cir. 1998)

"[Defendant-Appellant] Ajaj argues that identification of the placement of fingerprints is not based on any accepted scientific theory or principle. Thus, Ajaj maintains that although the identification of fingerprints rests on a reliable scientific foundation, an opinion on how particular fingerprints were made does not. His argument is wide of the mark. Edelen explained that, given her expertise in identifying fingerprints, she "could determine in what position your hand was placed because [she] can determine what the top of the fingerprint is, or the side of the fingerprint is, so [she] can tell the position that you would be holding [for example, a pad of paper]." Indeed, Ajaj did not object to Edelen's lengthy exposition on the way his fingers were positioned on the notebook when they left the prints Edelen identified.

The voir dire made clear that Edelen's testimony regarding the placement of Ajaj's hand on the notebook was based on the same well-accepted scientific foundation as her identification of his fingerprints. Edelen explained that when a finger touches an object, the ridges of that finger leave an identifiable mark upon the object, which is referred to as a latent print. By comparing the ridges of a latent print to a sample print, a fingerprint expert can tell which finger left the latent print. A fingerprint expert can also tell whether a particular part of a finger left a latent print by comparing the ridges on that part of the finger with those on the object. By determining what part of a finger left a given print, a fingerprint expert can then determine the position of the finger when it left that print. Finally, by putting together the position of all the fingers, an expert can tell how a person was holding an object. Judge Duffy correctly concluded that Edelen's opinion on the way that Ajaj held the notebook was based on a reliable scientific foundation. Ajaj's claim that Edelen was unqualified to give the testimony regarding the way he was holding the notebook is also frivolous. Edelen was qualified to give expert testimony on how fingerprints are made, and how a person was holding an object when a print was made. See McCulloch, 61 F.3d at 1044; Locascio, 6 F.3d 924, 937."

[Borukhova v. Warden, Bedford Hills Corr. Facility](#), 2015 U.S. Dist. LEXIS 120691, at 39-40 (E.D.N.Y. Sept. 10, 2015)

"Finally, the Second Department found that Borukhova's Confrontation Clause argument about holding a hearing on the reliability of the fingerprint expert was unpreserved for appellate review. *Borukhova*, 931 N.Y.S.2d at 373. I [[John Gleeson](#)] disagree that the argument was unpreserved, as *Borukhova* joined in *Mallayev's* motion for a hearing on the reliability of the expert testimony. See A. 250. The trial court also noted that *Borukhova* joined in *Mallayev's* motion for a hearing under *Daubert* or *Frye*. See A. 28. The trial court denied the defendants' motion in limine because "latent fingerprint analysis is not a novel scientific procedure that would fall within the ambit of the *Frye* rule and it is admissible without a hearing." A. 29. This was not an unreasonable determination of federal constitutional law as determined by the Supreme Court. See *United States v. Stevens*, 219 F. App'x 108, 109 (2d Cir. 2007) (*Daubert* hearing not required for fingerprint evidence because the "reliability of an expert's methods is properly taken for granted." (quoting *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 152 (1999))).

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Therefore, habeas relief on this ground is denied. Borukhova's claim for habeas relief based on the cross-examination of the fingerprint expert is also denied; the trial court was authorized to impose reasonable limits on cross-examination, and those limits were not exceeded in this case. See Alvarez, 763 F.3d at 230 (citing Van Arsdall, 475 U.S at 679)."

[Narrod v. Napoli](#), 763 F. Supp. 2d 359, 379-381 (W.D.N.Y. 2011)

"On cross-examination, defense counsel sought to elicit the fact that the latent print did not contain enough "ridge detail" to run it through SAFIS, New York's State Automated Fingerprint Identification System, for potential matches. The prosecutor objected, stating that SAFIS "has never passed a Frye test in terms of being admissible in court", that there was no foundation for the testimony, and that "SAFIS is a tool that's used to give fingerprint examiners possible prints to then make a comparison from. It is not a tool that's used to make identifications. It's just simply not reliable. We [the prosecution] can never come into court and say, oh, this is his fingerprint based on results from SAFIS." Defense counsel explained that he did not intend to use it for purposes of identification but rather to show the deficiencies in the latent print that was used to link Narrod to the crime. Defense counsel stated, "you have to put in general characteristics for the [SAFIS] computer to punch potential fingerprints out" but "[i]n this particular case, he didn't have enough detail to even program the system." T.787-88. The prosecutor further objected that this line of questioning was not relevant; the prosecutor stated that he had no objection to questions about the lack of detail in the print, which he commented that defense counsel did bring out. The trial court ruled without explanation that the objection was sustained, and directed defense counsel to "move on" to another topic. T.787-88. On direct appeal, the Appellate Division summarily rejected the claim concerning the limitation on the cross-examination of Investigator Hildreth as without merit. . . .

The Court turns first to the issue of whether the proposed cross-examination was proper. As noted above, the prosecution objected because SAFIS had not passed the Frye test for determining the admissibility of scientific evidence. However, defense counsel was not attempting to elicit testimony about the results of a SAFIS analysis but rather was attempting to show that the latent fingerprint analyzed by Investigator Hildreth was not complete enough to run through SAFIS. In other words, defense counsel wanted to show that a computer system that is used by law enforcement to generate potential fingerprint matches could not be utilized in this case due to the lack of completeness of the latent fingerprint found at the crime scene. On appeal, although continuing to argue that the cross-examination was impermissible because SAFIS had not passed the Frye test, the People's attorney conceded that testimony "regarding the institution and mechanics" of SAFIS had been admitted in at least one case — at the prosecution's request — because it was necessary to explain why the police apprehended the defendant after a lapse of many years. *People v. Myers*, 220 A.D.2d 272, 273, 632 N.Y.S.2d 111 (App. Div. 1st Dept.1995). That is essentially what defense counsel wanted to question Investigator Hildreth about — the "mechanics" of the SAFIS system, not its accuracy in matching fingerprint samples. Thus, this Court believes that whether SAFIS had passed muster under Frye was not the issue. The prosecutor's objection on this basis was inapposite and irrelevant — although it apparently persuaded the trial judge. The proposed cross-examination was another avenue by which defense counsel could attempt to undermine the quality of the fingerprint evidence upon which Investigator Hildreth based his expert opinion. The Court recognizes that a trial court may impose reasonable limits on such cross-examination based on concerns about, among other things, harassment, prejudice, confusion of the issues, the witness'

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safety, or interrogation that is repetitive or only marginally relevant. The proposed subject of questioning was relevant. The only concern that arguably arose here was potential "confusion of the issues", but that could have been dealt with by means of a limiting instruction, and the prosecutor easily could have conducted a re-direct examination of Investigator Hildreth to elicit the limitations of SAFIS. However, even if there was error, it was harmless."

[Gomas v. City of New York](#), 2009 U.S. Dist. LEXIS 15575 (E.D.N.Y. Feb. 27, 2009)<sup>30</sup>

"The Court will, however, sua sponte order defendants to produce, pursuant to a confidentiality order, any written handbooks and/or guidelines applicable to fingerprint examinations by the NYPD, in force during the relevant time period."

[Tao Li v. Phillips](#), 358 F. Supp. 2d 135, 142-143 (E.D.N.Y. 2005)

"Citing *Frye v. United States*, 293 F. 1013 (1923), petitioner claims that his appellate counsel was ineffective for failing to argue that "[t]he trial court erred in ruling that the fingerprint evidence was authentic since the procedure that was used to lift the print was never established to have gained general acceptance in the particular field in which it belongs." Petitioner's Reply Mem. at 18. In *Frye*, the court held that "while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs." *Frye*, 293 F. at 1014. Although *Frye*'s general acceptance test has been superseded in federal courts by Federal Rule of Evidence 702, it remains the applicable standard in New York courts. See *People v. Wesley*, 83 N.Y.2d 417, 422, 611 N.Y.S.2d 97, 633 N.E.2d 451 (1994).

Petitioner's reliance on *Frye* is nevertheless misplaced. The crux of petitioner's argument is that the procedures used to collect the fingerprint evidence in this case were deficient. Specifically, petitioner alleges that Officer Stanulis was not accompanied to the crime scene by a partner and did not photograph the fingerprints at the crime scene prior to lifting them, as required by the police department manual. "While foundation concerns itself with the adequacy of the specific procedures used to generate the particular evidence to be admitted, the test pursuant to *Frye* ... poses the more elemental question of whether the accepted techniques, when properly performed, generate results accepted as reliable within the scientific community generally." *Wesley*, 83 N.Y.2d at 422, 611 N.Y.S.2d 97, 633 N.E.2d 451 (citation omitted). Fingerprint analysis has long been accepted in the scientific community and is regularly admitted into evidence in New York criminal proceedings. There was nothing novel or innovative about the methods used to collect and analyze the fingerprint evidence in this case. As a result, the deficiencies in procedure alleged by petitioner were relevant to the credibility and weight of the evidence, not to its admissibility under *Frye*. See *People v. Garcia*, 299 A.D.2d 493, 493, 749 N.Y.S.2d 882 (2d Dept.2002); *People v. Seals*, 247 A.D.2d 349, 349, 669 N.Y.S.2d 293 (1st Dept.1998).

The trial court properly exercised its discretion in admitting that portion of the fingerprint evidence for which the prosecution laid an adequate foundation and established a chain of custody, and excluding the rest. Moreover, petitioner's trial counsel conducted extensive cross-

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<sup>30</sup> See follow-up litigation in [Gomas v. City of New York](#), 2009 U.S. Dist. LEXIS 29607 (E.D.N.Y. Apr. 8, 2009) ("Defendants have produced the NYPD Latent Print Section Procedure Manual in effect at the relevant period, and defense counsel has represented to the Court that he knows of no other documents responsive to the Court's directive. See 3/26/09 Def. Letter at 2.").

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examinations of all witnesses who participated in the collection and analysis of the fingerprint evidence, namely, Detective Palmer, Officer Stanulis, and Lennox Jitta, and argued to the jury during summation that the fingerprint evidence was flawed. Since the claim concerning admission of the fingerprint evidence was meritless, appellate counsel's decision not to raise it did not fall below an objective standard of reasonableness based on prevailing professional norms. Accordingly, the Appellate Division did not apply Strickland in an unreasonable manner when it denied petitioner's application for a writ of error coram nobis with respect to this ground."

United States v. Frias, 2003 U.S. Dist. LEXIS 2079, at 2-5 (S.D.N.Y. Feb. 11, 2003)

"Frias correctly states that HN1 the admissibility of expert testimony is governed by *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993) and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 143 L. Ed. 2d 238, 119 S. Ct. 1167 (1999). However, nothing in either case mandates that a court conduct a pre-trial evidentiary hearing if the expert testimony is based on well-established principles. See, e.g., *United States v. Cooper*, 91 F. Supp. 2d 79, 82 (D.D.C. 2000). Frias's motion lacks merit for two reasons. First, he fails to identify with any specificity the way in which New York City Police Department's ("NYPD") fingerprint identification techniques differ from those used by the Federal Bureau of Investigation and why the Court should consider the NYPD's methods less reliable.

Second, Frias's motion ignores the substantial corpus of case law in which numerous circuit and district courts have permitted fingerprint examiners to state their opinions and conclusions. See, e.g., *United States v. Havvard*, 260 F.3d 597 (7th Cir. 2001); *United States v. Salim*, 189 F. Supp. 2d 93, 101 (S.D.N.Y. 2002); *United States v. Cooper*, 91 F. Supp. 2d 79, 82 (D.D.C. 2000). HN2 Numerous defendants have challenged the reliability of fingerprint evidence, but courts have almost universally rejected these challenges. Indeed, one of the few courts to cast serious doubt on the admissibility of fingerprint evidence granted a motion for reconsideration and vacated its prior ruling that such evidence was inadmissible. See *United States v. Plaza*, *United States v. Plaza*, 179 F. Supp. 2d 492 (D.N.J. 2002), vacated by 188 F. Supp. 2d 549 (D.N.J. 2002). In light of the overwhelming precedential support for permitting expert testimony on fingerprint identification, and in light of Frias's failure to provide any particularized basis on which to hold that the NYPD's fingerprint investigation techniques fail to meet the standards enunciated by the Supreme Court in *Daubert* and *Kuhmo Tire*, Frias's motion for a pre-trial hearing on the admissibility of expert fingerprint testimony is denied. Frias remains, of course, free to cross-examine any expert witness called by the government and to present testimony contradicting the government's contentions.

Finally, Frias seeks to preclude or limit expert testimony on ballistics identification. In its brief, the government states that it does not expect to call a ballistics expert at trial, and assures Frias that it will provide him with sufficient notice if it decides to call such an expert. Based on the government's representation, the Court denies Frias's motion with respect to expert testimony on ballistics as moot, with leave granted to renew the motion if the government decides to present expert testimony on that subject."

### NY STATE CASES

People v. Roach, 215 N.Y. 592, 604-606 (N.Y. Ct. App. 1915)

"Before testifying to his opinion as to the identity of the defendant's finger prints with the marks

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upon the board the witness explained fully his qualifications, specified the circumstances upon which he predicated his opinion and swore that he was able to express an opinion with reasonable certainty. He was exhaustively and skillfully cross-examined as to every detail of his testimony. Ample basis was afforded for the jury to come to an intelligent conclusion as to the correctness of the opinion which he expressed. In view of the progress that has been made by scientific students and those charged with the detection of crime in the police departments of the larger cities of the world, in effecting identification by means of finger-print impressions, we cannot rule as a matter of law that such evidence is incompetent. Nor does the fact that it presents to the court novel questions preclude its admission upon common-law principles. The same thing was true of typewriting, photography and X-ray photographs, and yet the reception of such evidence is a common occurrence in our courts. The evidence to prove identity often presents doubtful and unsatisfactory features. One man may be mistaken for another because they look alike, or identity of person may be inferred from similarity of features, height, expression or a variety of other circumstances. Under common-law principles whatever tends to prove any material fact is relevant and competent. The evidence as to footprints is admissible. (Young v. State, 68 Ala. 569, 574; Jones v. State, 63 Ga. 395, 398, 401; People v. Storrs, 207 N. Y. 147, 153.) In *Castleton's Case* (3 Crim. App. Rep. 74) the Court of Criminal Appeal in England upheld a conviction where the only proof of identification was evidence as to finger prints upon a candle. In *People v. Jennings* (252 Ill. 534) evidence was received of the imprint of four fingers of someone's left hand in fresh paint upon a railing, and also the opinion of experts that such finger prints and the finger prints of the defendant were impressions of the same hand. The opinion of Chief Justice Carter in that case contains an instructive and learned discussion of this whole subject. The fact that error may sometimes result in effecting identification, by this means affords no reason for the exclusion of such evidence. Mistakes may also occur in effecting identification by personal appearance, casual meeting, by handwriting or by one's voice heard in the dark or over the telephone, but evidence of this character is admissible and its weight is to be determined by the jury. Courts have often allowed proof of circumstances apparently very trivial as evidence upon which identification might be effected. (*State v. Rainsbarger*, 74 Ia. 196; *Wilbur v. Hubbard*, 35 Barb. 303.) The evidence of the expert as to the identity of the finger prints of the defendant, with the blood marks found upon the clapboards of the house, was a proper subject for the consideration of the jury. The weight to be given to this evidence was for the jury, not the court, to determine. Certainly, the reception of this evidence would not justify the reversal of this judgment."

[People v. Wilson](#), 107 A.D.3d 919, 919-920 (2nd Dept 2013)

"The County Court properly denied the defendant's request to conduct a Frye hearing (see *Frye v. United States*, 293 F 1013 [DC Cir 1923]), with respect to a latent fingerprint comparison identifying him as a perpetrator in the charged crime. New York courts evaluate the admissibility of expert testimony under the Frye test (see *id.*; *People v. Wernick*, 89 NY2d 111 [1996]), pursuant to which such testimony must be based on principles that are generally accepted in the relevant scientific community (see *People v. LeGrand*, 8 NY3d 449 [2007]; *People v. Wernick*, 89 NY2d 111 [1996]; *People v. Wesley*, 83 NY2d 417 [1994]). A "court need not hold a Frye hearing where it can rely upon previous rulings in other court proceedings as an aid in determining the admissibility of the proffered testimony" (*People v. LeGrand*, 8 NY3d at 458). Given the longstanding acceptance of fingerprint evidence by New York courts (see e.g. *People v. Roach*, 215 NY 592 [1915]; *People v. Burnell*, 89 AD3d 1118, 1121-1122 [2011]; *People v.*

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Wofford, 66 AD3d 1404, 1404 [2009]; *People v. Garcia*, 299 AD2d 493, 493 [2002]), the County Court properly determined that a Frye hearing was not necessary here. Contrary to the defendant's contention, since he did not demonstrate the necessity for the appointment of fingerprint experts on his behalf under County Law § 722-c, the County Court providently exercised its discretion in denying his request to appoint such experts (see *People v. Moore*, 125 AD2d 501 [1986]; see also *People v. Robinson*, 70 AD3d 728, 728 [2010])."

[People v. Burnell](#), 89 A.D.3d 1118, 1121-1122 (3rd Dept 2011)<sup>31</sup>

"We reach a similar conclusion regarding defendant's assertion that County Court erred in admitting certain fingerprint evidence without conducting a "complete and thorough" Frye hearing. The primary flaw in defendant's argument on this point is that the allegedly novel scientific technique at issue — a software program known as MoreHits — did not actually "match" the prints lifted from the crime scene with the known prints belonging to defendant and/or the victim. As the State Police investigator who conducted the fingerprint analysis explained, the MoreHits program allows an examiner to digitally scan a fingerprint lift, enlarge it, adjust the contrast and isolate particular portions of the lifted print. Although such capabilities enable the examiner to focus in on areas where possible points of comparison may exist, the software program itself does not make the "match." Rather, as the investigator repeatedly and unequivocally testified at trial, he made the final matches by comparing defendant's exemplar to the fingerprints found on the coffee table in the victim's living room and by comparing the victim's postmortem fingerprints to the print found on the inside of the small plastic bag subsequently discovered in the backpack. Specifically, the investigator testified that he physically made these side-by-side comparisons utilizing a standard four-power magnifier and a set of small pins to mark the individual points of identification. Thus, as it was the investigator — using familiar and established techniques — who made the actual matches here, we discern no need for a Frye hearing."

[People v. Wofford](#), 66 A.D.3d 1404, 1404-1405 (4th Dept 2009)<sup>32</sup>

"Defendant appeals from a judgment convicting him, upon a jury verdict, of burglary in the second degree (Penal Law § 140.25 [2]), arising from an incident in which he entered an apartment and stole property. Defendant contends that the conviction is not supported by legally sufficient evidence because the fingerprint identification evidence, which was the sole direct proof identifying him as the perpetrator, did not establish that he entered the apartment on the specific date charged in the indictment. We reject that contention. Viewing the evidence in the light most favorable to the People (see *People v. Contes*, 60 NY2d 620, 621 [1983]), we conclude that there is a valid line of reasoning and permissible inferences that could lead a rational person to the conclusion reached by the jury based on the evidence at trial (see generally *People v. Danielson*, 9 NY3d 342, 349 [2007]; *People v. Bleakley*, 69 NY2d 490, 495 [1987]). Based on the testimony of tenants in the apartment building where the victim resided, a rational juror could have found that defendant's fingerprints found on one of the bedroom windows and a

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<sup>31</sup> But see Itiel E. Dror et al., [Impact of Human-Technology Cooperation and Distributed Cognition in Forensic Science: Biasing Effects of AFIS Contextual Information on Human Experts](#), 57 J. Forensic Sci. 343 (2012); Itiel E. Dror and Jennifer Mnookin, [Use of Technology in Human Expert Domains: Challenges and Risks Arising from the Use of Automated Fingerprint Identification Systems in Forensic Science](#), 9 Law, Prob. & Risk. 47 (2010)

<sup>32</sup> See supra note 20 (cases concerning standalone or uncorroborated fingerprint evidence).

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bowl from which personal property was taken were left by the perpetrator on the date specified in the indictment."

[People v. Owens](#), 39 A.D.3d 1260, 1262 (4th Dept 2007)

"We also agree with defendant that the court erred in failing to sanction the People for a Rosario violation, i.e., the destruction of the fingerprint examiner's notes, at the persistent violent felony offender hearing. "Where Rosario material is lost or destroyed, the court is required to impose an appropriate sanction that is designed to eliminate resulting prejudice to the defendant" (People v. Carracedo, 89 NY2d 1059, 1062 [1997]). Here, the notes were the only written record of the 10 points of similarity between the various sets of fingerprints and were the only means by which defendant could effectively cross-examine the fingerprint examiner. Defendant thus was prejudiced by the destruction of the notes, and the court erred in failing to impose any sanction (see People v. Wallace, 76 NY2d 953, 955 [1990]; People v. Holman, 283 AD2d 440, 441 [2001], lv denied 96 NY2d 902 [2001])."

[People v. Garcia](#), 299 A.D.2d 493 (2nd Dept 2002)

"The Supreme Court properly exercised its discretion in determining that the prosecution's fingerprint expert laid a sufficient foundation to provide the jury with the factual basis for his conclusion that the defendant's fingerprints matched the latent prints taken from the scene of the crime (see People v. Jones, 73 NY2d 427, 430; People v. Wilson, 133 AD2d 179; People v. Myers, 220 AD2d 272, 273; People v. Shaw, 111 AD2d 835, 836), and in concluding that the weaknesses in the expert's testimony went to the credibility and weight of the evidence rather than to its admissibility (see People v. Miller, 91 NY2d 372, 380)."

[People v. Myers](#), 220 A.D.2d 272, 273 (1st Dept 1995)

"Defendant's claims of error in connection with expert testimony regarding the fingerprint issue are for the most part unpreserved by appropriate and timely objection (CPL 470.05). In any event, the expert testimony regarding the institution and mechanics of the Statewide Automated Fingerprint Identification System did not constitute improper bolstering, but rather was properly admitted to explain why the police apprehended defendant after a lapse of seventeen years (see, People v. Aphaylath, 68 N.Y.2d 945, 947). Nor was there any error in admitting the testimony of the expert witness that based upon the number of comparison points and the quality of the latent fingerprints taken from the crime scene, the witness had no doubt that the fingerprints in question were those of the defendant. Expert testimony regarding the identification of fingerprints, a subject well beyond the ken of lay jurors, is a proper subject for consideration by the jury (People v. Roach, 215 N.Y. 592, 605), and the trial court's charge to the jury instructing, inter alia, that the jurors may reject in whole or in part any offered opinion of an expert where the jury disagrees with such opinion based on the facts as found by the jury, assured that no factual determination was improperly removed from the jury's consideration. Further, testimony and summation comment regarding comparison of latent fingerprints found at the scene of the crime with fingerprints "on file" did not compel a conclusion by the jurors that defendant had a prior criminal record. We accept as common knowledge that fingerprints are taken routinely for any number of reasons unconnected to criminal matters."

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[People v. Hyatt](#), 2001 NY Slip Op 50115(U), at 4-6 (Sup. Ct. Kings County 2001)<sup>33</sup>

"Here in its discretion and with a view towards the guidance of *People v. Lee*, 96 N.Y.2d 157, 750 N.E.2d 63, 726 N.Y.S.2d 361 (decided May 8, 2001) the court held a pre-trial "Frye hearing" to resolve this issue. In determining whether [Dr. Cole's](#) testimony concerning the latent fingerprint evidence in this case was admissible, the Court must focus its attention on whether his theory or conclusions has been accepted as reliable by the relevant scientific community Wesley at 454. In *Frye* (Supra at 1014) the court stated: "the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs" (emphasis added). It is incumbent upon the proponent of expert scientific testimony to lay a proper foundation establishing that the processes and methods employed by the expert in formulating his or her opinions adhere to the accepted standards of reliability within the field. *People v. Wilson*, 133 A.D.2d 179, 518 N.Y.S.2d 690. In this matter, the methodology or "the thing" from which Dr. Cole's deductions are made are anecdotal and second hand rather than scientific. The record is devoid of any evidence that Dr. Cole possesses any more than an elementary knowledge of latent fingerprint collection and comparison. His approach to this issue is historical in nature and can hardly be viewed as generally accepted as reliable in the relevant scientific community as required by *Frye* (supra). Dr. Cole's proposed attack on the scientific underpinning of fingerprint identification is more in the nature of the roll of an advocate or historian and not as an expert. His testimony would neither be relevant to the issues in this case nor assist the jurors who as triers of fact might be in need of specialized information. Even applying the Federal Courts Daubert Standard what Dr. Cole has offered here is "junk science". *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579, 113 S.Ct. 2786, 125 L. Ed. 2d 469. He is essentially playing the role of a Doubting Thomas without demonstrating any documented facts or evidence to support his conclusions.

"Skeptics are involved in many aspects of solving society's problems from a rational perspective. Yet few realize the insidious and negative effect our legal system can have on the establishment and propagation of logic and science. From the Scopes trial to silicone breast implant litigation, some courts have demeaned science and promoted junk science. The system must be changed. By incorporating a standardized policy with adherence to stringent rules regarding the admission

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<sup>33</sup> But see [United States v. Mitchell](#), 2007 US Dist LEXIS 37865 (E.D. Pa. May 21, 2007) ("Mitchell presented testimony from three experts during the Daubert hearing. These gentlemen were: Dr. David Stoney, who was qualified as an expert in forensic science, particularly with respect to the issue of fingerprint individuality; Professor James Starr, who was qualified as an expert "in forensic science qualified to provide an opinion as to whether latent fingerprint examination meets the criteria of science;" and *Dr. Simon Cole, who was qualified as an expert in the "field of science and technology studies with particular expertise regarding the fingerprint profession."* See 7-12-99 Daubert Tr. at 46 ln. 10-14; *id.* at 83-86 (Stoney); 7-12-00 Daubert Tr. at pp. 135-36, 147-48 (Starr); 7-13-99 Daubert Tr. at 8 ln. 14-16. The Court will refer to these gentlemen collectively as the "Daubert experts." *Id.* at 8 (italics added)); [State v. Sheehan](#), 273 P.3d 417 (Utah Ct. App. 2012) ("The trial court did not make any of the necessary findings or determinations pursuant to rule 702 concerning whether Dr. Cole qualified as an expert, i.e., that the expert's testimony "will assist the trier of fact," that the expert is qualified, and that the expert's testimony meets the threshold reliability standard.[5] See Utah R. Evid. 702(a)-(c); *State v. Clopten*, 2009 UT 84, ¶ 31, 223 P.3d 1103. Therefore, given the facts of this case, we are unable to properly evaluate prejudice because the court's error denied Sheehan the opportunity to develop whether Dr. Cole would qualify as an expert and whether any testimony he would have given at trial was admissible. We express no opinion on whether Dr. Cole is qualified under rule 702 or whether his proposed testimony is sufficiently reliable for admission and leave that determination to the trial court on remand under the correct legal standard. Nevertheless, because we also determine that the trial court violated Sheehan's constitutional rights in limiting the cross-examination of the State's experts, see *infra* ¶¶ 35-38, any determination of whether Dr. Cole qualifies as an expert should be made before the new trial is held." *Id.* at 428 (footnote omitted)).

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of scientific evidence most of these results can be avoided. Junk Science and the Law by John E. Dodes, Skeptical Enquirer, p. 31. Vol. 25 No. 4, July/August 2001". To take the crown away from the heavyweight champ you must decisively out score or knock him out. Going twelve (12) rounds will just not do. What Dr. Cole has offered here is interesting but too lacking in scientific method to even bloody the field of fingerprint analysis as a generally accepted scientific discipline. For these reasons, the Court precludes Dr. Cole from testifying as an expert in this case."

### NY RESOURCES<sup>34</sup>

#### [Best Practices for Submitting Latent Print Evidence \(DCJS 2016\)](#)

"Latent print evidence may be submitted either by mail or in person. It is recommended to submit each case individually in a separate envelope if being submitted by mail. All evidentiary items must be properly sealed. For explanation on how to properly seal evidence, see below. It is also recommended to use United States Postal Service Certified Mail/Return Receipt."

#### [NYS Police Evidence Tampering Investigation, Report to the Honorable George Pataki, Governor of the State of New York \(1997\)<sup>35</sup>](#)

"This report reflects the investigative findings of evidence tampering among New York State Police Troopers. Table of Contents: I. Introduction; II. Brief Overview of Findings; III. Acknowledgment of Participants and Staff; IV. Role of Identification Units in the State Police; V. The Initial Disclosure of Tampering in Troop C; VI. Legal Authority for the Investigation; VII. The Investigation; VIII. Corruption in the Troop C Identification Unit; IX. Corruption in the Troop F Identification Unit; X. Further Observations Concerning the Role of Troop C Personnel in Cases with Evidence Confirmed to be Tainted; XI. Evidence of Role of Officers Other Than One Convicted in Troop F; XII. Conclusions Regarding Troop C; XIII. Conclusions Regarding Troop F; XIV. Relationship if Any Between Troop C and Troop F; XV. Role of Prosecutors; XVI. The Failure of Prior Administrative Oversight, Changes Implemented in Response to the Disclosure of Tampering and Observations Concerning Those Changes; XVII. Miscellaneous Issues; XVIII. Conclusion; XIX. Exhibits."

#### [NYS Standard Practices for Fingerprinting Juveniles \(DCJS 2014\)](#)

"This Manual provides documentation on the procedures and standards essential to the efficient and accurate exchange and reporting of fingerprintable juvenile delinquent arrest and disposition information to the Division of Criminal Justice Services. This Manual may be used to develop policies and procedures for the fingerprinting of juveniles, ensure the proper electronic transmission of juvenile fingerprints to DCJS and set forth the necessary procedures for maintaining; sealing and destroying records pertaining to a juvenile delinquency case. The fingerprints of a juvenile offender should be processed as an adult according to the "New York State Standard Practices for Processing Fingerprintable Criminal Cases.""

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<sup>34</sup> N.B. To access certain PDF documents in this section, right click the title and select "Copy Hyperlink", then past it into a web browser.

<sup>35</sup> This link leads to a NYS Library catalog record; click on "URL" to access the full-text document. See generally Richard Perez-Pena, [Supervision of Troopers Faulted in Evidence-Tampering Scandal](#), N.Y. Times, Feb. 4, 1997, at B4 ("Concluding a four-year investigation into the worst scandal in state police history, a special prosecutor said today that troopers were able to plant evidence routinely in criminal cases across a broad swath of rural New York because they had no fear of detection by supervisors, who maintained a willful ignorance.").

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## [NYS Standard Practices Manual: Processing Fingerprintable Criminal Cases](#) (DCJS 2016)

"This manual provides documentation on the procedures necessary for the efficient and accurate exchange and reporting of fingerprintable criminal case information in New York State for the following areas: • Arrest Processing • Prosecutorial Processing • Judicial Processing • Custody and Supervision Processing."

## [Report on the New York City Police Department Crime Laboratory Latent Print Development Unit Incident](#) (NYS Commission of Investigation 2007)<sup>36</sup>

"The Commission concludes that, prior to the discovery of Officer Martin's failures, the technical review process utilized in the Latent Print Unit was deficient and contributed to the inability of Laboratory officials to uncover those failures, which were not found through an internal review process but, rather, by a fortuitous set of circumstances. The Commission finds, however, that, once the problem was uncovered, NYPD Laboratory officials reacted appropriately. Steps were taken to identify the extent of Officer Martin's deficiencies and to determine whether the same failures were being committed by other analysts as well. Officer Martin was removed from conducting examinations and all of her cases were identified so that they could be re-examined if needed. When the volume of her cases proved too large for an expeditious reexamination, Laboratory officials correctly prioritized those cases that had already resulted in a conviction to ensure that action could be taken to correct any wrongful convictions. Finally, the NYPD amended the Latent Print Unit's technical review process to help prevent a recurrence of this same problem and to ensure that similar incidents are uncovered more quickly.

The Commission also concludes, however, that Laboratory officials took too long to notify the District Attorneys about this problem and should have notified them earlier in the process. The Commission recognizes that it took time to identify the extent of problem and that none of the District Attorneys have since reported that any of their cases had been compromised.

Nevertheless, notifying the District Attorneys that there was an apparent problem with some of Officer Martin's work would have allowed them to take appropriate action more quickly. The Commission recommends that, in the future, Laboratory officials notify prosecutors as soon as possible regarding any problems that might affect their criminal cases, particularly those that have already resulted in a conviction. Continuing the recently initiated periodic meetings between Laboratory officials and representatives of the District Attorneys, which are noted above, will help to address this concern."

## [State Identification Bureau](#) (DCJS)

"The State Identification Bureau at DCJS processes criminal and civil fingerprint transactions to determine positive identification, past criminal history and warrant information. DCJS receives criminal fingerprint transactions electronically 24 hours a day, seven days a week, 365 days a year. Those fingerprints are associated with misdemeanor and felony arrests, incarcerations and other criminal justice-related inquiries from all law enforcement agencies across New York State. On average, arrest transactions are processed in fewer than 15 minutes. Criminal history record reports, commonly referred to as "rap sheets," are returned electronically to the agencies that submitted the arrest fingerprints, district attorney offices and to the courts and are used to

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<sup>36</sup> N.B. The Commission of Investigation closed its doors on [Mar. 31, 2009](#). However, its reports are still available through the [Internet Archive](#) (Wayback Machine), which has nine years of website captures: [sic.state.ny.us](#). Their downloadable publications are collected on the [Public Reports](#) page, whose last full capture was Mar. 21, 2009.

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make decisions about charging, bail and/or release at arraignment. DCJS also electronically scans hard-copy arrest fingerprint cards that are sent via surface mail by agencies that cannot transmit fingerprints electronically."

### Statewide Automated Fingerprint Identification System (SAFIS)

"The New York State Division of Criminal Justice Services (DCJS) initiated the latent fingerprint database of the Statewide Automated Fingerprint Identification System (SAFIS) in 1989, when it began automated latent fingerprint searches. The Latent Cognizant database contains the records and fingerprint images of approximately 3,000,000 individuals. This database is a sub-system of the Tenprint record database, which contains over 7,000,000 criminal and civil records. The Tenprint and Latent Cognizant databases constantly change with the addition of new records, updates to existing records, or deletions (sealing) of records. Cases can enter the latent system via two central sites in Albany and nineteen regional sites around the state. Each latent image is evaluated by a trained Latent Examiner. A determination is made as to whether the image is "of value," i.e., has enough identifiable minutiae to launch a search on SAFIS. If the image is determined to be of value, a search of the Latent Cognizant database is initiated. After all latent fingerprints have been entered, the Latent Examiner compares candidates returned by SAFIS, and makes the determination if the latent image matches any of the candidates. After searching is complete, latents not identified may be added to the Unsolved Latent Database and the images are archived in the Digital Image Retrieval Subsystem. All new arrest fingerprint cards received are automatically searched against this file daily. Since November, 2005, DCJS has the ability to search latent palm prints against NYPD's database of approximately 500,000 known palm prints and store them in NYPD's unknown palm print database if an identification is not determined."