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# Expert Testimony on Fingerprints: An Internet Exchange

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## EXPERT TESTIMONY ON FINGERPRINTS: AN INTERNET EXCHANGE

Richard Friedman, D.H. Kaye  
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**ABSTRACT:** 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.

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### *Editors' Introduction*

In *United States v. Llera Plaza*,<sup>1</sup> the District Court for the Eastern District of Pennsylvania held that the ability of fingerprint examiners to conclude that a “latent” print originated from a particular individual had yet to be scientifically demonstrated.<sup>2</sup> Although several law professors had suggested that such a ruling

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1. 2002 WL 27305 (E.D. Pa. Jan. 7, 2002) [*Llera Plaza I*], *vacated*, 188 F. Supp. 2d 549 (E.D. Pa. 2002) [*Llera Plaza II*].

2. For critical analysis of previous cases rejecting challenges to the scientific underpinnings of fingerprint evidence, see 3 MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT

was only a matter of time,<sup>3</sup> the event sent shock waves through the community of fingerprint analysts, the FBI, and the Department of Justice. Fearing that “prosecutorial effectiveness . . . would be seriously compromised,”<sup>4</sup> the government urged the court to reconsider its order that while fingerprint analysts could inform the jury of the similarities in fingerprints, they could not testify that the defendant was the source of the print in question.<sup>5</sup>

After a more complete evidentiary hearing and study of the law of England, the court reversed itself. “I disagree with myself,”<sup>6</sup> wrote the highly respected judge.<sup>7</sup> Some readers will find the first opinion the more persuasive of the two,<sup>8</sup> and it remains the sole instance in which a modern court has endorsed the view that the lack of scientific studies of certain aspects of fingerprint identification justifies the exclusion of opinions of identity.<sup>9</sup> Here, we reprint a series of

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TESTIMONY 346–67 (David L. Faigman et al. eds., 2002); see also Robert Epstein, *Fingerprints Meet Daubert: The Myth of Fingerprint “Science” Is Revealed*, 75 S. CAL. L. REV. 605 (2002).

3. See Malcolm Ritter, *Fingerprints’ Accuracy on Trial Evidence*, L.A. TIMES, Apr. 8, 2001, at A1, available at 2001 WL 2476491.

4. *Llera Plaza II*, at 552–53.

5. The order specified that:

The government may present expert fingerprint testimony (1) describing how the rolled and latent fingerprints at issue in this case were obtained, (2) identifying, and placing before the jury, the fingerprints and such magnifications as may be required to show minute details, and (3) pointing out observed similarities (and differences) between any latent print and any rolled print the government contends are attributable to the same person. The defendants may present expert fingerprint testimony countering the government’s fingerprint testimony. But no 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.

*Llera Plaza I*, at 18.

6. *Llera Plaza II*, at 570 (referring to the significance of the subjective component of deciding whether prints match).

7. Before his appointment to the court, Judge Lewis Pollak served as professor and dean at the law schools of Yale University and the University of Pennsylvania.

8. See, e.g., David L. Faigman, *Is Science Different for Lawyers?*, 297 SCIENCE 339 (2002) (contending that the court shifted its ground from demanding a showing of scientific validity and reliability to accepting poorly documented claims of “specialized knowledge”).

9. Of the more than thirty challenges under *Daubert* and *Kumho Tire* to the admissibility of expert opinions that a latent print is the print of a particular person, not one court ultimately has excluded it. None of those opinions, including *Llera Plaza*, has found the evidence offered in support of admission to meet the requirements of *Daubert* and Federal Rule of Evidence 702; instead, these courts have adopted creative alternative “tests” or procedures or presumptions to admit the testimony. These judicial tactics have included: (1) refusal to conduct a *Daubert* hearing; (2) reversal of the burden of proof; (3) ignoring the task-at-hand requirement of *Daubert* and *Kumho Tire* and taking instead a vague, global approach to admissibility; (4) conclusory judgments with no analysis; (5) substituting trial process criteria for the scientific criteria required by *Daubert*; (6) turning the holding of *Kumho Tire* on its head by narrowing the grounds for scrutinizing expert evidence or sparing the field making empirical claims from the more scientific criteria of *Daubert*; (7) over-reliance on general acceptance; (8) interpreting the flexibility of criteria allowed under *Daubert* and *Kumho Tire* to mean that virtually no criteria are needed, or that no criteria need be applied thoughtfully. Not one case applies *Daubert* and *Kumho Tire* in a reasonably straightforward fashion and finds the existence of reasonably well-designed empirical tests and acceptable error rates for the task-at-hand (which in many or most of these cases is the identification of fragmentary or poor quality latent prints). See 3 Faigman et al., *supra* note 2, at 346–67; *id.* Supplement § 27-1.2 (forthcoming 2003). That so many

messages prompted by *Llera Plaza I* and originally exchanged on an Internet discussion list maintained for law professors.<sup>10</sup>

**To: Evidence Professors Discussion List**  
**From: Richard Friedman**  
**Date: January 15, 2002**

The court took judicial notice that fingerprints are unique and permanent. The problem comes in determining that a latent print, which is often imperfect and incomplete, comes from the same person as a known print. The opinion runs through the checklist provided in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*<sup>11</sup> to determine whether an expert's testimony on that point was good evidence. It decided that it was not, because there is apparently no real scientific standard for determining what is enough agreement to make an absolute identification. It's all logical enough, I suppose, but the problem in my view—one that runs through *Daubert* and *Kumho Tire Co. v. Carmichael*<sup>12</sup>—is the demand that expert evidence be scientifically based. It's also surprising given that the judge didn't cite a single horror story in all the years that fingerprinting has been used—i.e., no tales of people convicted on the basis of fingerprints that were later determined to be those of other people. He pooh-poohed the government's litigation-testing theory, which again I think reflects a mistaken approach; if adversarial testing is able to minimize problems, that suggests the expert's subjective opinion may indeed be of assistance to the jury within the meaning of FRE 702.

**To: Evidence Professors Discussion List**  
**From: D.H. Kaye**  
**Date: January 15, 2002**

I agree with Dale Nancef's conclusion in an earlier message] that Judge Pollak's "compromise is entirely intelligible," but not with Dale's reasoning that "the likelihood that the fingerprints come from the same person depends not only on the characteristics of the prints and the circumstances of their discovery but also on the other evidence in the case implicating the accused. The expert has no legitimate role in evaluating the latter."

If scientific testing demonstrates that every latent fingerprint is (very probably) unique and that examiners have a very reliable method for identifying the unique features, then why should not an examiner using this method be permitted to testify that the method has identified the individual as the source of

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courts have been unwilling to apply *Daubert* and *Kumho* faithfully in this setting may reflect discomfort with the doctrine of those cases, a discomfort shared by some of the participants in this exchange.

10. These messages have been edited for publication in *Jurimetrics* and are reprinted with the permission of the authors. We are not able to include all the messages that were posted but have selected these initial messages to convey the flavor of the exchange.

11. 509 U.S. 579 (1993).

12. 526 U.S. 137 (1999).

the latent print? The expert is not evaluating “the other evidence in the case implicating the accused”—only the fingerprint evidence and its implications. Of course, scientific studies do not demonstrate the soundness of the methodology, and so the court limits the expert’s testimony to less contentious claims.

I also think that the court got it exactly right when it dismissed the government’s claim that fingerprint technology had been proved to be scientifically valid by many years of use in the courtroom. On the other hand, I agree with Rich that a subjective method should not be deemed inadmissible just because it is subjective. Methods that involve some subjectivity can be validated, and I think that *Daubert* and *Kumho Tire* would be satisfied by studies along these lines. The problem that Judge Pollak identified is that, for fingerprinting, these studies have not been done either.

That said, Rich has an interesting point about the failure to find obvious cases of false fingerprint testimony. But would not it take awfully powerful evidence to bring such an error to the surface? There have been, what, only 99 exonerations of convicted offenders with DNA evidence? There certainly are instances in which examiners disagree as to whether prints match. Is it really clear that every person who was convicted using fingerprint evidence was the source of the latent prints?

**To: Evidence Professors Discussion List**  
**From: Dale Nance**  
**Date: January 15, 2002**

Consider two hypothetical cases that are identical in every respect except one. Both involve an expert assessing fingerprints from the crime scene and the accused. The degree of similarity between the prints in the two cases is the same. (Stay with me, here; this is a thought experiment.) In one case, the defendant’s whereabouts at the time of the crime is unknown; in the other, the accused offers testimony by police from a nearby city that the accused was in custody at the time of the crime. Isn’t the probability that the accused left the crime scene fingerprints different in the two cases? If the experts in the two cases offer opinions about whether the fingerprints came from the respective accuseds, mustn’t those opinions take into account the evidence about whereabouts? If so, why is the fingerprint expert properly offering an opinion that requires things like the assessment of the reliability of the testimony of the police witnesses offered by the accused in the second case?

**To: Evidence Professors Discussion List**  
**From: Michael Saks**  
**Date: January 15, 2002**

The problem arises from the fact that the fingerprint examiner is incorporating into his opinion information which is extraneous to (reaches outside the bounds of) the expertise which the fingerprint expert claims. The solution is to

prevent the examiner from even knowing about that information, and to have someone else combine these different pieces of evidence.

It is now common practice for experts to have access to other evidence, which causes the problems you suggest as well as others (double counting of evidence, experts “adjusting” their evidence to be consistent with other facts in the case, and so on).<sup>13</sup>

**To: Evidence Professors Discussion List**  
**From: Jennifer Mnookin**  
**Date: January 15, 2002**

I agree with Rich that the most fundamental issue this case raises is just how “scientific” expert evidence should have to be in order to be admitted. However, in my view, Judge Pollak is probably right that fingerprinting fails *Daubert*, or at least it’s a close case: the error rate is basically unknown, though limited (and not blind) proficiency testing suggests that examiners do make lots of mistakes; the claim that partial smudged prints in particular can be associated uniquely with a person is basically untested; the standards for determining a “match” are subjective and tested only through experience rather than any formal study, and so on.

Judge Pollak also, in my view, gets a couple of subpoints absolutely right. First, while “adversarial testing” by an opposing party may or may not be an effective way to minimize problems with expert evidence, it certainly is not the kind of testing that *Daubert* envisioned. Second, Judge Pollak properly takes to task the fingerprint experts’ claims that the error rate is zero: fingerprint examiners and prosecutors have been arguing in these *Daubert* challenges (of which there have now been roughly 25, though *Llera Plaza* was the first to be even partially successful) that the “theoretical” error rate for fingerprinting is zero if the technique is used correctly. This, however, borders on the tautological (if the method is perfectly done, it will operate correctly), and in all events is obviously not the error rate with which we need to be concerned. The appropriate question is what the on-the-ground actual error rate is.

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13. See Michael Risinger, Michael Saks, Robert Rosenthal & William Thompson, *The Daubert/Kumho Implications of Observer Effects in Forensic Science: Hidden Problems of Expectation and Suggestion*, 90 CAL. L. REV. 1 (2002) (discussing the problem of context information in forensic science and offering possible solutions).

As for real-life errors, there have in fact been some that *have* come to light; Simon Cole's recent book on criminal identification systems, *Suspect Identities*,<sup>14</sup> provides some details.<sup>15</sup>

To my mind, the hard and interesting question is this: If fingerprinting fails *Daubert*, does this suggest the limits of fingerprinting or the limits of *Daubert*? I'd say that it reveals both at once: it is astounding the extent to which fingerprint examiners' techniques have not been validated. That fingerprint examiners have been permitted (since 1911!) to testify in a language of certainty (routinely giving their opinion that they are 'positive' that the prints came from the same person), without any rigorous statistical basis for this claim, is something of a scandal. At the same time, fingerprinting is nonetheless probably a whole lot more reliable than a great deal of nonexpert evidence that we routinely permit (take, for example, eyewitness testimony), so it seems somewhat perverse to exclude it.

That said, Judge Pollak's compromise—to permit expert testimony about similarities and differences but prohibit the fingerprint examiner from expressing a conclusion about identity—does strike me as problematic. The real problem is that we lack any empirical foundation to provide a denominator, the equivalent of a random match probability for DNA. We simply don't really know how likely it is that a random person's print might appear to match a partial smudged print found at the scene of a crime. Without that information, what exactly is the jury supposed to make of the expert's delineation of similarities? The factfinder knows that not *everyone's* prints would match, and perhaps even believes that such matches would be rare (or, given the tremendous cultural authority of fingerprints, even unique), but the denominator is in fact unknown. So is allowing testimony about similarities without an opinion about the meaning of these similarities actually helpful to the jury, or does it risk significant and disturbing misestimation errors? It strikes me as quite different from typical nonexpert identification evidence (the perpetrator and the suspect are both brunettes, or both have a mole, or whatever) in that in those cases we expect (rightly or wrongly) that lay jurors

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14. SIMON A. COLE, *SUSPECT IDENTITIES: A HISTORY OF FINGERPRINTING AND CRIMINAL IDENTIFICATION* (2001). This book has outraged the fingerprint community. See, e.g., Brendan I. Koerner, *As the Whorl Turns*, VILLAGE VOICE, Mar. 20–26, 2002, available at <http://www.villagevoice.com/issues/0212/koerner.php> (noting that the examiners' "most venomous attacks" have focused on Cole); [http://onin.com/fp/stmt\\_ref\\_articles.html](http://onin.com/fp/stmt_ref_articles.html) (updated Apr. 4, 2002) (criticizing Cole as a publicity hound).

15. Cases in which the prosecution offers evidence that two fingerprints match, but the defense offers rebuttal evidence and the jury acquits, as in the celebrated case of Shirley McKie, described in COLE, *supra* note 14, at 283, do not constitute a "horror story." On the other hand, a case like that of Roger Caldwell (see *State v. Caldwell*, 322 N.W.2d 574 (Minn. 1982)), in which the prosecution offers incorrect fingerprint evidence, the defense fails to counter it, and the defendant is convicted, does represent a terrible breakdown of the system—even if the error comes to light at a later time (as it did for Caldwell, in the trial of another defendant) and the defendant is freed. Cole does not have evidence to suggest that such breakdowns have occurred with significant frequency, but part of the problem is that we know almost nothing about the frequency of erroneous testimony declaring a fingerprint match; moreover, whether our current system typically does detect such errors when they do occur is far from certain.

will have some intuitive sense about frequencies. With fingerprints, juries *don't* have any experiential basis for an intuitive sense of frequencies.

**To: Evidence Professors Discussion List**  
**From: D.H. Kaye**  
**Date: January 15, 2002**

Dale wrote, "Consider two hypothetical cases that are identical in every respect except one. Both involve an expert assessing fingerprints from the crime scene and the accused. The degree of similarity between the prints in the two cases is the same. (Stay with me, here; this is a thought experiment.)" I think this changes the hypothetical I offered of testimony involving sufficient points of comparison to claim uniqueness (as verified by sufficient empirical research). But I shall stay with him anyway.

"In one case, the defendant's whereabouts at the time of the crime is unknown; in the other, the accused offers testimony by police from a nearby city that the accused was in custody at the time of the crime. Isn't the probability that the accused left the crime scene fingerprints different in the two cases?" Yes. To be clear about what "the probability" refers to, let  $S_1$  stand for the event that  $D_1$  is the source,  $S_2$  that  $D_2$  is the source,  $F$  the fallible observation of the similar fingerprint match, and  $W$  the whereabouts of  $D_1$  and  $D_2$ . The conditional probabilities are  $P(S_1 | F \cap W)$  and  $P(S_2 | F \cap W)$ . These are different.

"If the experts in the two cases offer opinions about whether the fingerprints came from the respective accuseds, mustn't those opinions take into account the evidence about whereabouts?" No. An expert can testify that based on the fingerprint alone, one can conclude  $S_1$  (or  $S_2$ ). The conditional probabilities are the same. In the notation introduced above,  $P(S_1|F) = P(S_2|F)$ . In Dale's hypothetical, the expert who so testifies could be in error because of a mistaken belief, on the basis of an adequately validated theory, that the fingerprint match is sufficiently detailed to be conclusive.

"If so, why is the fingerprint expert properly offering an opinion that requires things like the assessment of the reliability of the testimony of the police witnesses offered by the accused in the second case?" The opinion I proposed was more circumscribed, but it hinges on establishing that fingerprint examiners can reliably ascertain uniquely individuating features. As Jennifer points out, that has not been shown to be the case. (I merely postulated it to make a logical point.) Ideally, the expert would testify in terms of likelihoods—how probable the matching characteristics are if the two prints are from the same source, and how probable they are if they are from different sources.<sup>16</sup> Of course, on the basis of the research to date, these numbers are difficult to estimate. Yet, it is clear that there is useful information in the fingerprints, and the question becomes whether Judge Pollak's solution (or something like it) is better than the alternatives of (1) excluding all

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16. See, e.g., RICHARD D. FRIEDMAN, *THE ELEMENTS OF EVIDENCE* 96 (2d ed. 1998).



the expert testimony about a match and its implications or (2) allowing what may well be overstated opinion testimony.

**To: Evidence Professors Discussion List**  
**From: Dale Nance**  
**Date: January 16, 2002**

Michael has identified the nature of the problem that I was raising. As an initial reaction, I wonder whether shielding is an adequate solution if the expert is going to give an opinion about identity. In my hypothetical, if we shield the expert in Case 2 from information about the alibi evidence offered by the accused, that doesn't necessarily mean that the expert is opining without regard to the information beyond the scope of his expertise. It means, rather, that the expert will (at least in some cases, perhaps in all cases) be making assumptions about that background information based on expectations derived from previous experience. For example, if shielded from information about the alibi, the expert—in order to opine on the probability that the crime prints came from the suspect (rather than giving information about the likelihood ratio)—will (must, may?) make some assumption (implicitly?) about the priors, and that will presumably be that this case is like the typical case of this crime. If so, that will rule out making the assumption of a police alibi, since that is very unusual.

That's why I also agree that we should use the DNA model and restrict the expert testimony to communicating the coincidental match probability in some fashion, that is, after there is sufficient scientific basis for calculating such a probability. Until that is possible, we have to choose between precluding an opinion on identity or, as you suggest, allowing an opinion that is acknowledged to be without scientific basis. (Perhaps there are other alternatives.)

I think Judge Pollak's choice is plausible, and will certainly provide more incentive to do the needed scientific work than the alternative of allowing a nonscientific, but nonetheless expert opinion on identity. I am also less worried about the risk of "misestimation" error that Jennifer rightly notes about *Llera Plaza's* approach—one that arises from the fact that jurors have no experience from which to obtain an intuitive or common sense coincidental match probability, at least in fingerprint cases. Allowing testimony about similarities demonstrates to the jury that the police were doing their job in obtaining fingerprint evidence, evidence that, in the case, does not convincingly exonerate the accused; moreover, their intuitive coincidental match probabilities are likely to be overestimated (thus favoring the accused) in the absence of hard statistics (and indeed even in their presence, if they should become available).