



E5 Emergence of Scientific Latent Print Practices: Implications for Examinations, Findings, Evidence, and Decision Making

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After attending this presentation, attendees will appreciate the foundations for upcoming fundamental changes arising from the scientific examination of latent prints and the associated documentation, interpretations, and legal decision-making.

This presentation will impact the forensic science community by foreshadowing and accelerating fundamental changes attending the scientific examination of latent prints, increasing their utility, reliability, transparency, and fairness.

Gradually over many decades, latent print comparison practices developed and achieved a measure of standardization. The focus during this period was effecting identifications — a process whereby an expert in latent print examination and comparison reached a categorical conclusion that a latent print was, in fact, made by a specific individual. Measurement of latent print individuality, a prerequisite for scientific determination of significance, was not a part of this process. Efforts to measure individuality occurred over these many decades, but they were infrequent and were largely untested hypotheses. At no time were they part of the process used by practitioners to form their conclusions.

Crude, poorly defined counting of minutiae was frequently employed. These counts were sometimes used, following community practice or legal regulations, as a threshold for identification conclusions. Vagaries in counting criteria and the lack of scientific foundations led to international resolution for their abandonment in 1995.

As late as 1997, it was inconceivable to have a hearing challenging the admissibility of latent print evidence. In that year, the *West Companion to Scientific Evidence* was published, in which legal scholars solicited the collaboration of leading forensic scientists to articulate points of agreement and disagreement covering a wide range of scientific evidence. Other important developments were afoot, including improved biometric applications of fingerprints, application of these to the measurement and modeling of fingerprint individuality, legal scholarship challenging the historical foundations for latent print practices, and maturing evidentiary expectations for DNA-based identifications. Latent print identification practices, long ignored by scientists, legal practitioners, and the lay public, soon began to receive attention and started to become a focus for objective evaluation.

In 1999, it was no longer inconceivable to hold an evidentiary hearing on the admissibility of latent print evidence. This, and the resulting debate, directly motivated research into the related aspects of the measurement of latent print individuality. Over the next few years, methodologies used in latent print examinations were consistently challenged and consistently improved. Those who resisted the attendant changes most adamantly, or who held prior practices above reproach, were exposed by a combination of scientific scrutiny, legal awareness and high profile errors.

Over the past several years, important advances promoting these changes include:

- Continued legal scholarship and debate on the foundations of latent print examination, individualization conclusions, and errors.
- Research on the interpretation of physical evidence by applied statisticians and academic forensic scientists.
- Emergence of highly capable tools for performance and documentation of latent print examination protocols, applicable to: (1) initial latent print assessments of quality, reliability, and number of features for comparison; and, (2) comparisons of latent prints to candidate sources.
- Study of human factors in the latent print comparison process.
- Increasingly relevant and practical methods for the measurement of latent print individuality.
 - During this last year or two particularly noteworthy are the publications of:
- A method for quantifying the weight of evidence from a forensic fingerprint comparison.
- Promulgation of professional guidelines and standards emphasizing transparency, documentation, and scientific practices.
- Explicit separation of the results of laboratory findings, from the evidence that results from their interpretation within case parameters and from their use in decision-making.
- Completion of an expert working group study of human factors in latent print examination.
- A comprehensive, critical study of current methods used for the examination of latent prints, with



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recommendations for improving their reliability.

The impact of these events will be to re-focus issues in latent print analysis on the use of measurement tools in the latent print examination processes, together with their associated documentation. Measurement enables scientific progress. The result will be objective determinations of quality, sufficiency, and levels of complexity in the analysis. These, in turn, will dictate different required levels of documentation. The existence of explicit documentation will lead to transparency in the latent print examination process and the establishment of routine expectations for the examination itself and for informative discovery.

Latent Prints, Scientific Practices, Measurement