B161 Evaluation and Validation of a Model to Quantify the Weight of Fingerprint Evidence

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The goal of this presentation is to introduce attendees to a novel method for quantifying the weight of fingerprint evidence, which has been developed and is currently undergoing validation by the United States Army Criminal Investigation Laboratory. After attending this presentation, attendees will have a better understanding of the difficulties with supporting claims of single-source attribution (e.g., "individualization") and be introduced to an alternative framework implemented within the Department of Defense.

This presentation will impact the forensic science community by helping attendees better understand the mathematical concepts by which this method was developed, the results of preliminary evaluation data against mated and non-mated fingerprints obtained from a database of several million fingerprints, and the on-going validation efforts to facilitate the transition of this technology into practice. This presentation will explore the evolution of fingerprint testimony, highlight potential issues with the current reporting paradigm, and recommend an alternative reporting framework to ensure fingerprint results are reported in an epistemologically compatible and more scientifically defensible manner.

For more than 100 years, fingerprint evidence has been used as a valuable tool for the criminal justice system. Relying on the generalized premise of "uniqueness," the forensic and legal communities have regarded fingerprint evidence as nearly infallible, having the capacity to "individualize" the source of a fingerprint impression to a single individual. While the uniqueness of a complete record of friction ridge skin detail is generally undisputed, the extension of that premise to partial and degraded impressions has become a central issue of debate. As a result, the traditional paradigm of reporting latent fingerprint conclusions with absolute certainty to a single source has been challenged. The underlying basis for the challenge pertains to the mathematical logic applied and the manner in which the evidence is articulated. By recognizing the subtle yet non-trivial differences in the mathematical logic, the fingerprint community may consider an alternative framework to report fingerprint evidence to ensure the certainties are not over- or understated. This presentation will discuss the logic largely subscribed to by the fingerprint community along with the underlying basis to why it is the focus of challenge, present an alternative framework for the community to consider adopting which is epistemologically more compatible and defensible, and discuss how this transition was achieved within the Department of Defense without minimizing the value of fingerprint evidence.

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Fingerprints, Likelihood, Statistics

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