W13   Statistical Interpretation Software for Friction Ridge Skin Impressions: FRStat

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Learning Overview: After attending this workshop, attendees will be familiar with a novel method for calculating the strength of fingerprint evidence using a statistical interpretation software, FRStat, developed by the United States government.

Impact on the Forensic Science Community: This workshop will impact the forensic science community by providing participants with the knowledge, skills, and abilities to provide a statistical foundation to latent print examinations using FRStat software to ensure examinations are conducted and conclusions are articulated in a more scientifically defensible manner.

Over the years, the forensic science community has faced increasing amounts of criticism by scientific and legal commentators, challenging the validity and reliability of many forensic examination methods that rely on subjective interpretations by forensic practitioners. As noted in 2009 by the National Research Council (NRC) of the National Academies of Science (NAS) and more recently by the President's Council of Advisors on Science and Technology (PCAST), a main concern is the lack of any empirically demonstrable bases to substantiate conclusions from pattern evidence. This limits the ability for the judiciary to reasonably understand the reliability of the expert's testimony for the given case. Consistent with several academic commentators, both the NRC and PCAST strongly encouraged the forensic science community to develop tools to evaluate and report the strength of forensic evidence using validated statistical methods. While these concerns apply to nearly every pattern-evidence discipline, the forensic fingerprint discipline has received most of the attention because fingerprint analysis is one of the most widely used techniques in the criminal justice system. As a result, numerous methods and models have been proposed to provide a statistical estimate of the weight of fingerprint evidence. However, *none* have been widely accessible to the forensic community, thus prohibiting their ability to be further evaluated or implemented into routine casework. Consequently, forensic science laboratories throughout the United States have been unable to adequately address the concerns raised by the NRC and PCAST by demonstrating the reliability of fingerprint evidence for the case at hand.

Over the past few years, the Defense Forensic Science Center's (DFSC) United States Army Criminal Investigation Laboratory (USACIL) has taken incremental steps toward the development, validation, and implementation of a method, FRStat, which facilitates the evaluation and reporting of the statistical strength of fingerprint evidence. In March 2017, the USACIL implemented FRStat into routine casework and began reporting the statistical strength of fingerprint evidence within the military criminal justice system. Now, FRStat is the only method known to be in operational use within the United States that provides the capability of ensuring that the strength of fingerprint evidence is evaluated with an empirically grounded basis.

Through a combination of lectures, group discussions, and practical exercises, this presentation will provide an overview of rudimentary statistical concepts relevant to FRStat, discuss the development, validation, and implementation of FRStat, and provide instruction on how to appropriately interpret, report, and testify to the FRStat results.

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Fingerprints, Statistics, Probability