



## Criminalistics Section - 2016

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### **B98 Demystifying Mixture Interpretation Software Tools (MIST) — Practical Applications and Implementation Strategies for DNA MIST**

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The goals of this presentation are to: (1) investigate how DNA MIST have been used for crime laboratory applications; (2) provide considerations from current users to inform potential technology adopters; and, (3) assist with implementation planning by providing practical and technical considerations through examples of real-world applications.

This presentation will impact the forensic science community by informing forensic practitioners in crime laboratories of the potential benefits of these tools and supporting the decision-making process for adoption of this technology into forensic DNA crime laboratories.

This presentation will provide an overview of the reported landscape study of DNA mixture interpretation software tools conducted by the National Institute of Justice's Forensic Technology Center of Excellence at RTI International with support from Duquesne University.

Many crime laboratories have recognized the benefits of adopting a DNA mixture interpretation software tool that assists with the challenges of complex mixture interpretation and provides statistical analysis. Forensic DNA crime laboratories, therefore, benefit from a study that reviews current product offerings, features, and capabilities, and examines how this technology is chosen, acquired, implemented, and validated. Although probabilistic software tools can assist with many of the issues experienced with complex mixtures, it is important for laboratories to understand the features and limitations of the different tools and make a choice that best meets their needs.

The objectives of this study were to investigate to what extent DNA mixture interpretation software tools have been used for DNA forensic crime laboratory applications, provide considerations from current users to inform potential technology adopters, and assist with implementation planning by providing practical and technical considerations through examples of real-world applications. This study captures the current state of DNA mixture interpretation software tools and the potential benefits of adoption. The considerations and benefits described in this study were obtained through interview discussions with subject matter experts, including crime laboratory practitioners, stakeholders, technology developers, academics, and key decision makers. The captured discussions highlight the different needs and methods for procurement, validation, and implementation. This study also contains a comprehensive review of secondary sources, such as journal and industry literature, for information related to need, successful use, developmental validation, and adoption criteria. In addition, the key considerations for successful implementation are discussed, including comprehensive training on the software and the underlying mathematical model, the resources needed for internal validation, including planning, labor, and time, and the potential for additional support from the laboratories' Information Technology (IT) departments.

With the continued increase of complex mixture data, the need for mixture interpretation software tools is of growing importance to the forensic DNA community. Given the availability of open-source and commercial software options, forensic DNA crime laboratories must assess their needs to find the most suitable software tool.

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#### **DNA, Mixture, Software**