A52 Optimization of FSS-i^3 for Future Use at the Michigan State Police CODIS Unit

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After attending this presentation, attendees will know about the i- STRess component of the FSS-i^3 software system and the process of optimizing such Expert System to mimic the guidelines of the Michigan State Police's CODIS Unit.

This pressentation will impact the forensic science community by helping reduce backlogs caused by data review with the help of Expert Systems, such as FSS-i^3.

With the implementation of automation, convicted offender DNA samples are currently collected, extracted, and amplified substantially faster than they can be manually reviewed. To reduce the data review backlogs, software programs, known as Expert Systems, are currently available for forensic laboratories to facilitate data interpretation. Using National Institute of Justice funding through the FY 2006 DNA Capacity Enhancement Program (2006-DW-BX-K122), the CODIS Unit of the Michigan State Police recently purchased the FSS-i^3 Expert System with the intent of using it as an additional tool for data analysis.

The FSS-i^3 software was created by the Forensic Science Service® in the United Kingdom and is licensed for retail sales in the United States through the Promega Corporation. FSS-i^3 needs the assistance of another software system, such as the Applied Biosystems GeneScan® and Genotyper® or GeneMapper® *ID,* for the purpose of calculating size, height, and area of allelic peaks. The FSS-i^3 has 3 components: i-STRess, i-STReam, and i-ntegrity, which allow single source samples, two person mixtures, and possible contamination to be reviewed. The primary focus of this project is the evaluation of FSS-i^3 for the analysis of single source samples using the i-STRess component.

In order for the Michigan State Police CODIS Unit to utilize the FSS-i^3 Expert System, the software must undergo a validation study to demonstrate its ability to perform at the same level or higher than a human analyst. The software must be validated using data generated with the laboratory's instrumentation and amplification kit. For this study, data was generated on an Applied Biosystems (ABI) 3100 Genetic Analyzer with ABI Data Collection Software 1.1 and ABI's GeneMapper® *ID* Software version 3.2 was used to organize height and area of each allele before introducing the data to the FSS-i^3 software. In the i-STRess application, the laboratory must optimize the rules and settings to mimic their specific data interpretation guidelines. The criteria for this determination will be that the software system will either pass samples with correct allele calls or flag problematic samples that show evidence of artifacts. A human analyst will then decide whether the flagged sample can be passed or failed. Over 1,500 known samples were processed using the i-STRess component of the FSS-i^3 Expert System to optimize the rules and settings to reflect the Michigan State Police CODIS Unit's interpretational guidelines. Using the FBI Laboratory's guidelines for validations on Expert Systems, a calibration set of at least 200 known samples exhibiting artifacts or explainable abnormal electrophoretic migration of DNA fragments was used to test the final rule settings. Once the testing of the software is completed, it will be sent to the National DNA Index System Custodian for validation approval.

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Expert System, FSS-i^3, Optimization

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