B25 Presumptive Mathematical Model of Capillary Electrophoresis Processes Involved in STR Analyses Based on Observations at the Biotechnology Center, Shadow Lane Campus, University of Nevada Las Vegas

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After attending this presentation, attendees will have increased knowledge about the potential of applied mathematics to analyze and process data involved in forensic DNA fragment analysis.

This presentation will impact the forensic community and/or humanity by demonstrating the capillary electrophoresis process to sep- arate short tandem repeat DNA fragments for analysis is complex and involves many factors that influence results. This method may lead to new insights in review of forensic DNA data.

This work is intended to explore the possibility that a specialized mathematical model (based on chemical engineering principles) can be used to depict physiochemical factors and their changes to allow another quantitative measure of influences on results important in DNA finger- printing. The potential impact on forensic casework could be significant.

The DNA Fingerprinting process involves use of a sensitive capillary electrophoresis instrument and associated software for separation and analysis of Short Tandem Repeat DNA fragments. The capillary electrophoretic process is subject to a multitude of physicochemical effects that critically impact on results obtained. Such effects include slow changes in polymer that fills the capillary to control flow, changes in the coating on the capillary wall that may disturb the flow of DNA molecules passing through the capillary as examples. Understanding these processes to a greater extent through use of mathematical modeling and their potential impact on DNA Fingerprinting profiles may be helpful in interpretation of DNA Fingerprinting patterns and nuances. Progress on this subject will be reported in this paper.

STR Fragment Separation and Analysis, Mathematical Model, UNLV

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