## A129 Rapid Microfluidic Human Specific DNA Quantitation

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The goal of this presentation is to familiarize the forensic scientist with recent advances in biochip based DNA analysis systems and, in particular, with a biochip-based rapid human-specific DNA quantitation system for fully integrated microfluidic STR analysis.

This presentation will impact the forensic science community by demonstrating biochip-based human specific quantitation, a major step towards the development of a fully integrated, samples-in to results-out STR analysis system.

The rationale for developing biochip-based DNA analysis tools is that a fully integrated system has the potential to reduce the time, labor, and cost of performing STR analysis. These advances may increase the capacity of forensic laboratories as well as reduce the current backlog of casework and database samples. Furthermore, a fully-integrated system that can be operated in the field offers the potential to expand the use of STR analysis beyond an evidentiary role at trial to an investigative role at the crime scene. A fully integrated STR analysis system based on microfluidic biochip technology for forensic laboratory and field-forward operation of casework samples would comprise modules to perform: (1) DNA purification and human specific DNA quantification; (2) multiplexed STR amplification; and, (3) separation and detection of the resulting amplicons.

The development of a rapid microfluidic human specific DNA quantitation system that is able to perform human specific DNA quantitation in seventeen minutes will be reported. Quantitation is based on end-point detection of PCR product using human specific primers and fluorescent intercalating dyes. The system uses the same rapid biochip- thermal cycler required to perform rapid STR amplification. Similarly, excitation and detection of the reaction solutions is accomplished with the same laser and optical train as used in the separation and detection module. This multipurposing of critical components is important to minimize the dimensions, cost, and complexity of the instrument.

Data will show generated with demonstrate the accuracy, repeatability, and specificity of the system. Mock casework and buccal swab samples will also be used to show that microfluidic biochip DNA quantitation is well-suited for incorporation into a fully-integrated microfluidic forensic DNA analysis system.

**STR Analysis, Human Specific DNA Quantitation, Biochip**

 ** Presenting Author*