## A197 The Statistical Evaluation of Duct Tape Fracture Match as Physical Evidence

*Frederic A. Tulleners, MA*, and Ka Lok Chan, BS, University of California - Davis, Forensic Science Program, 1333 Reasearch Park Drive, Davis, CA 95618; and You-Lo Hsieh, PhD, University of California - Davis, Fiber and Polymner Science, One Shields, Davis, CA 95616*

After attending this presentation, attendees will have an understanding of the uniqueness of duct tape shearing. Data and a statistical evaluation of a series of physical matches of randomly assigned duct tape samples will be provided.

This presentation will impact the forensic community by providing a statistical basis for the analysis of duct tape shearing.

Duct tapes are often submitted to crime laboratories as evidence associated with abductions, homicides, or construction of explosive devices. As a result, trace evidence chemists are often asked to analyze and compare commercial duct tapes to establish a possible evidentiary link between a suspect and a victim, or a suspect and a particular crime or between different crimes. Duct tape physical matches, which is the subjective arrangement or association of two or more separated fragments, have a significant higher evidentiary value and are considered to be the strongest association in forensic science comparative examination. Even though it is a fairly routine examination, there is a lack of sufficient statistical data and objective criteria to support what constitutes a physical match. The typical statement from a crime laboratory report is that the specimens in question physically match. This statement is assumes an absolute association without the consideration of any statistical data or error rates. This study was designed to examine duct tape physical matches in order to determine the statistical significance of a “match” conclusion. Two study participants separately evaluated three sets of experiments consisting of 174 torn duct tape specimens. Each of these experiments included the assignment of random numbers to the question specimens and the inclusion of at least five specimens that were not part of the exemplar sets. In experiment one, 100 specimens were torn by hand. In experiment two, 50 specimens from two similar duct tape samples were torn by hand and in experiment three, 24 specimens were torn by an Elmendorf Tear Tester. The examiners were able to correctly associate all the question and exemplar specimens and properly exclude the specimens not associated with the exemplars. To compare all the question specimens to all the exemplars, each examiner had the potential to conduct 13, 076 comparisons.

**Duct Tape, Fracture Match, Physical Match**

 ** Presenting Author*