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Sequencing Strokes in a Crossed-Line Intersection Using Ultraviolet-Visible Microspectrophotometry

Determining the age of a document is essential to a forensic document examiner, but an equally important focus area is the sequence of intersecting lines, which is instrumental in determining authenticity. However, past techniques that have been used for sequencing, both physical and chemical, are not consistently effective and some analyses are destructive towards the evidence. In a recent INTERPOL and AIEED study, the migration distance of a non-visible component of pen ink was used to determine the age of a crossed-line intersection. These components were visualized through luminescence when viewed under alternate light sources. Development of a non-destructive method to sequence two markings in a crossed-line intersection is desirable and a UV-visible microspectrophotometer (UV-Vis MSP) can be used for this purpose through the collection and comparison of fluorescent spectra. This study is based on the hypothesis that the pen that is on top in the intersection will emit greater fluorescence than the pen on the bottom. Specifically, when the intersection spectrum is compared to control spectra, the control for the pen on top should share more peaks with the intersection than the pen on the bottom. These fluorescent spectra are measured in reflectance, which is why the pen on top will fluoresce more and have more shared peaks. However, the bottom pen also shares peaks due to small amounts of penetration. This study examined the fluorescent data from intersection samples, which had been stored in heat and humid environments, to the control samples, which were stored in an ambient environment. The results of this study show that different environments produced varying success of the sequencing.

References:

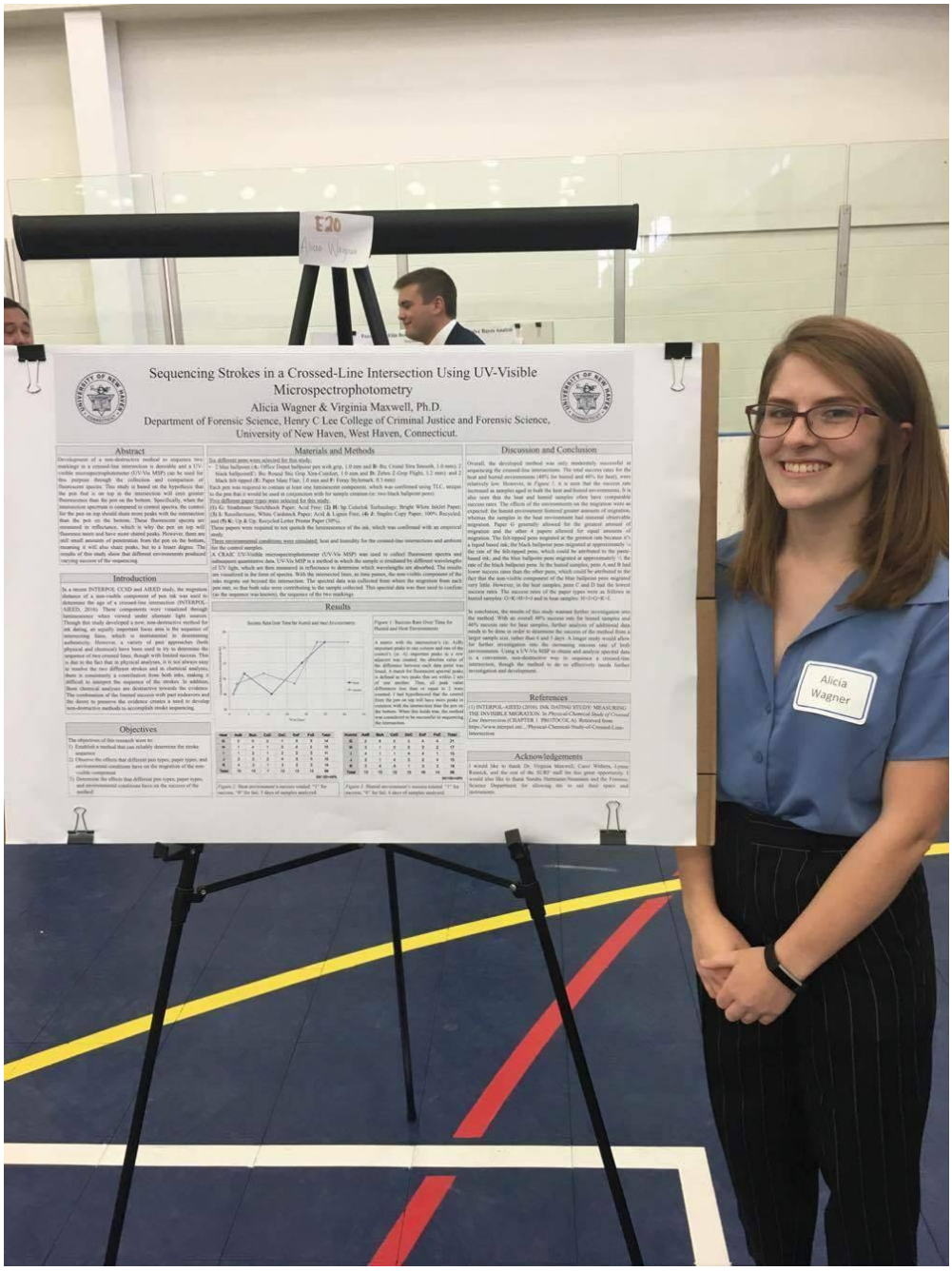
1) INTERPOL-AIEED (2016). INK DATING STUDY: MEASURING THE INVISIBLE MIGRATION. In *Physical-Chemical Study of Crossed Line Intersection* (CHAPTER 1. PROTOCOL A). Retrieved from https://www.interpol.int/.../Physical-Chemical-Study-of-Crossed-Line-Intersection

Acknowledgements:

I would like to thank Dr. Virginia Maxwell, Carol Withers, Lynne Resnick, and the rest of the SURF staff for this great opportunity. I would also like to thank Sandra Hartmann-Neumann and the Forensic Science Department for allowing me to use their space and instruments.

Bio:

Hello, my name is Alicia and I am from Newburgh, New York. I am a junior majoring in Forensic Science with a concentration in Chemistry, and I plan on pursuing a Masters, or possibly a doctorate, in Chemistry. On campus, I am a member of the Paranormal Research and Investigation Organization and the Forensic Science Student Association, where I am a committee head of the Community Service Committee.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