

## **ABSTRACT**

**DISSERTATION/THESIS/RESEARCH PAPER/CREATIVE PROJECT:** Uncovering the Mystery: An Application of XRF on Possible Comingled Remains

**STUDENT:** Katarina Wasley

**DEGREE:** Master of Arts

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This study examines the use of x-ray fluorescence, with osteological analysis, in determining the placement of dissociated bones to identified burials from a disturbed cemetery in Mississippi. The use of a control group, composed of two complete skeletons from Ball State University's Anthropology Department, was used to examine if x-ray fluorescence was a reliable method for bioarchaeology. The x-ray fluorescence data was analyzed using multivariate discriminant function analyses of the calcium, titanium, vanadium, chromium, magnesium, iron, copper, zinc, and potassium data collected. The results of the control group were that 81 percent of the skeletal elements tested were correctly identified to their skeleton suggesting that the method is acceptable for bioarchaeology. The results of the experimental group matched 43 percent of the 42 dissociated skeletal elements to single burials by using both x-ray fluorescence and osteological analyses while 50 percent of the skeletal elements matched to multiple burials and the remaining seven percent of skeletal elements did not match to any of the identified burials tested.