

Honors Senior Spotlight



Cody Silverman '22

Hometown: Milford, Massachusetts

Major: Forensic Science

Minor: Chemistry

Thesis Title: Evaluation of Raman Spectroscopy as a Screening Tool to Predict DNA Recovery Potential in Skeletonized Human Remains

Thesis Advisors: Drs. Angie Ambers; Brooke Kammrath

What is your thesis about?

Currently, a reliable screening method for DNA extraction from bones does not exist. Previous studies demonstrate that certain skeletal elements (e.g., weight-bearing long bones, molar teeth) are preferred for forensic DNA testing; however, once these skeletal elements are selected, the sampling technique is somewhat blind. Moreover, the external physical appearance of bone has been proven to not be a reliable predictor of DNA recovery potential. During postmortem diagenesis, the microstructure of bone decomposes in a non-uniform manner. The heterogeneous nature of bone diagenesis poses a challenge in determining which region(s) of the bone contain the most intact microstructure (and presumably the most DNA). The goal of my research is to use Raman spectroscopy as a pre-screening tool for DNA extraction of bone which would provide analysts with preliminary data to make informed decisions on the location of optimal sampling sites along the diaphysis of a long bone, thereby reducing the amount of bone consumed and destroyed in the testing process. As a result, Raman spectroscopy could offer a robust and reliable method to expedite and streamline the processing of unidentified skeletal remains in casework. This in turn would save time, labor, and money.

What motivated and/or inspired you to select this as your research topic?

I had the opportunity to take a special topics class in forensic science and I chose to take Advanced Forensic DNA Applications for Missing Persons, Unidentified Human Remains (UHRs), and Mass Death Investigations taught by Dr. Ambers. In this class, one thing we learned about was all the sources of DNA damage and potential challenges that a DNA analyst may face when attempting to extract DNA. When families lose a loved one, the last thing we want to do as DNA analysts is to destroy the body any further by sampling multiple sections of the bone. This technique will be able to provide closure for these families with a reduced amount of bone consumption.

Do you have any advice for future Honors students thinking about writing an Honors Thesis?

My advice for future Honors students is to find a topic you are passionate about and a professor who can get you where you want to be. I would advise you start early in your search and form connections with as many faculty members as possible to determine who you would work well under. Do not be afraid to reach out to professors with potential ideas. If you are not sure what you want to do research in, talk to a professor that you have a good connection with and see if they have any current research that they need help with.

After graduating, what are your plans?

After graduation, I will attend the University at Albany, SUNY to pursue a PhD in Chemistry. I would like to work for the DEA after my PhD and ultimately become a professor in forensic chemistry.