



# Duquesne Student Works to Unravel Mysteries Behind Bags of Bones

*By Ken Walters*

**M**ckenna Lohr plans to graduate from Duquesne University this spring with an eye toward a doctoral degree, but she may also want to consider joining a detective agency.

For the past three years, the Duquesne graduate student has been studying human bones recovered from two ancient graves in Rhodes, Greece. The five bags of bones were brought to Duquesne by Dr. Philip Reeder, dean of the Bayer School of Natural and Environmental Sciences, who was working on the island in the Aegean Sea with international researchers. Those colleagues offered the bones—with only scant details about them—to the University for study.

To try to determine the identities of the people behind the bones, Lohr started to conduct research on what was happening in Rhodes between 323 BC and 650 AD—the dates of objects found with the remains.

Her initial research only generated more questions.

“What I found that was exciting was that Rhodes had a tumultuous time during that period,” says Lohr, who earned a bachelor’s degree in biology in 2018 and will earn her master’s degree in forensic science and law in May 2019. “There were people who were natives, Greeks who fought the Persians, and Romans who would vacation there, or have their children go to school there. There was a lot happening at that time, so the remains could be anybody.”

The area also had been occupied by Sasanian Empire Persians as well as those of Arab descent, adding further to the number of groups in the area. (See chart for timeline.)

To begin the identification process, Lohr and Dr. Anne Burrows, professor in the Rangos School of Health Sciences, conducted an osteology analysis, looking at the bones and bone fragments to see if they fit together. They also studied the bones for fusion lines, as bones with no lines indicate an adult, while bones with some fusion lines indicate the person was younger, perhaps a child or teenager.

“Based on the analysis, we estimated that there were 15 bone fragments with some bones articulating together to form 12 bones total,” Lohr says. “From the layout of bone fragments across the two separate graves and other factors, we estimated that there were at least four individuals present in the remains we had been given.”

The next step in her research required Lohr to learn a new and complicated skill.

To verify the estimates, Lohr would need to conduct DNA analysis on the bones. Working with Duquesne faculty, she spent hours in the lab learning the intricate procedures needed to sequence DNA accurately.

“At each step of the process, we look at the results and see if there are any signs of contamination,” she explains. “If there are, we have to go back in the process to before the contamination began. And if we can’t tell when it began, we have to go back to the beginning. So it’s an involved process, to say the least.”

After extracting DNA from the bones, Lohr conducted a process to sequence the DNA to examine variations. Lohr compared the DNA sequences of her samples to a well-known DNA sequence used by scientists to differentiate between individuals and possibly determine maternal ancestry.





From this information and some objects found with the remains, Lohr says it's possible that the graves may have been part of a Christian cemetery. It was also determined that two of the bodies were adults, a male and female.

"It's impossible for us to know if there were any familial relationships from the DNA," Lohr says. "We can only tell if they have a similar maternal ancestry, thus indicating they are more likely to be closely related. At this point, we still need to do more sequencing to determine that."

Reeder notes that the applications for this forensic work extend beyond ancient remains and that such research projects provide students with a broad range of skills and expertise.

"The techniques and methodology of the research can be applied to degraded or damaged skeletal remains found at crime scenes and archeological digs," he says. "The research work also allows students to use expertise from other disciplines, such as chemistry, toxicology and pathology, to create a more comprehensive profile of an unknown person."

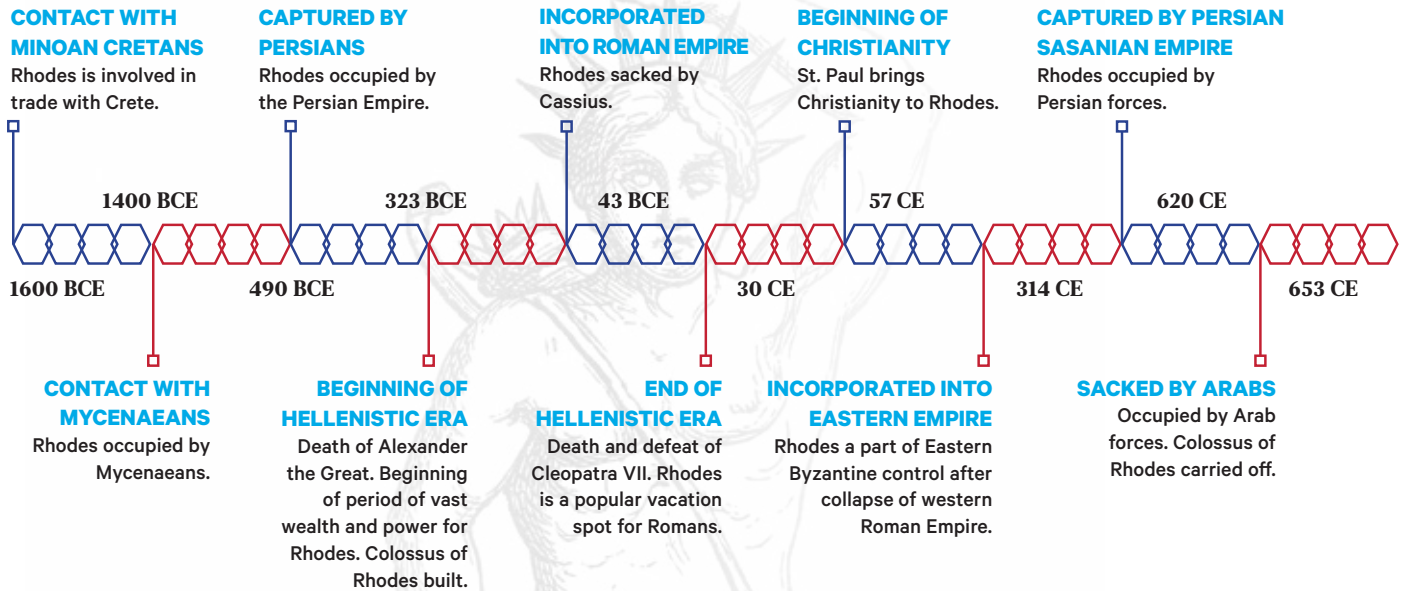
For Lohr, this bag of bones helped expand her interest in anthropology and archeology and increased her skills in biology and forensics.

"This project has meant so much to me," she says. "It's very fulfilling work in that you are giving a forgotten person their sense of identity back by further understanding the specifics of how they lived and died."

Lohr is applying to graduate schools to further her anthropology studies and hopes to be a professor one day. While she won't see the final results from her investigation—there is still much DNA testing to be done—she's excited by the future possibilities.

"It's a great challenge—what can you do with a bag of bones? The possibilities are truly endless," she says, noting that further technological advancements may help lead to more discoveries. "I look forward to students taking on this project in the future and helping us learn more about the bones and the lives of these people." ♦

## A history of Rhodes, highlighting the various people and cultures who occupied the island.



*Encyclopedia Britannica, Rhodes Guide, Ancient History Encyclopedia and Biblical Tour Guide*