

Corpses leave clues behind in the soil long after they're gone

ASU research has potential to help forensic teams solve cases when a victim's body has been moved

By Dolores Tropiano, ASU News
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It is not uncommon for a body to be moved after a murder, usually to hide or eliminate evidence.

And while the Arizona desert may seem like the perfect place to commit such a crime, a new study shows that a cadaver can still leave critical clues behind in that harsh environment.

Arizona State University researchers have found that trace elements linger at an original dump site even after an extensive amount of time. These elements can provide insights into postmortem processes, helping forensic investigators uncover clandestine burials and relocate the remains of murder victims.

"A lot of times a murderer will kill someone and put the body somewhere, stash it, panic and then move it. And how can you ever trace where they have done this?" said Assistant Professor [Katelyn Bolhofner](#) with the [School of Interdisciplinary Forensics](#), who collaborated with President's Professor [Pam Marshall](#) from the [School of Mathematical and Natural Sciences](#) on the study.

"The surprising result was that even with the hot Arizona summer, we could still tell that there had been something that was dying and decomposing in that spot in the desert," Bolhofner said.

Uncovering signatures in the soil

Prior to the study, Bolhofner and Marshall believed that any evidence on the original site of a transported body would be baked under Arizona's scorching summer sun.

That was far from the case.

The [study](#) used two 200-pound pig models¹ that were dressed up in jeans and a button-up shirt by students, since murder victims are commonly clothed. They were left to decompose in large cages (to keep scavenging animals away) in various environments and seasons in the Sonoran Desert.

After 25 days, the remains were moved to a secondary burial location. Then, over a period of nine months, the researchers tested the soil where the model was originally placed, where it was moved and in a location adjacent to the original burial as a control.

“It’s a multifaceted, year-round project to try to determine timing, insects involved, and the humidity and the temperature and many other of these factors,” Bolhofner said.

What they found were distinct microbial fingerprints where death gave way to new life — bacteria and fungi that once lived inside or on the body and were released into the surrounding ground as decomposition occurred.

“It turned out to be a really crazy finding,” Bolhofner said. “It’s like the murder victim is leaving a signature of themselves in death ... almost like leaving breadcrumbs right around the desert (indicating) that they had been there, and those breadcrumbs stayed there in the soil, invisible to the naked eye for a year.”

“No one has ever done an experiment like this,” Marshall said. “It was unique because no one had looked at a dumped body that was then moved. It was also unusual because no one’s been looking at the Sonoran Desert.”

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—

Kaitlyn Bolhofner
Assistant professor of forensics

Counting on collaboration

The study was a collective and collaborative effort.

ASU graduate Jennifer Matta Salinas worked on the study for her honors thesis. She collected and processed the data, and extracted DNA for the study.

“I felt like my results definitely opened the door to a novel area of forensic science that has many avenues to explore and to still verify,” said Salinas, who earned a bachelor’s degree in forensic science. “I’m hoping someday it is used to help find someone’s loved ones months or years after their disappearance no matter where the environment is.”

The DNA was then prepped and analyzed by [Kristina Buss](#) in ASU’s [Bioinformatics Facility](#) and [Desert Southwest Genomics Center](#), and Teaching Professor [Ken G. Sweat](#) performed the chemical analysis of the soil.

“We here in the School of Mathematical and Natural Sciences and the School of Interdisciplinary Forensics are very collaborative — we depend on each other,” Marshall said. “Without Jennifer needing to write her thesis, this wouldn’t have happened. Without Ken doing the elemental analysis, that part wouldn’t have happened either.”

Future forensic potential

[Stuart Somershoe](#), a retired police detective with the Phoenix Police Department’s missing-persons division, was also a part of the project.

According to the World Population Review, Arizona has one of the highest number of missing persons in the nation, with more than 1,000 people missing and 1,588 resolved cases in 2025.

Somershoe says the desert plays into those statistics. He sees the potential application of this study in cold cases and missing persons cases both now and in the future.

“I read the study and could see the value in police investigations,” Somershoe said. “It would certainly be something that could be used.”

Somershoe said that as this research develops and becomes more well-known, it could become a technique as commonly used as DNA testing.

But first, more experiments and studies will be needed.

“We’re way in our infancy,” Marshall said.

The researchers are interested in taking the study on the road to see if the findings can be confirmed in other climates, but Marshall is hopeful.

“This study is really specific to this climate and this landscape and this geography,” Marshall said. “Our soil and our climate (are) so harsh and so odd. The fact that this can be proven here should show that in other climates, it’s much more doable. Those climates are much friendlier.”

The researchers also plan to verify that human remains would yield similar results.

“We need to confirm that the things we’re seeing in pigs are the same in humans,” she said. “We need to figure out how what we have discovered is transferable.”

Why this research matters

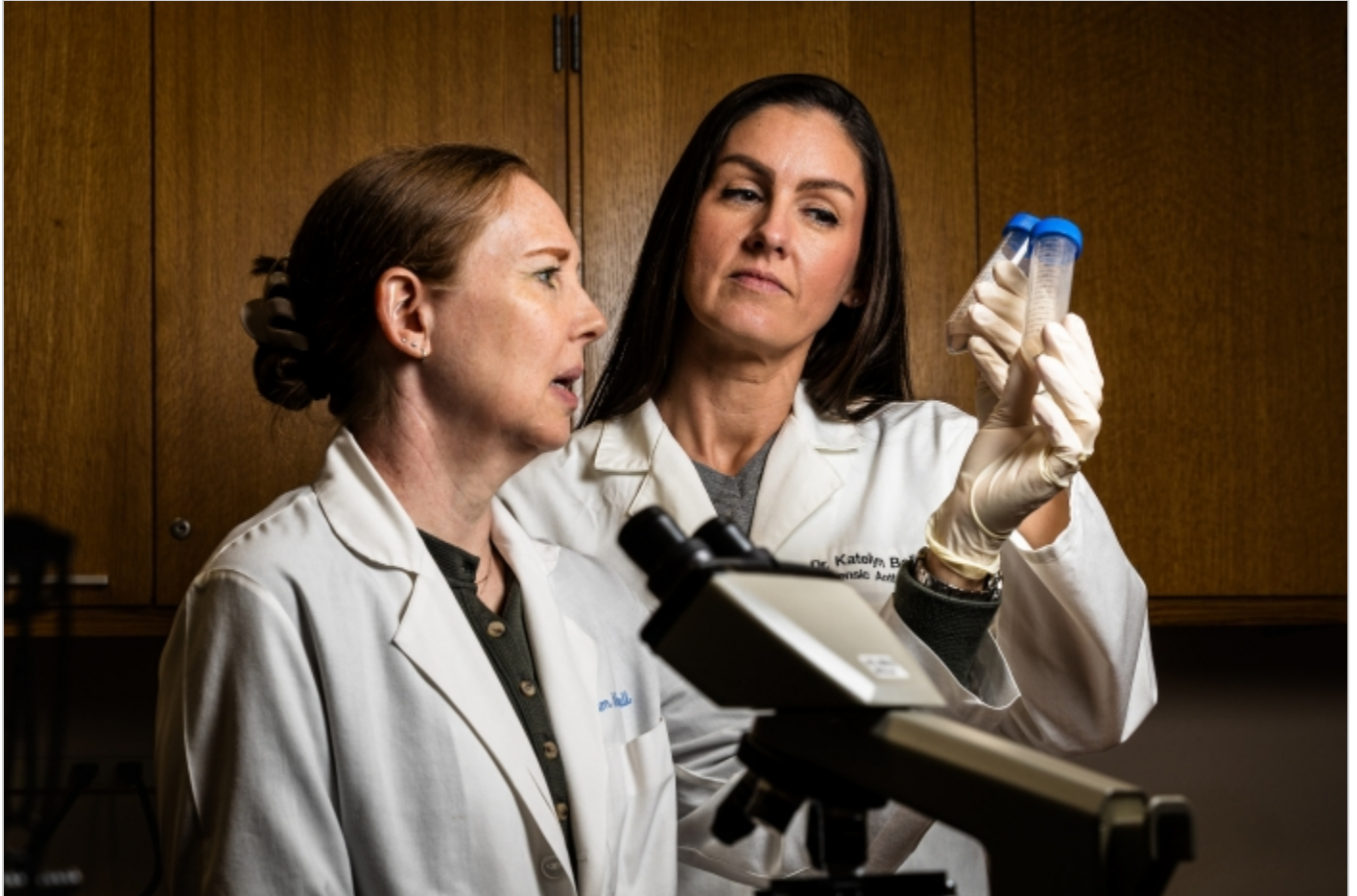
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This story originally appeared on [ASU News](#).

¹ No live animals were harmed or used for the purposes of this research and all procedures were conducted in accordance with institutional guidelines and overseen by the Arizona State University Institutional Animal Care and Use Committee.

Main image



President's Professor Pamela Marshall (left) and Assistant Professor Katelyn Bolhofner pose with soil samples in one of their labs on Thursday, Feb. 19, on the West Valley campus. The researchers analyze the microbial and chemical traces left behind when remains are moved, uncovering patterns of postmortem change that can guide forensic investigations. Photo by Charlie Leight/ASU News