

Science Read

Career Guidance

Interesting Science

Real Life Application

Real Time News

SCIENCE & CAREERS - #cooljob #crimescene #csi

Cool Jobs: Crime Scene Investigators

These researchers don't miss a clue

By **SID PERKINS**
DEC 5, 2012



The dead do tell tales — if experts care to listen. Forensic anthropologist William Bass arranges a display of how a person's bones change year by year as we age. This information can help identify a crime victim when little else is known. UNIVERSITY OF TENNESSEE, KNOXVILLE

TV shows such as CSI: Crime Scene Investigation and Bones make forensics look exciting — and in many cases, using science and technology to investigate crime is exciting.

Some crime scenes come loaded with clues: fingerprints, bullet holes, blood spots and even a body or two. Others have almost none: Maybe just a small swatch of an escapee's clothing snagged on a fence, or a tiny scrape where a burglar jimmied a window. In still other cases, the clues can be so minuscule that they require a microscope to reveal.

If anything, television shows make solving crimes seem easier, more glamorous and certainly quicker than in reality. "Those shows are mostly just for entertainment," says Kendall Stoner, an analyst at the Tennessee Bureau of Investigation's crime laboratory in Nashville. "We only have basic computers, and our lab doesn't look like a movie set," she says. "But we get the job done."

Here we profile Stoner and two other real forensic experts. Each job requires very individual skills, yet all three work in teams to decipher crime scenes, identify evidence and help bring criminals to justice. Oh, and these specialist crime fighters also help ensure no innocent people are punished for crimes they didn't commit.

“It’s all about making sure that the correct person is prosecuted,” says Reanna Day, an agent with the Federal Bureau of Investigation in Knoxville, Tenn.

On the scene

Arson, bank robbery, kidnapping and murder are just a few of the many serious crimes forensic experts will investigate. These crimes can happen just about anywhere, from the tallest office building to the deepest forest. Solving such a diverse set of offenses across a range of scenes is challenging. But there’s good news: “Anything can be a piece of evidence,” Day points out.



Researchers at the University of Tennessee's Forensic Anthropology Center, nicknamed the Body Farm, excavate the site of an experimental burial to learn more about how the human body decomposes. UNIVERSITY OF TENNESSEE, KNOXVILLE

Photographs are an important part of Day's job, since they document exactly how a crime scene looked before her investigating scours the site for evidence. Later, this scene-setting information helps analysts interpret that evidence, which law-enforcement agents also use to identify suspects. Eventually, attorneys rely on that same evidence to help show a suspect's guilt or innocence.

Examining a crime scene can take 12 or more hours. It might involve poring over a single room for a handful of clues — or a broad patch of forest laden with thousands of potential clues. Day and her team sometimes work quickly. "If it's raining or snowing, we have to rush to protect evidence before it gets erased," she notes. Other times, at the scenes of crimes that occurred outdoors long ago, the team works at a careful pace familiar to any archaeologist.



A vial contains a cotton swab used to collect DNA evidence at a crime scene.

A person's DNA provides a genetic fingerprint unique to every individual.

Meanwhile, back at the lab

The job of the crime analyst is to study evidence collected at a crime scene. Often, that means comparing evidence to information contained in huge databases. Those databases contain everything from the treads of thousands of different sneakers, boots and other footwear to millions of fingerprints. Making a match can help identify clues and nab criminals.

In recent years, DNA analysis has become one of the greatest forensic tools for identifying crime suspects. For Kendall Stoner, it is every bit as important as the magnifying glass was a century ago.



About 99.8 percent of human DNA is identical among all people. However, the remaining 0.2 percent contains enough differences to give each person a unique genetic signature. (Except in identical twins, and even then there are individual differences in the chemicals attached to their genes.)

Kendall Stoner performs some genetic sleuth work in her laboratory at the Tennessee Bureau of Investigation's crime lab in Nashville.

TENNESSEE BUREAU OF INVESTIGATION

In an FBI laboratory, an analyst swabs a plastic bottle for DNA. The genetic material can help identify a crime's victim — or its perpetrator. FBI



Many detectives call a DNA profile a “genetic fingerprint.” That is because just like an actual fingerprint, a suspect’s unique DNA also can provide a link to a crime scene.

DNA analysis is like the puzzles (and crime novels) that Stoner loved as a teen. “Anything where I was working toward an answer,” Stoner says. “I loved the challenge.”

For each analysis, Stoner starts by collecting DNA from evidence collected at a crime scene. She might swab a bloodstained piece of clothing or snip a piece of skin collected from under a victim’s fingernails — skin that may have been scratched from a suspect while fending off an attack.

Stoner then drops the swab, and any cells it has picked up, into a test tube holding a chemical solution. That solution extracts the DNA from the cells. Next, she adds dyes that reveal whether there's enough DNA present to produce a genetic profile. If there is, she uses a process called polymerase (po LIM er aze) chain reaction, or PCR, to copy the DNA over and over. PCR can take just one-billionth of a gram of a person's genetic material and create thousands or millions of copies of that DNA. Finally, Stoner places this amplified — or copied — genetic material into a machine that converts genes in the DNA into a series of numbers. These numbers can be compared to other DNA profiles.



William Bass unearths a crime victim's decomposed remains as law enforcement officers look on.
THE UNIVERSITY OF TENNESSEE,
KNOXVILLE

New developments in chemistry and technology now let Stoner produce genetic fingerprints from smaller amounts of genetic material than ever.

Even in the fictional world of television, Stoner notes characters often are shown using real forensic techniques. Still, these crime shows can give viewers some wrong ideas. For instance, Stoner says, "one cell doesn't provide a full DNA profile. Also, you can't collect DNA off of just anything."

"You're always learning something, and every case is different," Stoner says. "If you want to sit behind a desk and do the same thing day after day, this is not the job for you."

Article Adapted from: <https://www.sciencenewsforstudents.org>