



Behind the Crime Lab Doors

An Inside Look at the Utah Bureau of Forensic Services

Highly trained criminalists staff the in-demand Utah Bureau of Forensic Services, a division of the Utah Department of Public Safety responsible for criminal evidence analysis across the state. Three sections comprise its central lab network at DPS headquarters.

A **NALYZING MORE THAN JUST FINGERPRINTS, THE Impression Evidence Section** processes footwear and tire treads, blood stain patterns, and other latent prints. The **Forensic Biology Section** detects, identifies, and evaluates biological evidence, and the **Forensic Chemistry Section** examines controlled substances and trace evidence. The Bureau's satellite lab in Southern Utah provides additional forensic chemistry and impressions services, while firearms and tool marks are handled solely at its Northern lab. This year's budget cuts forced the closing of the Forensic Services Eastern lab in Price.

In 2007, the Bureau's lab system became the second full-service laboratory in the U.S. to achieve the gold standard of testing laboratory accreditations. While the Bureau has earned its ASCLD/LAB International Program accreditation, they don't yet have international Crime Scene accreditation—a difficult achievement because the requirements are so diverse. Crime Scene inspection crosses a broad range of disciplines, requiring specialized staff to cross-train. On a crime scene, a serologist who deals with blood all day will also need to be skilled in collecting footwear impression evidence. ASCLD/LAB International sets the bar high, but the Bureau has greeted the challenge, and will achieve international Crime Scene accreditation in 2010.

Processing felony criminal offense evidence for the entire Utah DPS, the Bureau also assists other local, state, and national law enforcement agencies when called upon. While most of their work is carried out in the lab, the Forensic Services team works onsite at crime scenes and

in the courtroom. Twenty analysts (of the staff's 32) testified in court last year. In sum, the Bureau knows no slow season, and we're fortunate to snag a visit with Karen Elliott, who divulges what's in store for the Bureau this year, describes their coolest tools, and tells *Utah State Trooper* what she thinks about Hollywood's take on forensics.

UHPA: *Karen, what role do you play at the Utah Bureau of Forensic Services? How long have you been with the DPS?*

ELLIOTT: Currently I am the Quality Assurance Manager. I have been in this position for approximately six months, and I'm also the Crime Scene Supervisor. Prior to that, I was the supervisor or manager of the impressions section. I was supervisor there for four years, and before that I was a forensic scientist analyst in the section doing fingerprints and crime scene analysis. So, I've been with the Bureau for nine years.

UHPA: *Describe a typical day's operations for the Bureau.*

ELLIOTT: It's different for everybody. For me, it's coming in and reviewing documents, making sure they're up-to-date, online and available for everyone who needs to access them. For Crime Scene, I make sure that everyone is trained up, and policies and procedures are in place. The Crime Scene unit has an eight-hour Crime Scene training every six to eight weeks, which includes about 15 people.

Schedules are flexible to accommodate those with children, so shift times vary among the staff. In general, a typical day for someone in the department starts with office work—answering e-mails from law enforcement agencies and prosecutors early in the morning. Then they'll go into the laboratory and check out evidence—observing, taking notes and processing items. Each section is different in the way they analyze evidence.

The day ends with writing reports, which are reviewed by another analyst before being entered in UCJIS (Utah Criminal

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Justice Information System). Cases take a lot of time to process—it rarely happens in one day. People in the department wear a lot of different hats, and we never have the same day twice.

UHPA: *What's the secret to being a successful forensic scientist?*

ELLIOTT: A lot of different things—analysts need to possess good communication skills to work with law enforcement, attorneys, and juries. You must be able to articulate your expertise in a way

they can understand. It also requires being well educated, with a strong science background and expertise in your field. You have to be dedicated, and you cannot be offended by obscene casework. We see a lot of unpleasant things.

UHPA: *Tell us about your background. Did you always see yourself working in forensics? What was your field of study?*

ELLIOTT: I'm from South Carolina. I got my undergrad degree in education and taught school for a period of time, then decided to be a full-time mom when my children were born. But I had always wanted to be in law enforcement—always. As a small kid, I remember Mom going out to the mailbox and finding a package from the FBI—I had requested information about a career.

Back when I graduated from high school (many years ago), the career opportunities for women were slim. If you wanted to be in law enforcement, you could be a meter maid. They had just started taking women in the forensics area, but it wasn't widespread and it certainly wasn't being done in South Carolina. When my youngest daughter was a teenager, I decided to go back and get my master's degree in Criminal Justice at the University of South Carolina. I had just completed my thesis when my husband's job brought us here to Utah in December of 1999. I started working here at the Bureau in January of 2000.



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UHPA: *Do you have a specific area of expertise?*

ELLIOTT: Quality assurance management. My forensic expertise is in latent prints and blood stain pattern analysis.

UHPA: *The crime lab in Salt Lake City is the central lab within the system. What happens at the satellite labs?*

ELLIOTT: There are currently two satellite labs, the Northern lab in Ogden and the Southern lab in Cedar City. At the Northern lab we do firearms analysis, and have an inventory of more than 1,000 guns for testing. There isn't room for this type of facility at the central lab in Salt Lake City. There's also chemist at the Northern lab, and we're

hoping to open up a latent print section there, as well. The Southern lab handles controlled substances and latent prints.

UHPA: *Forensic science is a mysterious and fascinating arena for a lot of people. What's one of the biggest misconceptions about the work you do?*

ELLIOTT: It's gotten really bad with all the forensic shows on TV. Number one is that we can do everything in a day (or an hour). There are a lot of other factors involved, such as backlog and level of importance. Number two is that we all do everything. You used to have "generalists," but now everyone is very specialized, possessing a high level of expertise because of that.



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UHPA: *We have to ask: do you ever watch CSI television shows?*

ELLIOTT: I enjoy Forensic Files, Cold Case, and other documentaries. But there are a lot of inaccuracies in the Hollywood shows.

UHPA: *When processing a piece of evidence, what is the trickiest procedure?*

ELLIOTT: It depends on the section you're in. Fingerprints are very fragile and can be easily destroyed, so the criminalist must be extremely careful. Duct tape is a bear to process especially when it's all stuck together. There are storage concerns with controlled substances. For example, some Clandestine Laboratory or Arson Evidence may contain volatile chemicals and fumes. It is important for them to be stored in proper containers in order to protect the analysts. There are cross-contamination issues with DNA. Trace evidence also requires extreme care—you could sneeze and literally blow your evidence into oblivion.

UHPA: *What is the most intricate piece of equipment you currently use?*

ELLIOTT: Our most intricate is the Genetic Analyzer for DNA. Our cameras, all digital, are pretty complex, and photography takes a lot of training. Our IRUV cameras can photograph blood on a black surface.

UHPA: *What are some of the most unusual items that you process?*

ELLIOTT: I'd probably say the most interesting to process is hands. We get a lot of decomposed hands from the office of the medical examiner, if a victim can't be identified. There are a lot of different techniques you can use to get fingerprints—casting with Microfil, or boiling hands to plump up the ridges.

UHPA: *Are certain types of crime prevalent in Utah? Do you get the same volume of evidence year-round?*

ELLIOTT: Property crimes (burglaries, larcenies, stolen vehicles) are fairly common in Utah. There are a lot of nonviolent crimes per capita, but fewer violent crimes. Some types of crime are almost cyclical, so it depends on the section or discipline, but we're pretty busy all year. We only accept felony cases.

UHPA: *Do you see any drawbacks to technological evolution in forensics?*

ELLIOTT: The downside is that equipment and instrumentation—especially the groundbreaking equipment—is expensive, and labs can't afford them. We also need to test and validate every piece of equipment we use and that takes a long time. Sometimes by the time you get that done, something else is coming out. It's exciting but frustrating.



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UHPA: *What's in store for the Bureau of Forensic Services in 2009? Are there any goals you are working toward?*

ELLIOTT: The biggest thing is that the science advisors of National Academy of Sciences (NAS) came out with new recommendation reports, which we are working to follow. One goal is to have all of our analysts become certified in their areas of expertise by September, and to earn Crime Scene Unit accreditation. We're also working on backlog and turnaround time.

UHPA: *What is one of the most complex cases the Bureau has solved?*

ELLIOTT: A cold case from 1984. It was a homicide in Brigham City that took 20 years to solve. Last year, the murderer went to trial and was convicted, so it was 24 years before it went to court.

UHPA: *What is the most far-fetched thing you've seen in a TV crime lab?*

ELLIOTT: On an early CSI episode, an electronic nose was brought in to sniff and identify perfume at a crime scene—if it exists, I don't know about it!

There is an upside to forensics figuring into the media: people have an idea of what we do, and it has brought notoriety to our profession. The downside is that sometimes we don't have physical evidence, and juries can assume the perpetrator wasn't involved because of this—which is absolutely not true. You don't always get physical evidence. Juries are often misled by TV, and you have to explain the CSI effect to them. A good prosecutor can approach that and ask a jury the right questions.

UHPA: *If someone were interested in a career in forensics, what advice would you give?*

ELLIOTT: Getting a correct education is very important. At a minimum, a four-year hard science degree is required to work in most of the sections. Internships are also important. As part of my graduate requirements I was interning at the state lab while working on my thesis. I got to go out on crime scenes and help process evidence, and I really learned a lot. Just about everybody in the impressions section has been an intern at one point, and we've had some really good interns who've gone on to get good positions elsewhere. It's good for people to see if they'll really like the job, and if they can handle it. ■

Evidence Collected on a Lab Tour

at the Utah Bureau of Forensic Services

- The controlled substance and chemistry lab is the noisiest at the Bureau, humming with \$1 million worth of instrumentation.
- The impressions section is almost as noisy—criminalists erupt with laughter while working on note-taking and photo documentation. Yes, the formalities can be fun!
- A DNA test in the biology lab costs a whopping \$400 to run.
- The humidity chamber in the impressions lab condenses a six month process to two minutes.
- The SEM, or scanning electron microscope, magnifies samples up to a couple hundred thousand times to allow identification of elemental composition. The lab has a library of 40,000 different compositions to compare to.
- Some cases require the collection of evidence at multiple scenes. The Elizabeth Smart case involved 11 different scenes—one major and 10 follow-ups.
- The main focus of the Bureau is lab work, not crime scene work. 95% of the criminalists' time is spent in lab.
- Not just TV tricks: trace evidence can be discovered with chemical reagents and infrared flashlights. When a color test is infrared light is applied, certain substances—like blood—become visible.
- OSHA and the Bureau's accreditation require protective equipment. The essentials: lab coats, gloves, masks and sometimes goggles. Even more is required on a crime scene.
- Seasonal misdeeds: the lab sees more homicides during holidays, and more stolen vehicles in warmer months. There were about 8,800 vehicles stolen in Utah in 2007.

