

## Q&A with a Forensic Chemist

Ann E. Miller, Forensic Chemist with Customs and Border Protection's laboratory in Chicago, agreed to answer some common questions from students about forensic sciences. Ann double majored in chemistry and anthropology at Beloit College in Wisconsin and then earned a Master's degree in analytical chemistry at Texas A&M University. She has been with CBP since 2001, where she has driven a mobile lab unit around the country, worked in training people to understand radioactivity and currently is involved in projects to identify drugs that are mailed into the United States.

Q: What is forensics?

A: There are a number of sub-disciplines in forensic science and no individual works in all sub-disciplines (unlike the TV shows). Forensics is where science and the law meet. In all sub-disciplines Forensics is an applied science. So in forensic chemistry you are applying chemistry to the Law.

Q: How does one get into forensic chemistry?

A: I'm most familiar with forensic chemistry. A chemistry degree is usually required, or at least a hard science degree with enough chemistry credits. With a chemistry degree you can further specialize as a forensic drug chemist, a trace analyst, or a forensic toxicologist (a degree or knowledge in biology would be also appropriate for Toxicology).

Q: What does a forensic chemist actually do?

A: Day to day activities begin with receiving the evidence that will be analyzed that day. Evidence must be tracked at all times and therefore a chain of custody is signed every time evidence is transferred from one person to another. Thin layer chromatography (TLC) may be used as a screening technique. Analytical chemistry instruments that are typically used in a forensic chemistry laboratory are infrared spectroscopy and GC-MS. . There can be some wet chemistry extractions depending on the sample matrix. GC is also used for quantitative analysis when required. After the data is collected and process, a report is written stating what technologies were used and the identification of the substance. There is always the possibility of testifying in a court of law on your results.

Q: Is forensic chemistry different from toxicology?

A: I believe that toxicology laboratories are similar only they would use GC-MS and LC-MS, and have different protocols for handling samples since they are biological in nature. Toxicologists investigate the metabolites of the drugs which would require some knowledge of biology. There is also a lot more quantitative analysis done in the tox laboratory since knowing how much, say ethanol, is in the blood is as important as knowing it is there.

Q: Is there more to being a forensic chemist?

A: Other areas that chemists can work in forensics are combustion and arson, explosives, and firearms, which includes both ballistics and testing chemical residue from firing a gun.

Q: How does someone get into working on DNA?

A: A large field in forensics is DNA analysis. I would assume a Biology degree would be appropriate for that.

Q: What about trace evidence analysis?

State crime laboratories often have a division called trace evidence analysis. This is the study of materials collected at crime scenes. I'm not that familiar with what they do. According to *Forensic Chemistry* by Suzanne Bell trace analysis includes examining inks, paints, papers, and fibers found at crime scenes. Did the fiber found next to the body come from the defendant's coat? What is the make and model of the car that left a small paint chip after a hit and run?

Q: What kind of training does someone need to get into forensic science?

A: A strong background in chemistry or biology is recommended for the forensic fields that I can think of. There is also forensic anthropology but what I know about that field is 25 years old! [EMU has some courses in biological anthropology: interested students should contact Dr. Moore in SAC.]

Q: What kinds of skills or attributes should someone have to be a forensic chemist?

A: As for characteristics for the job, I would say an attention to detail is important. Also a desire to serve; that sounds a bit corny but most Forensic Scientists work for state governments or even county governments there are not a lot of money or resources available to them.