



# Forensic Chemists

## **... Apply scientific disciplines to physical evidence**

A forensic chemist is a professional chemist who analyzes evidence that is brought in from crime scenes and reaches a conclusion based on tests run on that piece of evidence. A forensic chemist's job is to identify and characterize the evidence as part of the larger process of solving a crime. Forensic chemists rarely conduct any investigative work; they handle the evidence collected from the crime scene. Evidence may include hair samples, paint chips, glass fragments, or blood stains. Understanding the evidence requires tools from many disciplines, including chemistry, biology, materials science, and genetics. The prevalence of DNA analysis is making knowledge of genetics increasingly important in this field.

## **... Explain and defend results**

Forensic chemists agree that public speaking skills and being comfortable with what you do are important personal characteristics for this career. As seen on *Court TV*, forensic chemists are often called upon to explain what was found and how they arrived at their conclusions.

Not all cases go to trial, but when one does, giving expert testimony in court is a significant piece of a forensic chemist's job. Some employers require their forensic chemists to go through several months of mock courtroom testimony training along with their regular training. Forensic chemists must be able to give an impartial explanation to the jury that will assist in a final judgment—forensic chemists analyze the evidence but do not determine the verdict.

## **... Have various opportunities**

The career path for most forensic chemists is through federal, state, or county labs associated with the medical examiner's office. However, there are different types of careers available, including those in other fields of forensic science, academe, or administration. Chemists can also move up within a particular organization, changing responsibilities along the way. For example, the director of a crime lab may supervise other forensic scientists rather than being involved in day-to-day analysis. A director may also be responsible for case review and general lab management. Some forensic chemists also use their technical training to pursue a career in patent law.

## **FACT FILE: Forensic Chemists**

**WORK DESCRIPTION** ► Forensic chemists apply knowledge from diverse disciplines such as chemistry, biology, materials science, and genetics to the analysis of evidence found at crime scenes or on/in the bodies of crime suspects. The field is a combination of criminalistics and analytical toxicology. Criminalistics is the qualitative examination of evidence using methods such as microscopy and spot testing, whereas analytical toxicology looks for evidence in body fluids through a range of instrumental techniques from optical methods (UV, infrared, X-ray) to separations analyses (gas chromatography, HPLC, and thin-layer chromatography). Mass spectrometry is also frequently used since it provides the strongest evidence in court. Most often, forensic chemists do not know the nature of the sample before they analyze it. The results of their work are used in police investigations and court trials, at which they may be called upon to provide expert testimony and explain their findings to a jury.



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**WORKING CONDITIONS** ► Forensic chemists generally work in government labs, which can be small, understaffed, and underfunded. They spend time preparing and giving testimony in court. Formerly under the jurisdiction of police departments, forensics has traditionally been totally male dominated. However, over the last 15 years, the field has opened up to women, who are moving up in its ranks.

**PLACES OF EMPLOYMENT** ► Most labs are associated with a federal, state, or local police department, medical examiner's office, forensic services lab, or branch of the Federal Bureau of Investigation. There are some private labs that carry out forensic analyses.

**PERSONAL CHARACTERISTICS** ► Versatility and patience are the most often cited qualities of a forensic chemist. Forensic chemists must be able to spend hours rigorously applying analytical techniques to evidence and then defending their work in a court of law. They must be able to clearly and concisely answer challenges to their findings. Integrity is also an important characteristic, because it is not unusual for the different interests in a case to try to sway the forensic chemist's position.

**EDUCATION AND TRAINING** ► A strong background in chemistry and instrumental analysis as well as a good grounding in criminalistics is vital. A forensic science degree at both the undergraduate and graduate level is recommended. Those interested in working with trace evidence, such as glass, hair, and paper, should focus on instrumentation skills and take courses in geology, soil chemistry, and materials science. If forensic biology and DNA analysis are preferred, take microbiology, genetics, and biochemistry courses. Those interested in the toxicological aspects of this work should study physiology, biochemistry, and chemistry.

**JOB OUTLOOK** ► The forensic science field is guardedly optimistic about job prospects for the future. Greater interest in the use of DNA analysis is expected to create more jobs. Those interested in DNA work should keep up with the rapidly changing technology and develop skills that distinguish them from the pack.

**SALARY RANGE** ► For forensic chemists with a B.S. degree, incomes start in the high \$30,000s per year. The median salary is \$50,000. Chemists at the high end are paid more than \$60,000 per year. Scientists involved with fingerprint analysis are on the lower end of the pay scale.

#### **FOR MORE INFORMATION**

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[www.forensicsciencesociety.co.uk](http://www.forensicsciencesociety.co.uk)

You can also contact schools with academic programs in forensic science. University of New Haven (CT), George Washington University (DC), and John Jay College of Criminal Justice of the City University of New York all have graduate programs. Michigan State University has programs on the graduate and undergraduate level.

**WHAT YOU CAN DO NOW** ► Contact local forensics labs and find out when a forensic chemist will be testifying in court. Attending courtroom testimony will give you a sense of whether this aspect of the work is right for you. Hands-on technical experience is more difficult to get. Most labs do not have internships but may take on volunteers. Academic requirements are tightening. Give some thought to graduate work and research projects that show you are capable of problem solving. To prepare for court presentations, scientists recommend participation in the debate team and school theater.