

The LAB detectives

by Victor Chan Chun-ho

So, you think you can forge your parents' signature on report cards and handbooks without risk of detection? You might be able to fool your teacher, but there are some people whose eagle eyes will catch you out - the forensic scientists.

Unlike the crime-busting scientist-cum-law enforcement officers of television shows like CSI, who chase down criminals, conduct interviews and then get instant results in laboratories, Hong Kong's real life forensic scientists are engaged in the methodical and painstaking work of collecting and analysing evidence as Patrick Cheng Yau-sang, a former head of the Questioned Documents Section of the Government Laboratory, explains.

"The word 'forensic' means 'court'," says Cheng, who retired from the government in 2004. When there is no witness in a trial, forensic scientists have to give objective and scientific opinions to the judge. "It is a science that helps the court to solve crimes," he says.

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A veteran forensic handwriting and document examiner who is now practising privately, Cheng is responsible for examining questioned documents and determining the authenticity of signatures. A handwriting examiner can differentiate a real document from a forged one. "For example, an undergraduate certificate has a specific paper quality, words fonts and inks. With our professional knowledge, we can see those characteristics which laymen cannot differentiate," he says.

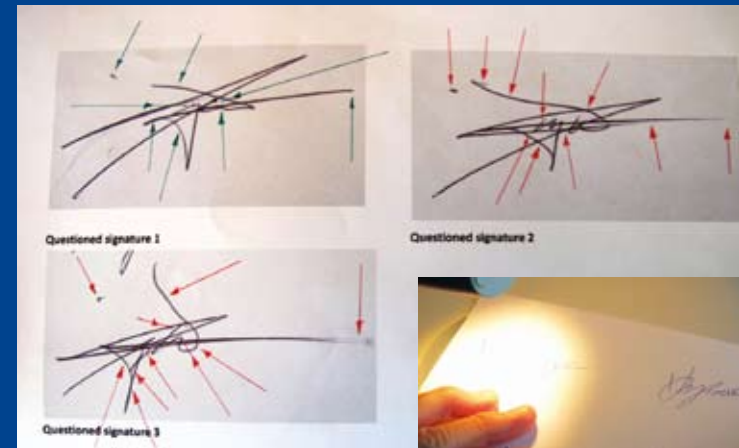
Handwriting examination involves documents like wills, contracts and minutes. As signatures can be forged, forensic scientists might be needed to

verify their authenticity. A handwriting examiner would use a stereo microscope to observe the line quality, pen pressure variations, fluency and tremors of writing. Normally, a complicated signature will have more observable characteristics. As examiners have to compare a signature from different periods of time, 20 to 30 signature samples are needed for



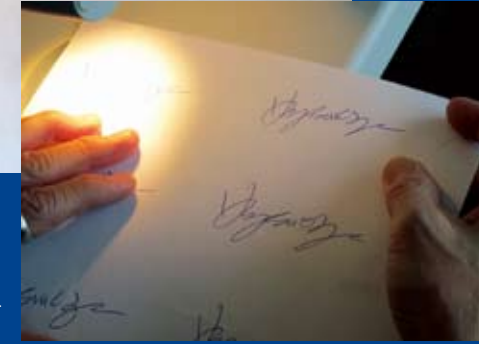
Patrick Cheng Yau-sang has worked as a handwriting expert for more than 20 years.

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Above: Handwriting experts look at the direction and fluency of questioned signatures for verification. Right: Cheng puts signature samples under a stereo microscope for examination.



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examination. Experts, such as Cheng, then photograph each sample so that they can be presented to the judge as evidence.

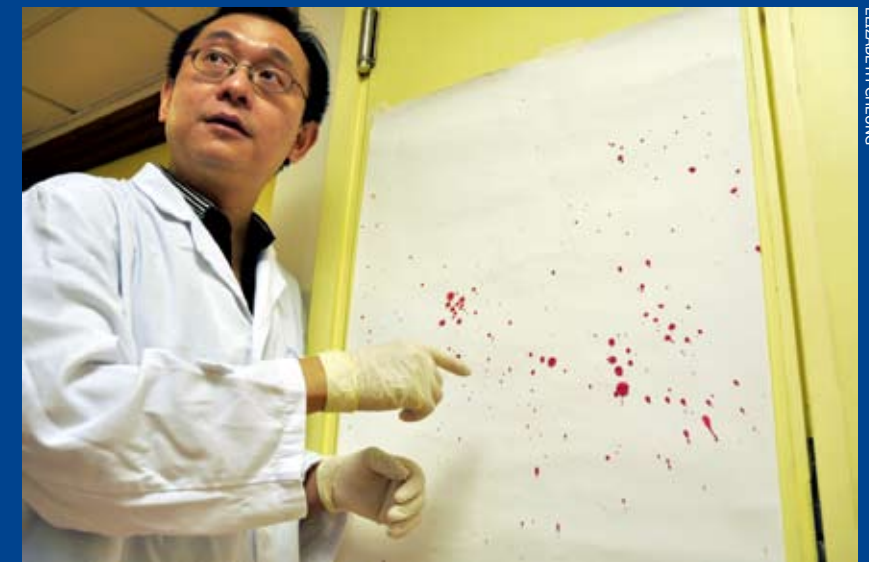
Forensic scientists frequently work with the police and Independent Commission Against Corruption (ICAC) as expert witnesses. Besides law-enforcement agencies, lawyers may also seek their professional help for document or signature authentication.

In a career spanning more than 20 years, Cheng says his most memorable case was that involving the Teddy Wang Teh-huei estate in 2002. The dispute between Wang's father, Wang Din-shin, and his widow, Nina Wang Kung Yu-sum, hinged on signature examination which proved an enormous task. Over six months, Cheng had to analyse four pages of wills and a large number of signatures of Teddy Wang and Tse Ping-yim, the witness to the will. With the help of Electro-Static Detection Apparatus, Cheng could closely check the indented impressions of handwriting on the questioned wills.

Apart from being able to work away silently in the laboratory, forensic scientists also need to have good presentation skills. "I once testified in court for more than two weeks, which set a record among

the chemists in the Government Laboratory," says Cheng.

Since forensic science was developed in the west, some might assume that western scientists have more expertise than local ones. Cheng says this is not always the case. In the legal battle over a multibillion-dollar estate between Tony Chan Chun-chuen and the Chinachem Charitable Foundation, both sides summoned foreign handwriting experts for advice. But Cheng believes local experts were better equipped to handle



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Henry Cheung Kam-yin explains how bloodstain pattern analysis helps reconstruct a crime scene.

such cases. "Our knowledge of Chinese words and culture favour our work in Chinese language examination. We can therefore give more objective and accurate opinions to the court," he says.

There are four to five experienced handwriting and document examiners in the Government Laboratory, making up the majority of handwriting experts in Hong Kong. Including Cheng, there are only two to three experts practising privately.

"Sometimes it is more disturbing to recall how the victims were killed."

While handwriting forensics can be affected by cultural background, DNA forensics is entirely dependent on science.

According to Henry Cheung Kam-yin, DNA forensics mainly deals with bloodstain pattern and DNA analysis. The former government forensic expert says bloodstain pattern analysis is a "powerful tool" to reconstruct the sequence of an event. After scenes of crime officers (SOCOs) have collected

evidence from the crime scene, the forensic experts analyse the size, shape and pattern formation of groups of bloodstains at the scene.

For example, blood might splatter from a victim in an assault case. Forensic experts have to study the impact spatter of the group of bloodstains. Impact spatter refers to the pattern of the blood when it splashes out at high speed and lands on a surface.

Scenes of crime officers take photos of the crime scene and record the bloodstain pattern. If the pattern is too complicated, they take the evidence back to the laboratory for examination. Cheung says they once dismantled and took away a door from the crime scene.

Bloodstain pattern analysis has a long history in forensic science. Song Ci, a medical forensic expert in the Southern Sung dynasty, was already using this method to investigate crime scenes around 1,000 years ago.

Just as painstaking as bloodstain analysis is DNA analysis, which also requires a lot of careful calculations. In DNA analysis, experts examine nine to 15 DNA characteristics of a DNA sequence and determine whether a suspect can be excluded from the source of blood at the crime scene.

Cheung handled more than 2,000 cases during his government service. He says the mysterious death of Police Constable Leung Shing-yan in 2001 was his most memorable case. Cheung joined the investigation right after Leung's body was found. The officer had been shot five times at close range and his gun was missing. "A mask was found at the crime scene and I found some bloodstains which probably belonged to the victim. I also discovered some saliva DNA from the anonymous man in the mask," he says.

In 2006, the DNA in saliva on the mask was found to match the DNA of fellow police officer Tsui Po-ko. This unravelled not only the mystery of Leung's death but also that of a security

guard and another police officer who was killed in a shootout with Tsui.

A thousand items of evidence were collected in the case and it took Cheung three years to examine everything. The mask was a huge challenge for the forensic team. It had a lot of bloodstains but very few saliva cells "It is really complicated to extract DNA accurately from a mask," he says.

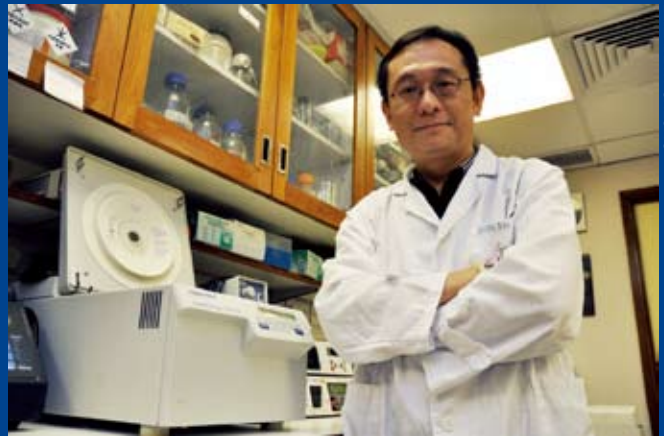
Cheung left the government in 2004 and considers this case to be a "perfect ending" to his 10 years working in the Government Laboratory.

Contrary to how it is portrayed in TV dramas, forensics work is not as bloody as people might expect. Scientists just have to handle the specimens of blood. "Sometimes it is more disturbing to recall how the victims were killed," Cheung says.

“Staying impartial is an art. It is very difficult to present the gist of the evidence without bias.”

To become a forensic expert like Cheng or Cheung, you need a degree in biochemistry or chemistry. Most experts in Hong Kong work for the Government Laboratory. Competition can be intense, as only three to four people are hired from several hundred applicants.

It is important to have a scientific background, but in order to become really proficient in the job, work



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Cheung considers the case of Tsui Po-ko a perfect ending to his forensic career in the government.

experience is even more important. The Government Laboratory provides ample opportunities to gain knowledge and experience in the field. A junior chemist will undertake job rotations and try different sections. Patrick Cheng worked in the fire investigation section, and the narcotics and fibre examination sections before settling down in the Questioned Document Section.

As forensics can affect the destiny of a suspect or victim, forensic scientists are always required to strictly follow the code of ethics. Cheng and Cheung agree that impartiality is of utmost importance for a professional forensic scientist. "Staying impartial is an art. It is very difficult to present the gist of the evidence without bias. It causes great pressure on us," Cheung says.

Cheng, the handwriting expert, says sometimes experts may lack ethical integrity. "They might be influenced by authority and report their analysis without adhering to fundamental principles. This deviates from the normal practice," says Cheng. The authority could be lawyers or clients who hire them.

So, forensic scientists have to be diligently ethical as well as scientifically methodical. The work of real forensic scientists may not be as action-packed as that of their crime-busting TV counterparts, but it is every bit as challenging. 