

Forensic evidence offers only probabilities, not guarantees that justice will be served

April 2 2015, by Paul Roberts



Credit: cottonbro studio from Pexels

Scientific evidence and expert witness testimony are integral to criminal trials worldwide. Yet while we live in a scientific age of increasingly specialised expert knowledge, a growing reliance on forensic evidence is

a double-edged sword.

There is no doubting that [forensic science](#) techniques provide near-miraculous abilities to detect, investigate and prosecute crime. But any powerful medicine can have strong side-effects, if administered in excessive dosages or to the wrong patients. Forensic [scientific evidence](#) has won for itself an aura of credibility that verges on infallibility. This leaves flawed expert evidence as a potent source of potential injustice.

Is forensic science evidence fit for justice? Science and technology constantly evolve; forensic tests become ever more discriminating, cheaper and easier to use, and more freely available to law enforcement. Courts and legislators must not be complacent if they are to keep pace with scientific innovation. Unfortunately austerity-blighted Britain may be storing up serious trouble for the future.

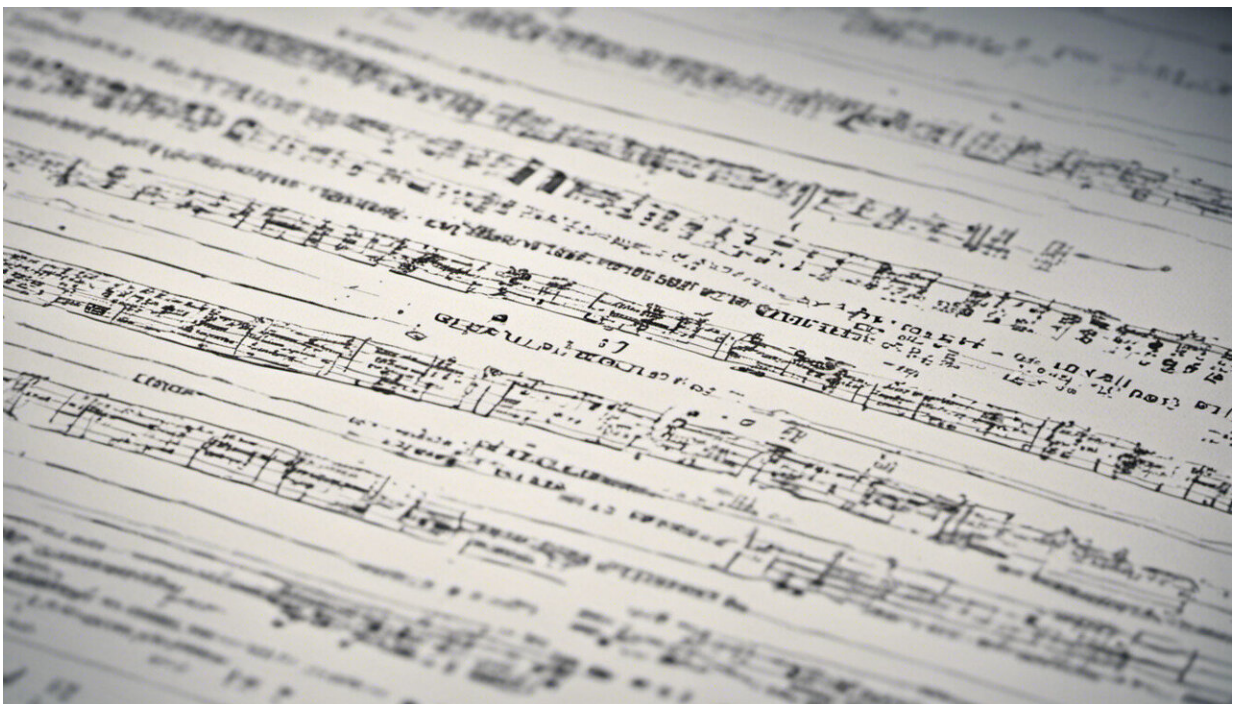
Forensics and miscarriages of justice

It shouldn't surprise us that forensic science is associated with miscarriages of justice. All forms of judicial evidence are inherently fallible: witnesses are sometimes dissembling or forgetful, or sincere and credible yet wrong. Confessions may be false or made under duress. As reliance on scientific evidence grows so too will the number of miscarriages of justice that stem from forensic science. It's also fair to say that injustice occurs when the scientific evidence and techniques available are not exploited to their maximum. Scientific evidence is in some areas peculiarly vulnerable to unreliability and misinterpretation.

To begin with, scientific evidence is circumstantial. It may constitute strong evidence of the offender's identity, his presence at the crime scene, or association with incriminating objects such as the murder weapon or stolen property. But it has at best very little, and generally no value in proving other elements of criminal liability such as intent,

grounds of excuse, justification, or the absence of the victim's consent. In other words, it typically leaves considerable scope for interpretation.

Scientific samples are prone to degradation and contamination, as demonstrated by recent high-profile cases [in the UK](#) and [Australia](#) in which contaminated samples falsely incriminated innocents. Presented in court, there is a constant danger that it will be misrepresented or misunderstood by lawyers, judges, or jurors. These difficulties are compounded whenever scientific evidence offered by one legal team is contradicted, or given a different interpretation, by counter-expertise advanced by the opposing side.



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There will always be a risk of error, attributable to human fallibility, that

must be accepted regardless of our efforts to detect miscarriages of justice. But one aspect of modern forensic science evidence is genuinely novel. Starting with the [invention of fingerprinting](#) about a century ago, forensic science has operated on the basis that it is possible to identify suspects or physical objects uniquely – an exclusively "matching" fingerprint, tool mark, hair sample, carpet fibre, bite mark would indicate the particular offender (or murder weapon, location of fibres or whatever). But the [arrival of DNA profiling](#) in the mid-1980s has seriously disrupted this way of thinking.

DNA profiles

DNA profiles, derived from only small samples of a person's entire genetic code, do not claim to point the finger so uniquely. They are statements of [random match probability](#) (RMP), the probability that a person would match the DNA at the crime scene? if they were not its donor. The conventional RMP for fully matching DNA profiles in England and Wales has been one in a billion – a tiny probability, but one which concedes the possibility that DNA profiles are not unique.

It was soon realised that, far from a weakness of DNA profiling in contrast to other well-established techniques, in fact DNA profiling represents a truly scientific approach, whereas orthodox forensic practice rested on a fallacy. It is never possible to conclusively identify a person from sets of matching characteristics, unless the characteristics measured are known to be absolutely unique in the population. This kind of uniqueness probably does not exist in the real world – as graphically demonstrated by [recent fingerprint miss-attributions in Scotland](#) and [in the US](#).

So with DNA profiling as the new forensic science model, nobody should assert or believe that a matching fingerprint or other forensic trace means "it's definitely him". Yet the impression is that many

forensic scientists have failed to grasp these radical implications, and continue to make claims for their evidence that lack foundation in either logic or science.

In search of a remedy

For an effective prescription for institutional reform there needs to be an intelligent diagnosis of the existing ailments. Simplistic solutions, or those predicated on superficial misunderstandings of criminal procedure, are liable to do more harm than good. Modest but effective reforms include greater pre-trial dialogue between legal teams, only putting disputed facts before a jury, reinforcing professional ethics among lawyers and expert witnesses, proper scrutiny of scientific evidence before admitting it, and educational initiatives such as the Royal Statistical Society's [guides for interpretation of statistics](#).

Unfortunately, in a moment of penny-pinching madness that future governments may regard with incomprehension, the UK coalition government [closed down the world-famous Forensic Science Service](#), arguing – quite improbably – that the private sector would fill the gap.

There are now serious worries, [expressed by a parliamentary select committee](#) and in a [National Audit Commission report](#), that this move to free-market forensics is not meeting the justice system's need for high-quality scientific support and has put in jeopardy long-term forensic research, development and training.

The closure stands against a landscape of "austerity justice", across which swingeing cuts to legal aid raises serious questions about the viability of effective criminal defence in England and Wales.

Meanwhile, the [Forensic Science Regulator](#), professional bodies such as the [Chartered Society of Forensic Sciences](#) and other key stakeholders such as academic departments must do what they can to pick up the

slack, in an effort to ensure that [forensic evidence](#) generated and presented in criminal proceedings remains fit for justice.

The price of failure will be paid not by politicians in Westminster, nor by prosecutors, nor by free-market forensic practitioners, but by the victims of miscarriages of justice and through damage to public confidence in the legal system. Something that, in an all-too-familiar historical pattern, may not become apparent for many years, or even decades, to come.

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