

Bokolo v S 2014 (1) SACR 66 (SCA)

The practicality of challenging DNA evidence in court

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The techniques used in DNA profiling are well established and scientifically validated. The scientific validity of DNA evidence can, however, be so persuasive that such evidence risks being reduced to proof of guilt or innocence. Thus, the incorrect use of DNA evidence could lead to a miscarriage of justice where the innocent are convicted and the guilty are acquitted. Drawing from the Supreme Court of Appeal decision in Bokolo v S (Bokolo case), this case note discusses how DNA evidence can be placed in its proper forensic context. The article sets out the ideal role of expert witnesses, the role of opposing or neutral experts, and the active role of judicial officers in evaluating DNA evidence.

DNA evidence plays an important role in the prosecution of criminals if it is used in the appropriate context. The relevance of DNA evidence lies in its potential to place an individual at the scene of the crime. However, evidence that the short tandem repeat (STR) profile of an individual matches that of a sample taken at the crime scene does not directly answer questions of the guilt or innocence of that individual. In addition, the successful use of DNA evidence depends on the size of the sample, the level of degradation and the purity of the sample. DNA lasts for varying periods of time depending on the sample collected, how it is extracted, and how it is stored. If DNA is extracted in time and stored under suitable conditions, it can last for longer periods than if it is collected later and stored under non-optimal conditions.

With the exception of identical twins, everyone has a distinctive DNA signature or 'genetic fingerprint', which cannot change or be altered in one's lifetime, and even after death. Because of the scientific validity of DNA profiling it has been utilised in a number of criminal prosecutions, including cases of homicide and sexual offences. Over the years the science behind the validity of DNA profiling has 'wowed' criminal justice systems to the extent that in some cases, it has been mistakenly reduced to evidence proving guilt or innocence.

In the past, DNA evidence was never challenged by the defence, nor by the presiding judges. In some cases, innocent accused immediately pleaded guilty, doubting their ability to challenge DNA evidence. The Bokolo case, however, stands out as one in which the relevance of DNA evidence was placed in the proper forensic context.¹ This case note therefore draws from the Supreme Court of Appeal judgement in the Bokolo case to underscore the importance of the role of opposing expert witnesses and the active role of judicial officers in placing DNA in its proper forensic context. The case note also briefly discusses

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the basic scientific principles of DNA profiling. The discussion is intended to offer useful insights for legal practitioners, expert witnesses and law enforcement personnel.

Basic scientific principles of DNA profiling²

DNA stands for deoxyribonucleic acid. This is the genetic material that is passed from a parent to a child. DNA is found in every cell of the human body, except in red blood cells. Each cell contains the same configuration of DNA. In terms of structure, DNA is a double stranded molecule, composed of 46 sections referred to as chromosomes. A chromosome is a thread-like structure that carries genetic information arranged in a linear sequence. DNA is packed into 23 pairs of chromosomes. One half of each pair is inherited from the mother and the other half from the father. The 23rd pair determines an individual's sex. An offspring always receives an X chromosome from its mother but may receive either an X or a Y from its father. Individuals with XX in the 23rd chromosome are female, while those with XY are male. Chromosomes consist of linked base pairs that form a ladder-like structure. This ladder is twisted into what is referred to as a 'double helix'. The sequence of base pairs in chromosomes differs from person to person. It is the unique sequence of a person's base pairs that distinguishes him or her. Genes are found at a locus which is a specific physical location on a chromosome. These physical loci are referred to as codes. Two forms of a gene at a particular locus constitute an allele. At each locus there is a pair of alleles, one maternal and one paternal. This pair is called a genotype. A set of genotypes at multiple or numerous loci form a DNA profile.

DNA can be extracted from whole blood and blood cells; semen and sperm cells; tissues and organs; bones and teeth; hair roots and dandruff; saliva, urine, faeces and other bodily secretions; and epithelial cells found on clothes. Scientists have developed methods in which sequences of DNA are analysed at a specific locus on a chromosome. The STR is one of the DNA profiling techniques that is commonly used by scientists. The STR DNA profiling technique makes use of the polymerase chain reaction (PCR) technique. The PCR process

produces millions of exact copies of the DNA at the specific locus to be analysed. This amplification of the initial DNA results in sufficient quantities for analysis. The PCR technique simulates the process that takes place when DNA is copied prior to the division of cells in the body.

The STR technique makes use of specific type of DNA sequences targeted during the PCR process. The STR constitutes a sequence of bases, which is repeated numerous times and is attached to one after another in tandem, hence the term 'tandem repeat'. The number of repetitions is used to name an allele. For example, five repeats of the sequence for base sequence ATCG would be ATCG ATCG ATCG ATCG ATCG and will therefore be called allele 5. There are, however, two alleles at each locus.

The DNA fragments produced by PCR are then subjected to a process called electrophoresis. This process produces a computer-generated graph called an electropherogram. On an electropherogram the alleles at each locus are indicated as peaks on a baseline. If the individual received the same allele from each parent, the electropherogram of his DNA will indicate one peak at a specific locus, otherwise there will be two peaks. More than two peaks at a specific locus can show that the sample is a mixture of DNA. Thus, if there are more than two peaks and multiple markers, it is likely that the sample is a mixture of DNA profiles from more than one individual. The electropherogram assigns allele names to peaks.

An STR profile is therefore a series of numbers that represent all the genotypes detected for each locus in a particular sample. Thus, evidence that the STR profile of an individual matches that of a sample taken at the scene of a crime merely identifies and places that individual on the scene of the crime. Whether that person is the offender or not cannot be directly interpreted from a matching DNA profile.

Having briefly discussed the basics of DNA profiling, I now turn to discuss the case of *Bokolo v S*, which forms the crux of the article.

The facts of the case

Only the facts that relate to the subject of DNA will be discussed in relation to the case. The appellant was

charged with murder, rape and indecent assault of a child (his daughter). The appellant was tried in the High Court and was only convicted on the charge of rape. The appellant appealed against the conviction in the Supreme Court of Appeal and the appeal was heard on 23 August 2013.³ The appellant contended that he was not involved in the rape and alleged that he had not been at home at the relevant time. It was the appellant's contention that, on the day of the offence, he went to work, then visited the shebeen across from his home at 15.00 hours and only retired to his home to sleep at 22.00 hours.

The prosecution's case against the appellant rested entirely on the results of DNA testing. After the alleged rape, DNA samples from the victim's private parts were secured, using two sanitary pads. These sanitary pads were analysed for DNA at the Biology Unit of the Forensic Science Laboratory of the South African Police Service. The two samples were referred to in evidence as pad 1 and pad 2 respectively. The electropherograms showed that both samples contained a mixture of DNA.⁴ Based on the results of the DNA profiling conducted, it was found that the combination of alleles on the electropherograms in respect of both pad 1 and 2 reflected the DNA of at least three males.⁵ The STR profile of the appellant was not in dispute. The alleles at the respective loci coincided with the combination of alleles reflected on the electropherograms of pad 1 and pad 2, except for the appellant's allele 22 at locus FGA.⁶ Although there was an indication at the relevant place on each of the electropherograms, neither reflected a peak labelled allele 22 at locus FGA.⁷ The alleles on the electropherograms at locus FGA were in fact 20, 25 and 26 (in respect of pad 1) and 21, 23, 24 and 25 (in respect of pad 2).⁸

Two experts, one for the prosecution and one for the defence, gave an interpretation of the results of the DNA profiling. The prosecution expert's interpretation of the results was that they indicated allele 22 at locus FGA and that the STR profile of the appellant could therefore be read into the mixture reflected on the electropherogram of pad 1 and 2.⁹ Categorically, the prosecution expert opined as follows:

M'Lord, at that point FGA 22:25, you will see that there is not a clearly marked 22 at FGA. A possible reason for this is that FGA is a huge – is one of the largest ... areas in the DNA molecule, so obviously when you have DNA donated by quite a few people, you can actually lose some of your bigger fragments. So although there is not a labelled 22, we do have indications of DNA being present where we would expect to see a 22, so we can actually interpret it as such.¹⁰

Conversely, the defence expert's interpretation of the results was that because the height of a peak on an electropherogram is proportional to the quantity of DNA, alleles not detected in a less enriched sample of DNA may be indicated as a peak in the more enriched sample thereof.¹¹ Therefore a hint of DNA in a less enriched sample, if it represents DNA, should constitute a peak in the more enriched sample.¹² A more enriched sample in this context simply means that it contains a greater quantity of the DNA than the less enriched sample.¹³ Pad 1, in the case in question, contained a greater quantity of DNA than pad 2. Pad 1 was the sample more enriched with sperm and therefore the electropherogram presented a much clearer picture than that of pad 2. According to the defence expert, there was a little block on the electropherogram of pad 2 that hinted at DNA where one would find allele 22 at locus FGA.¹⁴ However, if that was DNA, it should have been represented as a labelled peak and therefore an allele on the electropherogram of pad 1.¹⁵ In the absence of any other explanation, the defence expert opined that it must be concluded that allele 22 could not be detected at locus FGA on the electropherograms of either pad 1 or pad 2.¹⁶

The Supreme Court of Appeal judgement

The court *in quo* found the opinion of the prosecution expert more convincing than the opinion of the defence expert, and accordingly convicted the appellant. The divergence of opinion between the experts and the subsequent High Court decision formed the crux of the appeal in the Supreme Court of Appeal.

Attention will be devoted to the decision of the Supreme Court of Appeal. The court was presented with relatively divergent scientific opinions, and ultimately had to draw on the opinion that was most logical and valid in deciding if the appellant was guilty of rape. Judge AJA van der Merwe, with the unanimous court concurring, ruled that, properly analysed, the evidence of the prosecution expert meant that it was possible that allele 22 at locus FGA may have been lost in the mixture.¹⁷ As such, the prosecution expert's evidence did not exclude the reasonable possibility that the allele was never there.¹⁸

Van der Merwe was inclined to accept the interpretation offered by the defence expert because the expert took cognisance of the alternative hypothesis.¹⁹ In the court's view, the defence expert gave credit and made concessions where due.²⁰ The court found the opinion of the defence expert more convincing on the basis that since it is scientifically accepted that a sample more enriched with DNA will show a higher peak on an electropherogram than the less enriched sample, it was not disputed that pad 1 was more enriched with male DNA (sperm) than pad 2.²¹ According to the court, the defence expert graphically illustrated this by comparing the electropherogram of pad 2 with that of pad 1.²² This accorded with the evidence of the prosecution expert that semen was targeted when the samples were taken but that despite this there was a bigger component of the victim's female DNA on pad 2 than on pad 1. The court reasoned that this quantitative element of the interpretation of the electropherograms was not taken into account by the prosecution expert.²³ The court therefore held that the defence expert's conclusion that allele 22 at locus FGA was not present on the crime scene samples was convincing and logical.²⁴ In light of the foregoing, the court held that the appellant should not have been convicted of rape by the court *a quo*.

Analysis and observations

This judgement raises a number of issues in respect of the role of judicial officers in evaluating DNA evidence, and the role of opposing or neutral experts in aiding the courts to arrive at informed

decisions when dealing with DNA evidence. The issues raised justify comment and are discussed extensively below.

The role of an expert in the interpretation of DNA results

Since the subject of DNA profiling is often not adequately understood by legal practitioners, the perception that DNA evidence is infallible obscures many potential problems raised by its interpretation. The divergent opinions of the two experts in the Bokolo case on the interpretation of the DNA results helps to unravel some critical problems of interpretation that are often glossed over when courts are confronted with DNA evidence.

Even when the court accepts the DNA results as reliable, as in the Bokolo case, the results have to be interpreted once a DNA test is complete. The results do not interpret themselves; experts interpret them. This is one of the points at which human error or bias may come into play.²⁵ The Bokolo case demonstrates that the manner in which DNA evidence is interpreted in court is paramount. Without prejudice to the opinion of the prosecution expert, the opinion of the defence expert in the Bokolo case underscored the critical need for experts to be mindful of alternative interpretations of DNA results.²⁶ It is possible, as it was in the Bokolo case, that an alternative explanation can be offered with regard to DNA results.

Jamieson, through his analysis of DNA reports, has showed that forensic scientists often fail to take into account other possible explanations that exclude the accused person.²⁷ Jamieson observes that in casework it is common to 'come across DNA reports that all but ignore any other possible interpretation than the one that provides the best probative value against the accused'.²⁸ Naughton and Tan have observed that the foregoing tendencies have been known to cause wrongful convictions in the United States.²⁹

The Bokolo case underscores the fact that it is not enough for experts, when opining on their interpretation of DNA evidence, to merely reiterate the validity of the science behind DNA evidence. This provides limited insight to judicial officers, as they are

conversant with the validity of this technique. Rather, it is important for experts to draw the attention of the courts to alternative interpretations, so that having weighed all the possible interpretations, the court can arrive at an informed decision on the probative value and weight of the DNA evidence in that particular case.

The Bokolo case demonstrates that the manner in which DNA results are interpreted by experts can undermine its usefulness to the judicial process. If these limitations are not properly addressed, DNA evidence, though highly probative, can result in a miscarriage of justice. For experts to be of appreciable help to the courts in the interpretation of DNA results, it is critical that these experts understand the duty of an expert to the court. The function of the expert is not to decide the matter in issue. As Zeffert and Paizes submit, the opinion of experts is only admissible because 'by reason of their special knowledge and skill, they are better qualified to draw inferences than the judicial officer'.³⁰ This is based on the premise that 'there are some subjects upon which the court is usually quite incapable of forming an opinion unassisted'.³¹

Thus, since the standard position regarding the admission of expert evidence is that the court can derive 'appreciable help' from the expert, the expert witness must possess sufficient skill, training and experience to render the 'appreciable help' sought by the court. Hoffman and Zeffert offer a framework for the admissibility of expert testimony, observing that the expert must:

- Be able to furnish the court with information falling outside the knowledge and expertise of any reasonable court
- Have some qualifications, but not necessarily 'formal' or 'professional' ones (i.e. a course of study coupled with practical experience)
- Must be able to state his or her opinion either as an inference from facts derived from personal knowledge, or provided by others
- Be able to guide the court to a correct decision on questions falling within the expert's field³²

Allan and Meintjes-Van der Walt have submitted that just because a person holds relevant qualifications, it does not make him or her an expert on a specific issue the court has to assess.³³ The person has to equally have knowledge, skill and expertise on the specific issue to be assessed by court, so that s/he can be of appreciable help in guiding the court to arrive at informed decisions. As J Addleson ruled in *Menday v Protea Assurance Co (Pty) Ltd*,³⁴ 'however eminent an expert may be in a general field, he does not constitute an expert in a particular sphere unless by special study or experience he is qualified to express an opinion on that topic'. Thus, with specific regard to DNA evidence, the expert must not only recite their relevant credentials to court, but must also, in accordance with their skill and expertise, identify the basis for their interpretation of DNA results to the court. Rather than promoting the case of the party that called them, experts should strive at guiding the court on the complex subject of DNA so that the court can arrive at an informed decision. This has been elaborated upon in the case of *S v Huma*,³⁵ in which it was underscored that 'the value of an expert is not to espouse and further the cause of a particular party, but to assist the court in coming to a proper decision on technical and scientific matters. It should therefore at all times be remembered that an expert is primarily there to assist the court and not necessarily to further the cause of his particular client to such an extent that he loses objectivity and in fact undermines his client's case.'

The role of defence or neutral experts in advancing DNA evidence

Although cross-examination is supposedly the 'greatest engine ever invented for the discovery of truth',³⁶ arguably, the complexity of the technique of DNA profiling limits the effectiveness of cross-examination. It is notable that there is a significant difference between attacking the opinion of an opponent's expert through cross-examination and attacking that opinion through the testimony of a defence expert. The latter is exactly what happened in the Bokolo case. The opinion of the prosecution expert was implicitly attacked through the alternative interpretation of the defence expert, something that could not be done by the defence attorney through

cross-examination. Cross-examination would have been insufficient, in the Bokolo case, to uncover the alternative interpretation advanced by the defence expert to the effect that 'in the absence of any other explanation, it [was to] be concluded that allele 22 cannot be detected at locus FGA on the electropherograms of either pad 1 or pad 2 and that the little block is in fact an artefact'.³⁷ Thus, defence or neutral experts are essential to the court's assessment of the reliability, relevancy and weight to be attached to DNA evidence. More specifically, it guards against the exaggerated probative value of DNA evidence.

Thompson et al³⁸ offer some useful guidance to defence experts on how to help the court place DNA evidence into proper perspective. The authors suggest that defence experts should have access to the laboratory report, which should, among others, state what samples were tested, what type of DNA testing was performed, and which samples could have a common source. The authors are, however, concerned that although there is a critical need for defence experts to scrutinise the laboratory reports, 'many defence lawyers simply accept lab reports at face value without looking behind them to see whether the actual test results fully support the laboratory's conclusions'.³⁹ Thompson et al. also submit that a number of factors (such as mixtures, degradation, allelic dropout, and spikes, blobs and other false peaks) can introduce ambiguity into STR evidence, leaving the results open to alternative interpretations. Thus, to competently represent the accused, the authors advise defence lawyers to seek expert opinion in this field so that they are able to uncover these ambiguities if they exist, understand their implications, and explain them to the court.

While the role of defence or neutral experts is critical in informing the decision of the court when dealing with DNA evidence, the financial costs involved in marshalling reliable defence opinion on DNA evidence may be high. Indeed, one could argue that some constitutional safeguards, such as the right to counsel, offer the accused sufficient protection. However, the right to counsel may prove meaningless if a lawyer is unable to make an effective defence because s/he has no funds to provide the expert testimony that the case requires.

In these circumstances, basic principles of fairness may require the state to provide an indigent accused with the ability to prepare an effective defence to such evidence. Goodwin and Meintjes-Van der Walt⁴⁰ suggest that this problem can be resolved by providing the defence with adequate resources and with accessibility to an expert. They add that recourse to neutral or court-appointed experts might be a viable option.⁴¹

Further, the equipment and software necessary to examine the data generated by DNA laboratories is highly sophisticated, and accordingly requires such substantial capital investment⁴² that experts in private practice might not be able to afford it, and thus may not be able to conduct independent scientific research and analysis. This may hinder both defence lawyers and experts in private practice, and undermine their ability to challenge DNA evidence, with respect to both methodological legitimacy and reliability. This may advantage the state, because when the government, which has resources at its disposal, adduces DNA evidence, it could be accepted as true without being challenged.

The Bokolo case, however, illustrates a technique that may be relied on to surmount some of these challenges. The prosecution can allow the defence expert access to all the underlying material on DNA evidence, as derived from the state's analysis. In the Bokolo case, in respect of the electropherograms, the defence expert only gave evidence based on his interpretation of the DNA results.⁴³ He did not personally examine the DNA samples.⁴⁴ The defence expert's interpretation reflected on the electropherograms that the prosecution expert made available to the court.⁴⁵ It is these same electropherograms that formed the basis for the prosecution expert's conclusions.⁴⁶ Thus, even though experts in private practice may lack the resources to establish their own DNA labs, they can still offer valuable insights based on their interpretation of the laboratory results, as in the Bokolo case.

Can judicial officers adjudicate over science?

The Bokolo case is one of the cases in which the court conducted an exhaustive evaluation of both the DNA interpretation and the application of the

admissibility rules to DNA evidence. It is notable that on account of the scientific validity of DNA profiling, there has often been a tendency to equate DNA evidence with guilt and innocence. Naude has, for instance, pointed out that 'not only can DNA conclusively establish guilt or innocence (because of its scientific precision), but it remains highly reliable for decades'.⁴⁷ Indeed, in the appropriate context, the high probative value attached to DNA evidence is justified. Meintjes has, however, correctly demonstrated that although the science behind DNA is valid and accepted by the scientific community, problems may arise in the chain of custody of DNA samples, standards and techniques of analysing the DNA samples, and the interpretation of the DNA results by experts.⁴⁸ In these situations, DNA evidence may be less probative than it might initially appear.

Martin⁴⁹ also asserts that while most courts accept the methodology of DNA analysis, the collection, preservation and subsequent handling of the evidence can be challenged in court. Berger⁵⁰ aptly adds that a match only means that the accused is a possible source of the crime scene sample. The match could, in some cases, answer questions about the accused's participation, but it does not prove guilt or innocence. Thus, even with the appropriate interpretation of DNA results, DNA evidence, on its own, may not necessarily be sufficient to establish guilt or innocence. The DNA evidence has to be weighed against all the other evidence on record. The aforementioned limitations therefore demand that judicial officers play a gate-keeping role in ensuring that DNA evidence is used in a proper context. The issue that is not resolved is whether judicial officers can execute the gate-keeping role when presented with scientific subjects such as DNA, which fall outside their areas of expertise.

Over the years, doubt has been cast on the ability of judicial officers to assess scientific validity, especially with respect to complex subjects such as DNA profiling. Rehnquist,⁵¹ for example, was of the view that requiring judges to assess scientific validity was tantamount to requiring judges to become 'amateur scientists'. Despite concerted efforts by judges to become informed about the

technique of DNA profiling, it is an ongoing issue as to whether a scientifically untrained judicial officer is sufficiently competent to assess competing putative scientific claims by competing expert witnesses. Indeed, these suspicions could be justified in light of the fact that scientific data often entails concepts and terminologies beyond the understanding of lawyers and judicial officers. Meintjes has observed that 'experts testifying in court are likely to express their conclusions either in verbal or numerical terms in respect of the probabilities of tests. [In these circumstances], the process of fact finding is a notoriously difficult one.'⁵² Indeed, some judicial officers are deliberately evasive when confronted with scientific evidence. The Bokolo case, however, reflects the fair number of judicial officers who have successfully displaced these notions. The approach of the Bokolo court demonstrates that judges can learn to think like scientists, at least in so far as being able to recognise faulty logic when they hear it.

Van der Merwe pursued an analytical gate-keeping role in assessing the scientific DNA evidence presented by the experts, rather than drawing simplistic conclusions. To avoid placing undeserved weight on unreliable scientific conclusions, Van der Merwe examined the logic behind the interpretation of the DNA results by both the prosecution and defence experts.⁵³ He conducted an independent assessment of the scientific validity and reliability of the opinion of the two opposing experts, as well as the implication of these opinions on the guilt of the appellant. Notably, Van der Merwe recognised that an objective analysis of DNA results did 'not exclude the reasonable possibility that that allele [the appellant's allele 22 at locus FGA] was never there'.⁵⁴ Accordingly, when judging the real issue at stake, which was whether the appellant was guilty of the said rape, Van der Merwe actively, objectively and reasonably scrutinised the interpretations advanced by the two opposing experts. His ultimate preference for the opinion of the defence expert was consequently justified by the fact that this expert's interpretation withstood logical consideration.⁵⁵

It is, however, notable that Van der Merwe could only arrive at such an informed decision because of his understanding of the working of DNA. He categorically observes that, in as far as the science

of DNA is concerned, 'I derived valuable assistance from the work *DNA in the courtroom: principles and practice* by Prof Lirieka Meintjes-Van der Walt'.⁵⁶ Van der Merwe, notably, set out to understand the subject of DNA profiling so as to be able to arrive at an informed decision. Faigman has observed that the 'scientific sea' is very wide and deep and judges should at the very least know how to swim.⁵⁷ Faigman underscores the need for judges to 'have the basic skills necessary to read and understand scientific methods and to integrate scientific knowledge in their legal decisions without actually having to swim across the entire breadth of science'.⁵⁸ In the South African context, Meintjes equally recommends that 'all parties to the criminal justice process should grasp the nature of expert evidence ... [as this makes the scientific] waters more navigable'.⁵⁹

Another insight that can be drawn from the Bokolo case in relation to the gate-keeping role of judicial officers, is the need for more informed judicial rulings on DNA evidence. It is unsafe for judicial officers to stop at taking judicial notice of the fact that the science behind DNA is valid and is generally accepted in the relevant scientific field. The Bokolo case demonstrates the need for judges to make a more elaborate inquiry into the methodological standards and the interpretation of DNA results on a case-by-case basis. Judges cannot conduct this analysis without an understanding of the basics of DNA profiling. What Freckleton has called the 'knowledge gap'⁶⁰ needs to be bridged by continuous education on the manner in which DNA evidence operates. Scheck⁶¹ advises that for judicial officers, lawyers and law enforcement personnel to appropriately evaluate and make use of DNA evidence, they must undertake to learn more about molecular biology, population genetics and laboratory quality assurance. This is an uncomfortable venture, but will ultimately equip justice professionals with the basic knowledge to challenge illogical scientific conclusions, and consequently prevent incompetent evidence from getting into the trial record.

Conclusion

This case note has underscored that if DNA evidence is to remain relevant in the dispensation of justice, it is critical for it to be placed in proper context.

Experts in the field of DNA evidence play a critical role in ensuring that courts receive appreciable help from their expertise. However, to contribute positively towards the justice system, experts need to constantly be aware that their duty is to the court. In advancing DNA evidence and expert evidence generally, experts should desist from acting as 'hired guns' for the parties that instruct them. Moreover, to effectively advance DNA evidence, defence experts will need to play a more active role in evaluating the evidence presented by the prosecution. An even greater obligation rests upon judicial officers. Not only must they ensure that the person presenting the expert evidence is properly qualified to render an opinion on the subject of DNA evidence, but they must also understand the basics of DNA evidence so that when there are contradictions in the interpretation of DNA results by the experts (or a 'battle of experts'), they are able to critically evaluate the opposing experts' views, and consequently to make informed decisions.



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Notes

- 1 There are other cases in which the role of DNA evidence has been underscored and applied in South African courts. For example, see *S v Maqhina* 2001 (1) SACR 241 (T); *S v Nedzamba* 2013 (2) SACR 333 (SCA) at para [35]; *S v Carolus* 2008 (2) SACR 207 (SCA) at para [32]; *Mugwedi v The State* (694/13) [2014] ZASCA 23 at para [2].
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- 5 *Ibid.*
- 6 *Ibid.*, para [25].
- 7 *Ibid.*
- 8 *Ibid.*
- 9 *Ibid.*, para [26].
- 10 *Ibid.*
- 11 *Ibid.*, para [27].
- 12 *Ibid.*
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- 14 *Ibid.*

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- 34 *Menday v Protea Assurance Co (Pty) Ltd* 1976 (1) SA 565 (E).
- 35 *S v Huma* 1995 1 SACR 409 (W).
- 36 These words were uttered by Wigmore in 1940. See JH Wigmore, *A treatise on the Anglo-American system of evidence in trials at common law*, Boston: Little Brown, 1940, 1367, 29.
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- 41 Ibid.
- 42 On this reality, see 'Laboratory technology trends: lab automation and robotics, the brave new world of 24/7 research', *Science*, 2015, <http://www.sciencemag.org/site/products/robotfinal.xhtml> (accessed 23 March 2015).
- 43 Bokolo case, paras [28] & [29].
- 44 Ibid.
- 45 Ibid.
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- 47 BC Naude, Newly discovered DNA evidence: what South Africa can learn from the American experience, *The Comparative and International Law Journal of Southern Africa*, 36, 2003, 224.
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