IN THE HIGH COURT OF AUSTRALIA
SYDNEY OFFICE OF THE REGISTRY No. S315 of 2011

BETWEEN:

YUSUF AYTUGRUL

Appellant

AND

THE QUEEN

Respondent

APPELLANT'S SUBMISSIONS

Part I: We certify that this submission is in a form suitable for publication on the internet.

Part II Concise Statement of Issues Raised by this Appeal

1. Can s 135 and s 137 of the uniform evidence law be utilised to control the way in which "evidence" is presented or expressed? Does a criminal court have the power to control the presentation of statistical evidence, particularly in relation to DNA profiling? If the power exists, in what circumstances should it be utilised?

Part III: S78B Judiciary Act 1903 (Cth)

2. The appellant considers that notice should not be given to Attorneys General under s78B of the *Judiciary Act* 1903 (Cth).

Part IV: Citation

3. The judgment of the Court of Criminal Appeal (NSW) is reported as

Filed on behalf of the Appellant
Dated: 30 September 2011
THE APPELLANTS' SOLICITOR IS: Brian Sandiland, Legal Aid Commission,
323 Castlereagh St, Sydney NSW 2000
DX 5 Sydney
Telephone: 02 9219 5047
Facsimile: 02 9219 5059
Reference: Ms Claire Wasley

Aytugrul v The Queen (2010) 205 A Crim R 157.

Part V: Narrative Statement

The Trial

4. The appellant was convicted of the murder of Sevda Bayrak who died on 26 November 2005. The deceased's body was found just inside the front door of her flat at Betts St, North Parramatta, with multiple stab wounds. The deceased had spent the early evening with a man named Erdal Tunc, who was married to her best friend. Mr Tunc was initially arrested in relation to the murder but the charge was not pursued. The appellant had been in a relationship with the deceased which had ended more than two years before her death. In summary, the prosecution relied upon:

- evidence that the appellant was romantically obsessed with and "stalking" the deceased;

- evidence that the deceased had been subject to harassment, intimidation and vandalism at an address at Merrylands NSW where she had lived until a month before her death (although there was no evidence directly linking this to the appellant);

- evidence that the appellant had not been truthful to the police about the details of his involvement with the deceased in the months prior to her murder; and

- evidence that a small hair found on the thumbnail of the deceased was consistent with the appellant's mitochondrial DNA profile.

5. As regards the hair, it was a body hair. It was naturally shed, rather than torn or ripped. The Crown case was that the hair was shed during the attack on the deceased. The defence suggested it could have been picked up from the carpet when the blood adhering to the nail contacted the floor (that is, it may have been shed unnoticed on the carpet by a friend or relative of the deceased, including female friends, days before her death). There was no evidence that any activity or rubbing was required to shed body hair. The evidence from the expert pathologist Dr Ellis was that rubbing against clothing would be sufficient to dislodge hair (T 690) and that shedding was a natural process that happens regularly without our awareness "as we move around" (T 690). When asked if it was possible that the hair was picked up by the deceased's nail from the carpet "...taking into account the texture of that carpet..." Dr Ellis replied "I couldn't exclude that. I have no way of knowing how the hair got onto the thumbnail" (T 621).

6. The hair was sent to a private laboratory in the USA for forensic testing which produced a form of DNA profile known as a mitochondrial haplotype ("mito-type"). The mito-type obtained from the hair was a "near match" to the appellant's profile. While there were differences between the profiles this did not necessarily exclude the appellant. There was evidence that further testing could have confirmed a match (T 951) but it appears that no further testing was conducted.

7. Three experts in DNA evidence were called during the trial. Ms Gina Pineda, a scientist from the private commercial laboratory that tested the hair in the United States, testified that it was common practice in the US to disregard such a "mismatch" between the profiles. The remaining experts, Professor David Balding for the prosecution and Dr John Buckleton for the defence, stated that the difference between the profiles weakened the evidence of a match and could mean that the hair profile was not the same as that of the appellant. Professor Balding agreed that it was "conventional" to disregard the difference but expressed the opinion that such an approach was "unsatisfactory" (T 732.45, 738.30).

8. It was not in dispute that it was possible for a mito-type (unlike a nuclear DNA profile) to differ between different body samples from the same person so that, for example, a person's hair might give rise to a different profile than that obtained from their saliva. The expert witnesses agreed that mitochondrial DNA differed from the type of nuclear DNA commonly seen in criminal casework in a number of other respects:

- the gender of the contributor of a mitochondrial sample cannot be determined;
- mito-types are not unique - all maternal relatives will share the same mito-type as will numerous other apparently unrelated individuals ;
- mito-types are passed down the matrilineal line for several generations;
- there is no Australian database of mito-types.

9. Ms Pineda testified that, based on a US database of mito-types (the "SWGDAM database"), 1 in 1,600 people in the general population would be expected to share the mito-type found in the hair. Ms Pineda derived the figure from an assessment of a US database of 4,839 mito-types. One profile was discovered on the database which matched the mito-type of the hair found at the murder. Ms Pineda applied a "confidence limit" of 95% to the figure 1 in 4,839 to arrive at the 1 in 1600 assessment (the upper limit was 1 in 1,600 and the lower limit was 1 in 5,000). The purpose of the confidence limit adjustment was to take account of the possibility that the database was not entirely representative of the population (T 278). She gave evidence that application of the confidence limit was the only standard adjustment before the database match was extrapolated to the general population (T 290). Ms Pineda gave evidence of standard US practice, she conceded she was not a geneticist or a statistician. Dr Buckleton candidly offered

that there was an element of educated guesswork associated with any statistical assessment of frequency (T 978).

10. In Ms Pineda's report there was a statement, presumably in conformance with US practice, that 99.9% of the population would be excluded (T 228.10). Counsel for the appellant objected to Ms Pineda giving evidence that 99.9% of people in the general population would not be expected to have a profile matching the hair, on the basis that "its probative value is outweighed by its prejudicial effect" (T 228.48). During the voir dire the trial judge asked Ms Pineda (T 240):

> Q: How do you get from one in 1600 to 99.99% (sic)
> A: You just invert the frequency and if you divided one into 1600 and subtract that from one and convert it into a percentage, that gives you the 99.9.

While not expressed, it appears Ms Pineda "rounded down" the actual percentage figure of 99.9375%. His Honour later confirmed the evidence was "mathematically different ways of saying exactly the same thing" (T 243). It was conceded by counsel for the appellant that this evidence was another way of presenting the same statistic, but it was contended that "it has a very different impact upon a jury's consideration" (T 254.11). Reference was also made to the risk of the introduction of the prosecutor's fallacy, ie "that it is 99 percent sure it is the accused" (T 257). The trial judge did not exclude this evidence.

11. Ms Pineda referred to the 99.9% figure only briefly in her testimony (T 279, 285). More attention was given in her examination and cross examination to a different percentage calculation – the application of the 95% "confidence limit" which led to the figure of "one in 1600" being extrapolated from the discovery of one matching mitochondrial profile on the US database of 4,839 individuals.

12. The deceased and the appellant, as well as the deceased's family and almost all of the deceased's acquaintances, were members of the Turkish community in Australia. It was not in dispute that a person's ethnic background was relevant to the frequency with which a mito-type may be expected to occur. It was accepted that certain mito-types could occur in concentrated "chunks" in certain highly inter-related ethnic populations. Ms Pineda accepted it was not known how many, if any, Turkish people were represented on the US database of mito-types that she had consulted. She explained that her statistical estimate did not take ethnicity into account, beyond the application of the standard confidence limit adjustment, as there was no agreed approach to adjustments for the "subpopulation effect" in respect of mitochondrial evidence (T 291).

13. Evidence was given by another prosecution expert Professor Balding (a Professor in Statistical Genetics at Imperial College, London) that approximately

or 1 in 50, 2%, of Turkish persons would be expected to share the DNA profile found in the hair. The defence expert witness Dr Buckleton generally agreed with that evidence, stating the profile would be expected to occur in 1 in 50 to 1 in 100 members of the Turkish population. Professor Balding stated that the profile was expected to occur in a "substantial number of Turkish origin individuals" (T 735.35). Professor Balding suggested in his evidence that profile frequencies in Turkey could be different or distinct from patterns observed in the rest of the world (T 739.44). Each expert agreed that there was no representative database of Turkish mito-types and limited data on Turkish profiles. It was accepted by both prosecution experts that an accurate figure could be lower or higher (T 290, 300, 742.15). There was no evidence that the deceased's Turkish friends or family were tested with the exception of Mr Tunc, who was excluded.

14. The expert evidence was that the mito-type of the hair was "rare" and that the estimates were "cautious" or "generous". However, those statements were made with significant caveats. The figures were estimates made in the absence of any information about the Australian Turkish populations and without reference to any database of Turkish profiles or Australian profiles. It was acknowledged that the statistical estimates assumed that the profile was not part of a "chunk" or "pocket" of identical profiles known to exist in some ethnic communities. The possibility that the profile derived from a chunk could not be eliminated without more information on the Australian Turkish population. Professor Balding stated that the hair could belong to "thousands" of Turkish individuals.

15. Professor Balding commented that the profile could be expected to occur in 2% of the Turkish population but did not provide an exclusion figure (T 737, 739). Similarly Dr Buckleton adopted the 2% figure (T 963) but gave no exclusion percentage. However, at the conclusion of Dr Buckleton's evidence the trial judge asked the expert a series of questions (T 975). During those questions His Honour noted that Dr Buckleton had given evidence to the effect that a properly applied confidence limit would result in Ms Pineda's frequency assessment being more correctly expressed as "one in 1000" rather than "one in 1600". His Honour then stated:

> Q. Ms Pineda as I recall put the 1 in 1600 in a different way but mathematically in effect saying the same thing, she referred to 99 point something per cent of the population being excluded – can counsel recall what it was, 99?

The continuing exchange between the trial judge and the expert witness is extracted by McClellan CJ at CL (at [58] –[62]), where his Honour notes in bold text the numerous inaccuracies in the statistical percentages quoted during the exchange.

16. In closing addresses to the jury the Crown Prosecutor made no reference to the 99.9% or 98% percent exclusion figure in his summary of the DNA evidence (T 1054-1059), nor did counsel for the appellant (T 1086-1088). The exclusion figure was again introduced by the trial judge during his summing up. The trial judge directed the jury that, if the hair came from the appellant, "that would very strongly link the accused with the murder because there is really no other explanation for how a hair that is consistent with being his could have got there" (SU 27). His Honour stated (SU 29):

> You have the opinion of Ms Pineda that, by reference to the SWGDAM database, she concluded this profile could be expected in 1 in 1600 people. Putting it in another way, 99.99% (*sic*) of the population could be excluded as possibly having this profile. ...

His Honour later stated (SU 31):

> At one end, you have Ms Pineda's evidence that such a profile can be expected to be found in 1 in 1600 people or, looking at it from the reverse perspective, you would not expect it in 99.99% (*sic*) of people. At the other end you have the evidence of Dr Buckleton that amongst Turkish people you would expect to find the profile in something between 1 in 50 and 1 in 100 people or less, and the evidence of Professor Balding that you would expect it in 1 in 50 or less. Looking at their evidence in the reverse way, they are in effect saying you would not expect to find it in at least 98% of Turkish people. Of course, the less likely the expectation of finding the same profile in other people in the population, the more value the evidence has in establishing the probability that the hair came from the accused.

The Court of Criminal Appeal

17. In the Court of Criminal Appeal, the following ground of appeal was advanced:

> A miscarriage of justice occurred because of the prejudicial way in which DNA evidence was expressed to the jury.

It was argued that the trial judge erred in failing to apply s 135 or s 137 *Evidence Act 1995* (NSW) to exclude the DNA statistical evidence expressed in exclusion percentage terms.

18. McClellan CJ at CL, in dissent, upheld this ground of appeal, holding at [99] that the trial judge should have excluded the evidence that 99.9% of people would not be expected to have a DNA profile matching the hair, on the basis that the danger of unfair prejudice to the appellant substantially outweighed the probative value of the evidence.

19. Simpson J (with whom Fullerton J agreed) held at [176] that both s 135 and s 137 are "concerned with the content of the evidence, and not the manner in which it is expressed". Her Honour queried at [177] how sections 135 or 137 could have any operation if evidence with the same mathematical content could be expressed in a manner which did not offend the sections. Her Honour had expressed the view at [164] that the mere fact that different formulations of the conclusions to be drawn from DNA testing "are likely to have greater impact than others" is not a "reason to prefer one method of expression over another". While Simpson J considered that "it is probably the case that a trial judge retains a general discretion to protect against unfairness, and that may extend to the manner in which evidence is presented", her Honour did not proceed to consider the application of such a general discretion, holding only at [198]: "I have been able to discern nothing that suggests that the evidence before the jury, framed as it was, was unduly or unfairly prejudicial, or confusing or misleading such as to raise for consideration either s 135 or s 137".

Part VI: Argument

The approach of McClellan CJ at CL

20. The statistical evidence about the mito-type was ultimately presented to the jury in two forms:

- a "random occurrence" ratio, also known as a "frequency estimate", which expressed the frequency with which the profile was expected to occur in the population, namely one in 1,600 randomly selected individuals; and
- an "exclusion percentage" representing the proportion of the population who would not be expected to share the mito-type, namely 99.9% of the population.

McClellan CJ at CL was correct to hold, in dissent, that the trial judge should have excluded the evidence that 99.9% of people would not be expected to have a DNA profile matching the hair, on the basis that the danger of unfair prejudice to the appellant substantially outweighed the probative value of the evidence.

21. In *R v GK* (2001) 53 NSWLR 317 it was determined that DNA evidence presented in the form that there was a Relative Chance of Paternity of 99.9995% and 99.9993% should not have been placed before the jury because of the risk that the figures would mislead the jury and be unfairly prejudicial to the accused. *GK* was applied in *R v JCG* (2001) 127 A Crim R 493.

22. Since those decisions it has become common practice in Australian courts for evidence of the statistical probability of a DNA match to be expressed in terms of a "random occurrence ratio", or a "frequency estimate", rather than by an "exclusion percentage". There has been no reported case since *GK* and *JCG* where an exclusion percentage figure has been presented to a jury. During this trial, Ms Michelle Franco from the NSW Division of Analytical Laboratories gave evidence using the traditional frequency expression in relation to the more commonly used nuclear DNA (a mixed nuclear DNA profile consistent with the profiles of Erdal Tunc and an unknown male was found in an abrasion under the deceased's chin). Ms Franco testified the profile was consistent with Mr Tunc and could be expected to be found in 1 in 210,000 individuals in the general population (T 555). She did not use any percentage exclusion figures.

23. Whether or not such a practice should continue, it is submitted that McClellan CJ at CL was correct to hold that a proper application of s 135 and s 137 required the exclusion of the exclusion percentage evidence in the present case.

"Probative value"

24. A proper application of s 135 and s 137 must begin with an assessment of "probative value". That term is defined in the Dictionary to the Act to mean "the extent to which the evidence could rationally affect the assessment of the probability of the existence of a fact in issue". Application of that test should be performed in the context of the other evidence already admitted (or to be admitted) in the trial.

25. In the present case, the evidence could not add anything of substance to the evidence already admitted, that 1 in 1,600 people in the general population would be expected to share the DNA profile found in the hair. Thus, its incremental probative value was minimal because it added nothing to what had already been admitted into evidence. Given the admission into evidence of the frequency estimate, the exclusion percentage evidence could not, in any significant way, rationally add anything to the jury's assessment of the probability of the appellant's guilt.

26. In *R v Michael Taylor* [2003] NSWCCA 194 Bell J (Spigelman CJ and Miles AJ agreeing) observed that a trial judge exercising s 135 to exclude defence evidence was entitled to have "regard to the availability of other evidence to prove the same matter" as that which was sought to be proved by the excluded evidence (at [128]) and that the availability of the other evidence was "a reason for concluding that the probative value of the evidence was outweighed by the danger that its admission may result in undue waste of time" (at [129]).

27. Justice Simpson regarded the fact that the "frequency ratio" evidence and the "exclusion percentage" evidence were "exactly the same evidence" (at [175]) as a reason to hold that neither s 135 or s 137 had any application. Similarly, the trial

judge observed at T 254 that the statistics expressed in percentage terms "means the same thing" as the evidence expressed "in the more conservative terms" of frequencies. However, on a proper application of s 135 and s 137, this fact would support exclusion if there is any risk of the jury giving more weight to the exclusion percentage evidence than it deserved.

"Danger of unfair prejudice"

28. In the present case, there was a real risk that the statistical evidence, expressed in percentage terms, would be given more weight by the jury than it deserved, thereby constituting a risk of unfair prejudice.

29. The judgments in *GK* and *JCG* reflect a long-standing approach of caution by Australian courts in relation to the use of mathematical expressions of probability in criminal trials[1]. In his seminal article, "Trial by Mathematics: Precision and Ritual in the Legal Process", Laurence Tribe observed:

> The very mystery that surrounds mathematical arguments – the relative obscurity that makes them at once impenetrable by the layman and impressive to him – creates a continuing risk that he will give such arguments a credence they may not deserve and a weight they cannot logically claim.[2]

30. Australian courts have expressed apprehension about the complex nature of DNA evidence and the risks that jurors would be overawed or unduly swayed by the scientific aura surrounding the evidence: see King CJ in *R v Duke* (1979) 22 SASR 46 at 48, Doyle CJ in *R v Karger* [2002] SASC 135 at 143. Rather than exclude the evidence altogether, courts have carefully regulated the manner in which that evidence is presented to the jury to ensure the integrity of the trial process. As McClellan CJ at CL observed in the present case (at [102]):

> The response to the difficulty with the intelligibility of DNA evidence is not to banish all statistical evidence from the courtroom but to rationally determine the probabilistic formulations which are appropriate for use in a criminal trial.

31. The literature relied upon by McClellan CJ at CL is supported by Australian empirical studies of actual and mock jurors which demonstrate that:

1 Cross on Evidence (Aust ed, 2011) at [9090] notes the striking example of *People v Collins* 438 P 2d 33 (1968) which has become a spur for debate and a cautionary tale of the dangers of too readily transposing statistical reasoning to the assessment of guilt.

2 84 *Harv L Rev* 1329 at 1334 (1971).

- jurors place great weight on DNA evidences[3];
- jurors have great difficulty in understanding mathematical expressions of DNA evidence[4];
- higher levels of reported perceived understanding do not correlate with evidence of actual comprehension[5];
- mock jurors with a less accurate grasp of DNA information following the trial convicted more frequently than their more knowledgeable counterparts[6];
- model directions and warnings provided to mock jurors may not be effective in improving comprehension or reducing the risk of fallacious reasoning[7].

The Australian literature does not specifically address the risk of percentage exclusion evidence, presumably because of the established practice of expressing statistical evidence relating to DNA in frequency terms.

32. Australian appellate courts have encouraged criminal trial judges to be vigilant in respect of the danger of what has become known as the "prosecutor's fallacy" in the presentation of DNA evidence: *Doheny and Adams* (1997) 1 Cr App R 369; [1996] EWCA Crim 728; *R v Keir* [2002] NSWCCA 30. In his judgment, McClellan CJ at CL described the fallacy as (at [78]):

> a failure in statistical reasoning that invites the jury to assume that a DNA statistic provides a statistical likelihood that the incriminating DNA belongs to the suspect and therefore that the suspect is guilty.

McClellan CJ at CL at [84] considered that the trial judge adequately instructed the jury to avoid the fallacy but that is not conceded by the appellant.

33. A particular risk of unfair prejudice which attaches to the exclusion percentage expression is that invites forms of fallacious reasoning that are inconsistent with

3 M Briody "The effects of DNA evidence on homicide cases in court" (2004) *The Australian and New Zealand Journal of Criminology* 37, J Goodman-Delahunty, L Hewson "Improving jury understanding and use of expert DNA evidence", (2010), *Australian Institute Criminology* 37.

4 M Finlay and J Grix 'Challenging Forensic Evidence? Observations on the use of DNA in certain criminal trials' (2003) 14 *Current Issues in Criminal Justice* 269, S Dartnall S & J Goodman-Delahunty (2006) "Enhancing juror understanding of probabilistic DNA evidence" *Australian Journal of Forensic Sciences* 38(2): 85.

5 J Goodman-Delahunty, L Hewson "Improving jury understanding and use of expert DNA evidence", (2010), *Australian Institute Criminology* 37.

6 ibid

7 S Dartnall S & J Goodman-Delahunty (2006) "Enhancing juror understanding of probabilistic DNA evidence" *Australian Journal of Forensic Sciences* 38(2): 85

the task of the jury. The publications referred to in the judgment of McClellan CJ at CL at [89] – [102] demonstrate that there is an impressive and long standing body of empirical literature to support the existence of the dangers of exclusion percentage evidence identified in *GK* and *JCG*. The literature draws upon behavioural science studies which demonstrate that many people think "heuristically rather than probabilistically" and tend to use mental shortcuts and "rules of thumb" to comprehend quantitative evidence[8].

34. The studies identified illogical changes in the inculpatory weight given by mock jurors to the same DNA evidence in response to linguistic changes in the presentation of the evidence. Those changes were particularly acute when evidence given in frequency terms was compared to evidence presented in probabilistic percentage exclusions[9]. Juror studies demonstrated that evidence presented in percentage exclusion terms was given disproportionate weight and that mock jurors presented with exclusion percentages were more likely to fall into the "prosecutor's fallacy"[10].

35. As McClellan CJ at CL outlines in his judgment at [89] – [95] the difference in the psychological impact of the two expressions relates to the manner in which frequency estimates and percentage exclusion figures engage different heuristic tendencies. One such heuristic tendency is known as "exemplar cuing". Jurors are more able to conceive of the possibility of others who might match a DNA profile if the evidence is presented in a manner that allows the possibility to be easily brought to mind. Expressions of evidence which relate to frequency in a large population, for example 1 in 1,000 people in Australia, or 21,000 Australians, allow the triers of fact to easily imagine the existence of others who might share the profile. This allows better juror understanding and assessment of the weight of the evidence.

36. In contrast, expressing the same evidence as a percentage chance that the profile is **not** shared by the population, for example that 99.9% of the population would not be expected to share the profile, encourages a narrow outlook in which instant cases are thought of in isolation. The percentage expression not only discourages jurors from conceiving coincidental matches but can be misleading. In *JCG,* Spigelman CJ observed at [72]:

> "...if a figure of 98% was put to the jury, it is likely that many jurors would regard that as very significant evidence pointing to the accused, even though

8 J Koehler "The Psychology of Numbers in the Courtroom: How to Make DNA-March Statistics seem Impressive or Insufficient" (2001) 74 *Southern California Law Review* 1275

9 *ibid.*

10 *ibid*, see also W.C. Thompson and E. L. Schumann "Interpretation of statistical evidence in criminal trials: The prosecutors' fallacy and the defense attorney's fallacy" (1987) *Law & Human Behavior* 11: 167–187.

the Paternity Index was very low so that numerous persons in the general community could share the DNA profile".

The 99.9% figure also invites a subconscious rounding up to 100% (McClellan CJ at CL at [99]). To adopt the language of Sully J in *GK* at 341, there was a "residual risk of unfairness deriving from the subliminal impact" of the evidence.

37. Expression of the evidence in terms of exclusion percentages also creates a risk that the jury will approach the question of proof in terms of percentages of guilt. Proof of the appellant's guilt beyond reasonable doubt required exclusion of the possibility that another person with the same DNA profile left the hair. Expression of the evidence in terms of the frequency that such a profile could be expected to be found in the population was consistent with the task facing the jury. The frequency calculation invited the jury to consider how many other people may have had the same profile and whether it was reasonably possible that one of them may have been connected to the hair. Expression of the evidence in terms of percentages creates a danger that the jury might be misled.

38. Further, in addition to the risk of a subconscious "rounding-up", the use of percentage figures with decimals runs the risk of inadvertent imprecision in the expression of the evidence. The summing up of the trial judge in this case demonstrates such a risk in that the trial judge repeatedly (albeit inadvertently) expressed the percentage figure of 99.9% as 99.99%. The trial judge's inadvertent slip was significant mathematically - expressing the exclusion percentage as 99.99% rather than 99.9% amounted to stating that only 2,100 people potentially shared the profile rather than the intended figure of 21,000.[11]

39. The risks associated with exclusion percentages were particularly acute in the circumstances of the present case because of the complexity of the evidence. The mito-type did not exactly match the appellant and there was dispute among the experts as to the significance of the "mismatch". There was also a great deal of complex evidence in relation to the significance of the "sub-population effect" and the appropriate approach to the adjustment of the statistical evidence to take into account how database evidence should be extrapolated to the population at large. As the trial judge commented during a break in Dr Buckleton's evidence (in the absence of the jury) "I don't how the jury was faring with this. I must confess I am struggling" (T960).

40. In these circumstances, it was essential that the jury carefully evaluated the strength of the DNA evidence in the context of the evidence of the case and that the presentation of the evidence assisted rather than detracted from that task. A presentation of evidence which invited fallacious reasoning, compounded by the numerous inaccurate and imprecise expressions of the percentage exclusion evidence, created a real risk of unfair prejudice.

[11] Assuming an Australian population of 21 million people.

The probative value of the evidence was outweighed by the danger of unfair prejudice

41. As McClelland CJ at CL concluded, the danger of unfair prejudice substantially outweighed the probative value of the evidence.

42. Because the incremental probative value of the evidence was minimal, since it added nothing of substance to what was being admitted into evidence without objection, a proper application of s 135 and s 137 would require exclusion if there was any risk of the jury giving more weight to the percentage evidence than it deserved.

43. As Sully J observed in *GK,* it will be appropriate to utilise s 135 or s 137 to exclude DNA statistical evidence presented in a particular way where it has been already presented in a different way and the second proposed method of presenting it creates a "*residual risk of unfairness deriving from the subliminal impact*" of the evidence. McClellan CJ at CL observed at [98] that the desire for evidence to be persuasive should not outweigh the duty to present complicated evidence fairly and "the Crown should not have the advantage of the 'subliminal impact' of statistics to enhance the probative value of the evidence".

44. The directions provided to the jury by the trial judge were not sufficient to remove the risk that the jury would give the exclusion percentage evidence more weight than it deserved. The jury did not receive a warning that the question of proof beyond reasonable doubt is not a mathematical exercise or caution against adopting the statistical evidence as an expression of the percentages of guilt. The trial judge did not warn the jury against falling into the prosecutor's fallacy. The judge did not give any direction which highlighted the number of other member of the population who would share the profile, a direction noted as one which may be appropriate by Gray J in *R v Karger* (at 175) citing recommended directions in *R v Doheny and Adams* [1997] 1 Cr App R 369.

45. There was a further risk that the approach of the trial judge would suggest to the jury that the exclusion percentage was to be preferred or given more weight. The trial judge invited Dr Buckleton to express his evidence in percentage exclusion terms after he and Professor Balding had avoided percentage exclusion expressions of their evidence. He again introduced the 99.99% percentage expression in his summing up when it was not relied upon by counsel in closing addresses. As outlined above, after summarising the statistical evidence of all three experts the trial judge stated (SU 31):

> Looking at their [Professor Balding and Professor Buckleton] evidence in the reverse way, they are in effect saying you would not expect to find it in at least 98% of Turkish people. *Of course, the less likely the*

expectation of finding the same profile in other people in the population, the more value the evidence has in establishing the probability that the hair came from the accused.

The percentage formulation apparently preferred by the trial judge had a disarming simplicity which may have been welcomed by the jury when assessing the complex evidence. However, by inviting the jury to focus on the percentage of people who were expected to be excluded from sharing the profile the trial judge was inadvertently diverting attention from the significant number of people who would be expected to share the profile (the precise risk of percentage exclusion evidence identified by Spigelman CJ in *JCG*). The trial judge did not include in his summing up the number of people who would be expected to share the profile.

46. Further, the trial judge offered the jury the opportunity to "accept the evidence of Ms Pineda in preference to that of Professor Balding and Dr Buckleton" (SU 31.45). However there was no direct contest between the evidence of Ms Pineda and the remaining experts in relation to the different frequency for the Turkish population. Ms Pineda's evidence was based on her assessment of the US database with an unknown number of Turkish profiles and expressed in terms of the general population. There was dispute about the extent to which that database could be reliably extrapolated to the Australian population. Ms Pineda accepted that ethnicity was a relevant factor in assessing the commonality of the profile. She said in evidence that she did not adjust her statistical assessment for the "subpopulation effect" because she could not know the Turkish component of the database and there was no accepted "subpopulation" formula to apply. She accepted she did not have expertise in statistics or genetics and did not suggest she was capable of calculating a figure specifically addressed to the Turkish population. The evidence of Professor Balding, whose expertise lay in statistical genetics, was, in effect, to supplement Ms Pineda's evidence by providing an assessment of frequency within the Turkish population. That evidence was clearly significant in light of the number of Turkish friends and acquaintances who visited the deceased and thus may have contributed the hair.

47. The possibility that a juror or the jury might themselves convert the frequency ratio into an exclusion percentage (referred to by the trial judge at T 254) does not inevitably lead to the conclusion that such a conversion should be invited or encouraged. Criminal trials may give rise to the risk of impermissible reasoning or speculation in the privacy of the jury room. The existence of s 135 and 137, and judicial directions and warnings, are mechanisms to reduce those risks and allow the trial judge to ensure fairness in the trial process. The difficulty surrounding statistical evidence supports the use of a clear and consistent approach using mathematical expressions which have been found to maximise juror comprehension and reduce the risk of fallacious reasoning.

Criticism of the approach of the majority

48. Justice Simpson (Fullerton J agreeing) held, in substance, that:

> (a) neither s 135 or s 137 are engaged where it is contended that unfairness arise from the manner in which "evidence" is expressed rather than the content of the evidence; and
>
> (b) it was not open to conclude that any unfairness to the appellant arose from the fact that the statistical evidence was expressed in percentage as well as frequency terms.

The analysis appears founded on the assumption that s 135 and s 137 have no scope for operation if the identified dangers or prejudice of the evidence relate to the manner in which it is expressed rather than its content. It is submitted such an approach is fundamentally erroneous and improperly limits the ability of trial judges to control the presentation of evidence to a jury in a criminal trial.

49. The words of the sections do not express any such limitation. Both simply refer to "evidence". While that term is not defined, each statement made by a witness must be considered as a discrete item of evidence to which the provisions apply. The statement "99.9% of people in the general population would not have a DNA profile matching the hair" is, literally speaking, a different statement to "1 in 1600 people in the general population would be expected to share the DNA profile found in the hair", regardless of whether the substantive "content" of the two statements is the same.

50. The term "evidence" in s 135 and s 137 should be understood broadly, consistent with the wording of the provisions and the policy concerns behind both provisions. Both s 135 and s 137 are available to control the presentation of "evidence" to ensure a fair trial. If there is a risk of unfair prejudice (s. 137) or a danger that the evidence is misleading, confusing or unduly time consuming (s. 135) the evidence should not be admitted merely because it is also capable of admissible expression in another way.

51. The common law "discretion" to exclude prosecution evidence that is more prejudicial than probative exists "to avoid a risk of a miscarriage of justice": *R v Swaffield; Pavic v The Queen* (1998) 192 CLR 159 at 192 per Toohey, Gaudron and Gummow JJ. As their Honours observed:

> T]he fairness at issue in cases involving the exercise of a discretion to exclude unduly prejudicial evidence is the fairness of the trial, in the sense of a trial that does not involve a perceptible risk of a miscarriage of justice.

The "discretion" has been utilised to control the presentation of evidence with the same inherent content. For example, evidence of the wounds suffered by a victim

may be presented in the form of a description by a pathologist and/or by means of graphic photographs. The discretion is available to exclude the latter evidence: *R v Ames* [1964-5] NSWR 1489 at 1492.

52. There is nothing in the Reports of the Australian Law Reform Commission that would suggest the provisions differ from the common law approach in this regard. For example, in proposing retention of the "discretion to exclude evidence adduced by the prosecution if it is more prejudicial than probative", the ALRC stated in the Interim Report on Evidence (ALRC 26, vol 1, para 957):

> "There is some uncertainty over the meaning of "prejudice". But, clearly, it does not mean simply damage to the accused's case. It means damage to the accused's case in some unacceptable way, by provoking some irrational, emotional response, *or giving evidence more weight than it should have*. It is proposed to retain this judicial discretion in its conventional form."

53. The NSW Court of Criminal Appeal has repeatedly proceeded on the basis that exclusion may be justified under this provision where the jury are likely to give particular evidence more weight than it deserves: *R v Ngo* (2003) 57 NSWLR 55; [2003] NSWCCA 82 at [151]–[152]; *R v Arvidson* (2008) 185 A Crim R 428 [2008] NSWCCA 135 at [46]; *DPP (NSW) v J G* [2010] NSWCCA 222; see also *R v Yates* [2002] NSWCCA 520 at [252].

54. The increasing use of complex statistical evidence in criminal trials presents new challenges to trial judges seeking to ensure fairness. The risk of unfair prejudice posed by statistical evidence may be subtle. One reason why a trial judge's discretion to regulate presentation of statistical evidence should not be constrained is the almost unlimited way in which statistics can be presented. McClellan CJ at CL listed a number of equally accurate options in presenting the same DNA evidence in his judgment at [86] – noting that not all would have the same psychological impact on a jury. It cannot be assumed that presenting all possible formulations will eliminate confusion or enhance jury understanding. For example, one technically accurate presentation of the DNA evidence at trial that McClellan CJ at CL did not include was "there is a 99.9927% chance that the profile does **not** belong to the accused". If the profile could match 1 person in 1600 people, then, assuming an Australian population of 22 million people, the frequency would give rise to a potential class of 13 750 people sharing that profile. That means, mathematically, that the appellant's chance of owning the profile, as opposed to another member of that potential class, is 1 in 13 750,500 or 0.008%. That could be expressed - mathematically correctly - as "there is a 99.992% chance that the profile does not belong to the accused but another person in the community". Any juror can be expected to struggle when told that:

> - It is 99.9% more likely that that DNA profile belongs to the accused rather than a randomly selected person; AND

- There is a 99.9927% chance that the profile does not belong to the accused but to another Australian person.

55. While Simpson J considered that "it is probably the case that a trial judge retains a general discretion to protect against unfairness, and that may extend to the manner in which evidence is presented", her Honour did not proceed to explicitly consider the application of such a general discretion. It must be concluded that her Honour considered that it was not open to conclude that any risk of unfairness to the appellant arose from the fact that the statistical evidence was expressed in percentage as well as frequency terms. However, trial judges must assess the risk of unfair prejudice arising from the spectrum of mathematical ability which might be found in the jury. It may be that some jurors will share a sophisticated understanding of statistics and, like the trial judge and Justices Simpson and Fullerton, see the different expressions as benignly interchangeable. However, some jurors, and if the empirical research is accepted, most jurors, will struggle with statistical expressions, are likely to give some expressions more weight than they deserve and may fall into the trap of fallacious reasoning.

Part VII: Constitutional and Statutory Provisions

Evidence Act 1995 (NSW) ss 135, 137 (see Annexure)

Part VIII: Orders Sought

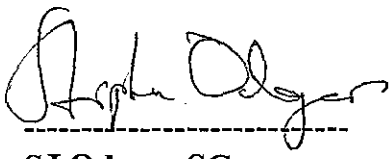
The orders sought are:

1. Appeal allowed.

2. Set aside the order of the Court of Criminal Appeal of New South Wales made on 3 December 2010.

3. In place thereof, order that the appeal against conviction to the Court of Criminal Appeal of New South Wales be allowed, the conviction quashed and that there be a new trial.

Dated: 30 September 2011



SJ Odgers SC
Counsel for the Appellant
Ph: 9261 1622
Fax: 9261 4600
Email: odgers@forbeschambers.com.au

K Edwards

IN THE HIGH COURT OF AUSTRALIA
SYDNEY OFFICE OF THE REGISTRY

No. S 315 of 2011

B E T W E E N:

YUSUF AYTUGRUL
Appellant

-and-

THE QUEEN
Respondent

APPELLANT'S ANNEXURES

No.	Description of Document

Legislation

1. *Evidence Act 1995 (NSW), s 135 and s 137*

FILED ON BEHALF OF THE APPLICANT DATED: 4 October 2011
THE APPLICANT'S SOLICITOR IS: Brian Sandland, Director Criminal Law, Legal Aid NSW
323 Castlereagh St, Sydney, NSW, 2000
Telephone: (02) 9219 5047
Facsimile: (20) 9219 5059
Reference: 2011209306 Claire Wasley

Evidence Act 1995 No 25

Historical version for 12 August 2005 to 31 December 2008 (accessed 4 October 2011 at 10:50) **Current version**

135 General discretion to exclude evidence

The court may refuse to admit evidence if its probative value is substantially outweighed by the danger that the evidence might:

(a) be unfairly prejudicial to a party, or

(b) be misleading or confusing, or

(c) cause or result in undue waste of time.

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Evidence Act 1995 No 25

137 Exclusion of prejudicial evidence in criminal proceedings

In a criminal proceeding, the court must refuse to admit evidence adduced by the prosecutor if its probative value is outweighed by the danger of unfair prejudice to the defendant.

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