What is the value of forensic science? An overview of the effectiveness of forensic science in the Australian criminal justice system project

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Forensic science is increasingly relied upon by law enforcement to assist in solving crime and gaining convictions, and by the judicial system in the adjudication of specific criminal cases. However, the value of forensic science relative to the work involved and the outcome of cases has yet to be established in the Australian context. Previous research in this area has mainly focused on the science and technology, rather than examining how people can use forensic services/science to the best possible advantage to produce appropriate justice outcomes. This five-year project entails an investigation into the effectiveness of forensic science in police investigations and court trials. It aims to identify when, where and how forensic science can add value to criminal investigations, court trials and justice outcomes while ensuring the efficient use of available resources initially in the Victorian and the ACT criminal justice systems and ultimately across Australia and New Zealand. This paper provides an overview of the rationale and aims of the research project and discusses current work-in-progress.

Keywords: investigations; intelligence-led; police; crime scene; effectiveness; efficiency

Introduction

Forensic science has received a great deal of publicity in recent years. This is apparent in the popularity of television programs such as CSI and in novels published in the crime science genre. This increased exposure in popular culture, it has been argued, has led to increased public awareness of, and interest in, the field of forensic science\textsuperscript{1,2}. Popular interest in forensic science is not a new phenomenon as witnessed, for example, by the publication of Sherlock Holmes stories in the 19th and 20th
centuries^3. What is new, however, is the widespread belief that recent developments in forensic science (DNA analysis in particular) have 'revolutionised' the ability of law enforcement to protect the innocent from wrongful prosecution\(^1\) and that DNA analysis and databases in particular have enhanced the capability of police to identify, arrest and prosecute offenders\(^4\).

In this paper we argue that there is an urgent need for empirical evidence on the effectiveness (or otherwise) of forensic science in criminal investigations before such definitive statements can be made with any confidence. What evidence is there that recent developments in forensic science have in fact revolutionised law enforcement in this way? What do we actually know about the impact of forensic science on the criminal justice system in general and on criminal investigations in particular? Indeed, a number of recent studies have emphasised the need to assess the contribution of the role and impact of scientific evidence in criminal case processing^5\) and the impact of forensic evidence on various stages of the criminal justice process^6–8\). This includes the need to assess how new technologies affect policing and whether policing practices become effective as a consequence\(^9\).

This paper provides an overview of a collaborative research project being undertaken in Australia that begins to address the lack of knowledge on the effectiveness of forensic science in the criminal justice system.

**Why should we be concerned about the effectiveness of forensic science?**

Forensic science is an integral component of a criminal justice system\(^10,11\). Forensic scientists provide valuable information that aids in the investigation and prosecution of crime through the scientific examination and analysis of physical evidence\(^12\), as well as providing insight into offender characteristics and criminal behaviour\(^13\). Forensic science disciplines are increasingly relied upon by law enforcement to solve crime, and by the judicial system to prosecute offenders\(^7,11,14\).

Over the last 20 years considerable advancements have been made in forensic science as an investigative and intelligence tool for police officers in criminal cases. These advances have changed the way police services around the world have conducted criminal investigations from murder cases to computer crime. Advancements in the methods of identifying biological material (e.g. DNA profiling) found at crime scenes have, in particular and especially, increased the possibility of linking persons of interest to the scene as well as removing the innocent from ongoing investigation. The increased ability to store DNA results and samples prompted many countries to construct national DNA databases, where the DNA profiles of convicted offenders are stored and may be searched at a later date. In an evaluation of the performance of the English DNA database between April 1995 and October 1998, Werrett and Sparkes\(^15\) found that the number of matches was between 300 and 500 per week. These included 28,128 matches of suspect to crime scene, and 5936 crime scene to crime scene matches. Their evaluation highlighted the effectiveness of biological forensic evidence as a powerful investigative tool for police services in Britain (refer also to Ref. 50, p 52). The results of more recent analyses are equivocal with some confirming the positive impact of DNA evidence\(^16\) while others are less positive\(^18\). Annual reports from the UK's Forensic Science Service are typically more positive; for example in 2003–2004 the report stated that 'a burglary reduction initiative within the West Midlands saw crimes reduce by 10% compared to a national increase of 1%'\(^17\). In 2005, Bradbury and Feist conducted a comprehensive
review of published research; one of their conclusions was that ‘In the UK, it is estimated that, for directly detected volume crimes, the main evidence securing the detection was forensic in more than one quarter of cases’\textsuperscript{17}. On the other hand, Briody and Prenzler analysed the impact of DNA on burglary convictions in Britain\textsuperscript{18}. They tested the hypothesis that criminal DNA databases can reduce the level of volume crimes such as burglaries by measuring the number of matches that led to convictions compared with the number of reported crimes. They found that ‘the average conviction rate achieved from reported burglaries was close to one percent’ and concluded that ‘the effects of the UK database on convictions for volume crime . . . were likely to be minimal’\textsuperscript{18}. Nevertheless, there is a clear trend towards an increased reliance on DNA testing within criminal justice\textsuperscript{19}. Development in forensic technologies, techniques and the ability to store digital data in databases, which allow investigators to cross-match samples in ways once not possible, have redefined what can now be considered material facts. Thus, developments in forensic techniques and technologies have implications that go beyond the scientific methodologies and analytical procedures practised in forensic laboratories. Many of these developments are directly related to the role of the police in the identification and evaluation of the crime scene, the protection of the crime scene and any subsequent involvement of forensic evidence in the criminal investigation. Innes and Clarke noted recently that recovering, processing and interpreting physical evidence routinely constitutes a significant part of the work carried out during a major crime investigation, work that is strongly supported in the United Kingdom by a rhetoric of ‘scientific policing’\textsuperscript{20}.

Police have a long history of involvement in forensic science. However, to date, most of the national and international research has focused on scientific practices rather than on the use of forensic science in the criminal investigative process\textsuperscript{20–23}. In fact, current knowledge regarding the application of forensic science, particularly its effectiveness in criminal investigations and judicial outcomes, is limited.

This state of affairs provided the impetus for a recent review of the field of forensic science by the National Academy of Science (NAS)\textsuperscript{24} and for a forthcoming review on the status of research and development in forensic science to be undertaken in the United Kingdom\textsuperscript{25}. The NAS report on the state of forensic science in the United States was highly critical of the strength of the science that supports forensic methods and practices (with the exception of DNA profiling). The authors of the NAS report made a number of recommendations including the need to conduct more research on the accuracy, reliability and validity of forensic methods and on the impact of context bias\textsuperscript{24}. At the same time, recent reports have highlighted the need for further social science research into the nexus between policing and forensic science in order to improve the effectiveness of policing\textsuperscript{9,26}. There have been some inroads into this space in recent years\textsuperscript{27–29} including studies that focus on return on investment (ROI) and cost-benefit analyses as decision-making tools for managers of forensic laboratories\textsuperscript{30–33}. In a recent paper, Wilson et al. summarised the findings from a Campbell Collaboration systematic review of field studies on the effectiveness of DNA testing\textsuperscript{7}. (Campbell Collaboration reviews are transparent comprehensive evaluations and summaries of the best available research on a specific question. Campbell reviews avoid bias by including unpublished literature, are international in scope, and with all coding of studies undergoing rigorous cross-coder reliability analyses.) Included in the review was
a study that had examined the impact of a DNA database on rates at which crimes are cleared and/or offenders prosecuted and convicted in the context of prison inmates in NSW\textsuperscript{4}, studies of the effect of DNA on case outcomes\textsuperscript{34,35} and an evaluation of DNA use in burglary investigations\textsuperscript{30}. In the context of this paper, it is important to note Wilson et al.’s conclusion that:

The findings (of the systematic review) generally support the value of DNA testing for police investigations, particularly for high volume crimes such as burglary, although most of the empirical evidence is methodologically weak. Additional work is needed, not only with respect to DNA testing but other forensic methods as well\textsuperscript{7}.

In short, to a large extent, the policing and forensic services community has been ‘flying blind’ in terms of the true impact of its work. The time saved in an investigation by information and intelligence provided by forensic examination and/or analyses is not known. Investments of government funds are based on the best sources of information known at the time and are often based on the number of analyses that will or can be performed rather than on the maximum effectiveness and efficiencies of the various forensic science disciplines. Such analyses are severely limited by the existing lack of standardization in the collection of data across forensic laboratories – a matter that is currently being addressed in Australia by a National Institute of Forensic Science project (the End-to End Volume Crime Identification Process)\textsuperscript{36}. With the onset of new technologies and the time and cost involved in their implementation it is important that the best strategic decisions are made. The questions of how effective one methodological approach is over another or the synergistic effects of combined methodologies have yet to be answered. Investment in infrastructure, personnel and future research into new techniques can be more effectively allocated if the value it will obtain can be predicted. With the emergence of more proactive forensic science techniques and the application of intelligence databases and data-mining tools, the speed of decision-making will increase and so too will rapid changes in the demand for certain types of forensic analyses. Research on new tools and technologies applied to forensic science have to be more focused on highlighting the value that different disciplines within the forensic sciences can provide. Police agencies need to know that they are providing the right level of forensic services and the most effective mix of such services.

Given the current pace of research and development, the impact of forensic science use in crime investigation and upon criminal justice outcomes, which is already significant, promises to grow even more significantly in the near future. However, the optimal realisation of that potential requires a level of knowledge and understanding about the nature of the interface between forensic science and police work that we do not at present possess. The project described in the next section of this paper aims to make progress towards addressing this gap.

Overview of the effectiveness project and data collection to date

‘The Effectiveness of Forensic Science in the Criminal Justice System’ is a five-year Australian Research Council (ARC) Linkage Project examining the value of forensic science in criminal investigations and court outcomes. This project brings together, possibly for the first time in Australia, a multi-disciplinary approach involving social scientists, law and economic researchers, state and federal police agencies, forensic
science practitioners, forensic researchers and intelligence experts from both Australian and international universities (please refer to the author’s notes for an overview of the research team, industry partners and universities involved). This project does not aim to assess the reliability or validity of the science itself (i.e. test and retest of analytical techniques) but rather to explore how people within the criminal justice system use forensic services and whether these services are used as effectively as possible. At this stage, this emphasis on how people use science is focused on law enforcement personnel, forensic laboratory personnel and criminal lawyers. We acknowledge that forensic science has a much broader role in securing justice; for example, it plays a significant role in coronial inquests into accidental deaths and suicides, in disaster victim identification (DVI) and in monitoring border security. Our future research objectives are to explore more widely the relationships between the forensic sciences and justice outcomes.

The current project involves a comprehensive analysis of the role of forensic science in the criminal justice system that focuses on processes and outcomes from the crime scene through to the courts, as illustrated in Figure 1.

**The aims and data collection to date**

The project has four primary aims. Each of these will be discussed in turn. We commenced data collection in 2010 and under each of the aims we outline what data collection has been undertaken to date and where available we will discuss some of our preliminary findings.

**Aim 1:** To identify the processes involved in police investigations and court trials and to investigate the phases in which forensic science is typically employed (specifically to identify the objective and subjective factors that impact upon the effective use of forensic science).

Due to time/resource constraints we are not able to explore the complete range of criminal matters and have limited our investigations to a selection of serious (i.e. homicide, serious arson) and volume crimes. We selected homicide matters because our industry partners stated that these investigations are costly and resource intensive, requiring a range of specialist personnel (e.g., ballistics, fingerprints, hair and fibres) to attend most scenes and with a larger number of specimens examined by different disciplines. It is crucial that in investigations that are resource intensive these forensic resources be used as effectively as possible. Additionally, we selected serious arson matters because of a unique situation where one police jurisdiction has a specialist arson investigation team (the same personnel attend the scene, collect traces, analyse samples and present their evidence in court) compared with the other jurisdiction where different stages of the arson investigation are carried out by

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**Figure 1.** Conceptual model for the effectiveness of forensic science project.
separate personnel and separate departments. This comparison will allow us to explore the benefits or pitfalls of a single ‘crime scene to court’ forensic team compared with a segmented approach.

Two different types of qualitative methods will be used in Aim 1. Work practices and patterns of collaborations between personnel that assist or hinder investigations (from the crime scene, through the investigation to preparation for court) will be explored through in-depth interviews and focus groups. Written communication will be explored through analysing the content and structure of the text of selected reports found in investigation case files.

We commenced the data collection by exploring the attributes of good crime scene examiners. If forensic science information is to add value to criminal investigations that ultimately result in accurate justice outcomes then the information used must be of high-quality. It follows therefore that the first critical point for using forensic science effectively is for crime scenes to be processed effectively and professionally. Our research question was:

If collecting high quality samples/traces from a crime scene is so vital, what are the skills and attributes needed to be an effective crime scene examiner/officer (CSE/O)?

To date, we have interviewed 46 senior detectives, specialist CSE/O educators (forensic science academics), and senior police with direct CSE/O managerial and supervisory responsibilities from a number of Australian police jurisdictions. During interviews or focus groups we asked CSE/Os or their colleagues to consider the skills of the most competent CSE/Os compared with less proficient peers in terms of work ethic, problem-solving, team-work, communication and ability to collect quality evidence. Our preliminary findings have identified a set of seven critical skill sets that a proficient CSE/O possesses. These are: knowledge base, experience, work orientation, approach to life, communication, professional demeanour and cognitive abilities. We will continue this component of the project in 2011 and publish our findings.

In late 2010, we began to map out the critical points for the use of forensic services in Australian homicide investigations. We identified the key personnel typically involved at each of the critical points. During 2011, the critical points in serious arson investigations will be identified. Following this mapping, a series of in-depth interviews with key personnel experienced in homicide and/or serious arson investigations will commence. The aim of these interviews is to identify the decisions people make in relation to the use of forensic science and what types of work procedures hinder or enhance the effective use of forensic science in homicide and serious arson cases. Pivotal to this study will be in-depth discussions with all the key personnel involved in using and delivering forensic services; for example, forensic biologists, forensic chemists, fingerprint experts, ballistics experts, crime scene examiners, police investigators, DPP and defence lawyers, and judges.

Lastly, we have also started to explore the role that lawyers play in appropriately presenting a selected range of forensic evidence (such as DNA) in criminal trials. Specifically, we are examining the current legal provisions and practice directions for lawyers presenting forensic evidence in criminal trials in Victoria and in the ACT. Further, we aim to identify where lawyers gain their knowledge about forensic science and forensic evidence. Finally, similar to crime scene examiners, we will explore the attributes of a good lawyer with respect to forensic evidence and
questioning expert witnesses (such as DNA biologists). Interviews with legal practitioners will take place during 2011 and 2012.

**Aim 2**: To quantify the outcomes of police investigations and court trials that have utilised forensic services.

The aim is to conduct a quantitative evaluation of the impact of forensic services on the criminal justice system by exploring the relationships between the results of forensic examinations, the outcomes of police investigations and the findings of any associated court processes. Statistical analyses will be applied to test any relationships empirically. For instance, to determine whether there are any statistically significant relationships between the results of forensic examinations (i.e. whether the results link suspects or not) and: (i) the frequency that police investigations result in suspects being charged; (ii) the types of pleas that are entered by the accused parties; and (iii) the frequency that accused parties are found by the courts to be innocent or guilty.

Forensic science is an integral part of the criminal justice system through the application of science to the available physical evidence in order to reach just outcomes in relation to criminal incidents. It follows that if forensic science is being used effectively, the results of forensic examinations should be influencing the outcomes of investigations and court trials. Correlation of the results of forensic examinations with policing and court outcomes could therefore be used as an indicator of whether forensic services are being influential in the criminal justice system.

A pilot study was conducted ahead of this project in which a model database was developed that linked the results of forensic examinations with the outcomes of the related police investigations and court hearings. The database was used to quantify the influence of forensic examinations on police investigations and court hearings. Data were collected in relation to four different forensic disciplines: (i) drug analysis; (ii) fire investigation; (iii) handwriting examination; and (iv) chemical trace evidence (e.g. paint, glass and fibres examinations). This pilot study was able to provide a forensic services perspective in which the impact of different types of forensic science disciplines could be compared. That is, the frequency that suspects were charged, and the proportions of accused parties being determined to be guilty or innocent by the courts, were calculated for definitive, negative and inconclusive forensic results for each of the sampled forensic disciplines. (Note: forensic results were deemed to be definitive when they determined that an incident was a criminal offence or implicated the involvement of a suspect.)

The results obtained from the pilot study indicated that there was significant variation in the manner in which the different forensic disciplines impacted on the outcomes of police investigations and court trials. There was a general correlation across all four forensic disciplines between definitive forensic results, suspects being charged and defendants being found guilty. However, the degree of correlation varied and suggested that some forensic disciplines were more influential on whether charges were laid while others were more influential on the determination of guilt or innocence.

The quantitative component of Aim 2 will expand on the pilot study by covering a broader range of forensic disciplines and exploring in more detail the role that forensic results can play in exonerating the innocent, whether matters are pursued
and continue to court, or there are changes in pleas. Aim 2 will also provide a means to compare the value that different types of forensic services can add to criminal investigations and criminal trials. For example, comparisons will be made between: (i) the disciplines and analyses carried out that confirm an offence has or has not taken place (e.g. to establish whether a fire was deliberate or not, or that a powder is an illicit substance or not); (ii) the disciplines and analyses that either implicate or exonerate suspects or persons of interest from police enquiries (e.g. fingerprints, DNA, handwriting), and (iii) disciplines and analyses that establish a connection between exhibits and an offence (chemical trace – glass, paint, fibres – ballistics and gunshot residue).

It is also anticipated that this part of the project will involve a smaller qualitative phase that will be based on case file analyses and/or interviews with relevant personnel. The qualitative phase will both seek to confirm apparent trends that are evident in the database study (i.e. confirm the actual level of impact of forensic results in a sample of specific cases) and also investigate the reasons for any anomalies that are detected (e.g. cases where positive forensic reports are presented in court but ‘not guilty’ verdicts are recorded).

Aim 3: To undertake a robust economic analysis of the effectiveness of the application of a range of forensic science roles to criminal justice investigations and prosecutions, such as savings in police and court time through the provision of the most appropriate forensic evidence, or savings in police time by evidence that allows persons of interest to be removed from investigations in a timely fashion.

As the FORESIGHT project is exploring the effective allocation of resources within selected forensic laboratories in US cities and within several states across Australia, our project will focus on resource allocation in police investigations and within courts. During 2011, in consultation with the project economist and industry partners, those areas where an economic analysis of the effectiveness of forensic sciences in the criminal justice system will be most valuable will be identified and an appraisal made of the type of economic interpretation that will be most effective. In addition, the data collected in Aims 1 and 2 will determine what sort of economic analyses (e.g. cost benefit analysis) we may undertake.

Aim 4: To develop and implement an evidence-based good practice model to assist police in using forensic science effectively as an intelligence and/or evidential tool in criminal investigations.

The research team will devise a draft model for the effective use of forensic science in volume and serious crime investigations based upon data collected from Aims 1 and 2. The model will be trialled and evaluated over a six-month period in either Victoria or ACT.

Forensic Science and Intelligence

Forensic science is often seen as an applied science used in criminal investigations and criminal trials. However, as discussed earlier, forensic science can play a vital role beyond criminal trials. Relevant examples of this include the national security space and coronial inquests into accidental deaths or bushfires. Such examples must also be included when assessing the effectiveness of forensic science.
During the 1980s, Kind identified the dual role of the forensic scientist as a forensic investigator (identification of suspects and exonerations of persons of interest) and forensic evaluator (structure of evidence)\(^{40}\). Later, Barclay expressed the work of the forensic scientist as being applied in an investigative as well as in a subsequent evidential phase\(^{41}\). In the overall process, forensic science can convert physical intelligence into physical evidence, but physical information from a crime scene can also be integrated into the understanding and analysis of crime and criminal conduct generally.

Ribaux et al. have argued that forensic scientists play a third role in contributing to crime intelligence processes\(^{42}\). By collecting, processing and interpreting ‘traces’ of human activity, the forensic scientist contributes effectively to the crime intelligence process that supports decision-making within policing strategies. By processing a crime scene in a certain way, forensic scientists can assist police by providing them with intelligence formed using forensic science methods. Although often informal, this interaction exists in both directions. The forensic scientist makes decisions and applies professional judgement to situations based on information provided by detectives, intelligence analysts and other investigative professionals. The study of such ‘traces’ (including detection, collection, processing and interpretation) within an intelligence-led policing strategy (which exists in most modern policing models) is collectively known as delineating a process of forensic intelligence\(^{43}\).

In the forensic intelligence context, forensic science is applied with the primary aim of developing efficient strategies and concrete operations for disrupting criminal activity. As noted above, this contrasts with the traditional use of forensic science that is predominantly focused on court outcomes. A typical example of forensic intelligence would be information about the illicit drug trade gained through forensic examination of drug seizures using both physico-chemical testing and analytical modelling of supply networks. This information might include, for example, identifying the country of production, the size and type of the distribution network, the role of the supplier in the network and how members might be re-organised in drug networks post drug arrests.

In this context, at the start of the chain, crime scene examination is an integral, although often informal, part of the intelligence process. To overcome this lack of formalisation, Ribaux et al. propose a four-dimensional model whereby crime scene examiners assess and process their case according to strategic, crime intelligence, situational and physical dimensions\(^{43}\). This process remains largely implicit in current investigations and for this reason research is needed in this area.

Two sub-projects in forensic intelligence have recently started at the Centre for Forensic Science at the University of Technology, Sydney (these form part of the Effectiveness of Forensic Science project). One of the sub-projects, involving collaboration with the Australian Federal Police, is exploring the requirements for a more effective forensic intelligence framework program. This program aims to analyse and use illicit drug profiling data (including physical evidence from packaging). The second sub-project will investigate the extent to which traditional forensic science case data collected at the crime scene in Victoria and the ACT includes an intelligence dimension. In accordance with Ribaux et al., it is hypothesised that a more strategic use of existing forensic science case data can contribute to a stronger relationship between forensic science, crime analysis and investigation\(^{44}\). This project aims to test the four-dimensional Ribaux et al. model
Conclusion and summary

Very few would disagree that the contribution of forensic science in the criminal justice system is an important element and will remain so into the future. Nonetheless, it is desirable that each of the players within the criminal justice system has a better appreciation of when, where and why the forensic sciences become an important element. For instance, even if we accept the generic value of the forensic sciences, do we accept that there is equal value in all aspects of the forensic sciences? For example, is it worth collecting hairs from a crime scene if, as one observer stated ‘there is no question . . . that DNA is a far more robust forensic science than hair microscopy. It is speculative, actually, to suggest that hair microscopy can still play a useful role in the forensic science or criminal adjudicatory process . . .’46. Robertson and Roux have discussed the value of trace evidence and have acknowledged that there are areas of concern that need to be addressed if trace evidence examination is to have a healthy future. If it ever was acceptable in the past that simply holding a belief in the value of hair examination, or any other potential forensic evidence, was sufficient to justify its value, this will not be the case in the future. This is not to say that the authors hold the view that trace evidence, including hairs, do not have value, but that is not a universally held view by some commentators47.

The NAS report from the USA likewise raised concerns about the underlying basis in science for many of the traditional pattern-based forensic sciences, including fingerprints24. The NAS report also expressed the view that forensic science laboratories should be independent of law enforcement. So too, in the United Kingdom the government has pursued a policy of the privatisation of non-police-provided forensic science, recently announcing that by March 2012 ‘there will be no continuing state interest in a forensic provider’48. A review of research and development released in the UK also supports the view expressed in the NAS report that forensic research is underfunded and not well supported49. Hence, whilst it may be safe to assume (even in the absence of any real evidence of value) that the role of the forensic sciences will remain high, it is certainly not safe to assume delivery models will remain the same, or that all current aspects of the forensic sciences will necessarily remain at all.

The matrix that is the criminal justice system, and the part the forensic sciences contribute, is complex indeed and even in an ambitious study such as this we have had to focus on specific questions to explore. The four aims described in this paper will not be repeated here. However, broadly what we hope to do is look at the criminal justice system in a holistic way in order to try to understand where forensic science can be most effective. We intend to measure a range of outputs and to explore outcomes at all stages in the justice continuum. In particular, we will look at the much discussed role of forensic intelligence using a four-dimensional model recently developed in Europe.

The principle purpose of this paper is to bring to the attention of a broader audience this important project and, through doing so, we hope interested readers will share with us their ideas and thoughts to ensure this project delivers the best possible outcomes for the criminal justice system.
Acknowledgments and authors notes

The research team for this project include social science researchers from The Tasmanian Institute of Law Enforcement Studies (TILES) and the University of Tasmania together with forensic science researchers from University of Technology, Sydney, University of Canberra and the University of Lausanne, Switzerland.

The Tasmanian Institute of Law Enforcement Studies (TILES) is based at the University of Tasmania (UTAS). The Institute conducts high quality empirical research for police and law enforcement practitioners and agencies. Researchers at TILES aim to produce results their clients want and need. For more information visit the TILES website at http://www.utas.edu.au/tiles/.

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For further information please visit the project webpage on http://www.utas.edu.au/tiles/research_projects/forensic_science_project.html

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