

THE FORENSIC EXHIBIT.

Forensic Science
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Document Examination
Fingerprinting
Electronic Evidence
Toxicology
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Drugs
Quality Management
Innovation
Coordination
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After the Fact
Peak Body
DNA Analysis
Facial Identification
Speakers
Fire Debris and Explosives
Geological Materials
Friction Ridge
Toolmarks
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Bloodstain Pattern Analysis
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Emerging Challenges
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Promote and Facilitate Excellence in Forensic Science
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Certification
Peak Body
DNA Analysis
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Recognition
Fire Debris and Explosives
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Toolmarks
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Shining a spotlight on the work of the Australia New Zealand forensic science community

ANZPAA NIFS turns 30!



Karina Muharam

Senior Forensic Project Officer
ANZPAA NIFS

For 30 years, ANZPAA NIFS has worked closely with forensic science services to deliver high-quality and innovative products, services and advice, enhancing the capabilities, efficiency and reliability of the forensic sciences for police, justice and the community. Over the years, ANZPAA NIFS has collaborated with stakeholders and partner agencies to deliver significant projects, such as establishing Standards Australia's core forensic analysis standards.

We are delighted to announce that ANZPAA NIFS has finalised a new service level agreement (SLA) with the 18 police and government agencies represented on the Australia New Zealand Forensic Executive Committee (ANZFEC). The SLA supports the delivery of critical ongoing programs, such as a network of discipline specialist advisory groups and the Best Paper Awards.

ANZPAA NIFS projects for 2022-23 include Forensic Fundamentals, Biology Workflow Mapping and Forensic Capability Mapping projects. Please visit the ANZPAA NIFS website to learn about our three-year strategy and this year's business plan <https://www.anzpaa.org.au/forensic-science/our-work/products/publications>.

Engender Change

On 5 May 2022, ANZPAA NIFS successfully facilitated the inaugural Engender Change Symposium *Leading Through A Crisis*. Nearly 140 members from the Australia and New Zealand forensic community attended the event. ANZPAA NIFS would like to acknowledge the incredible speakers and facilitators who took time from their

busy schedules to participate in this event. The success of this event is a credit to the insightful presentations and discussions from all involved.

Workshops

ANZPAA NIFS have moved to a new hybrid face-to-face and virtual environment for cross-jurisdictional workshops. The Forensic Intelligence Specialist Advisory Group (SAG) delivered its first hybrid workshop in May 2022, developing a concept of operations for national forensic intelligence.

The Quality SAG hosted a virtual workshop series over five sessions in April and May, titled 'Bias in Forensic Science and Considerations for Quality Management'.

Key Achievements

In the last six months, ANZPAA NIFS established several new groups, including the Forensic Genealogy Community of Interest and Cannabis Technical Advisory Group. We also convened expert working groups to develop new AFSAB assessment materials. ANZPAA NIFS established an ANZFEC agency application process, resulting in \$100,000 investment in research projects. ANZFEC agency working groups developed a framework for identifying forensic capability risks and future needs, which will be piloted for firearm analysis. Similarly, a project working group developed the Standardised Consumables Pricing Arrangements framework, which will be piloted for analytical chemistry consumables.

Welcome

ANZPAA NIFS is delighted to welcome Dr. Grant Liddy as our new Director. Grant was Detective Superintendent with the Australian Federal Police (AFP) before joining the ANZPAA NIFS team and brings extensive forensic science and investigation knowledge and experience.



Finally, I would like to thank my specialist advisory group and project working group colleagues for their support and guidance since joining the NIFS team 12 months ago. I will be taking leave over the next few months; however, I look forward to re-joining the team very soon.

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News from the forensic community

Engender Change



ENGENDER CHANGE

Transforming Culture Through Leadership

Engender Change Symposium – Leading Through a Crisis

On 5 May 2022, ANZPAA NIFS were proud to facilitate the inaugural Engender Change Symposium – *Leading Through a Crisis*. The Symposium was a milestone event for the Engender Change program and sought to promote the importance of transforming diversity and inclusion culture through leadership. The Symposium highlighted the core values of the Engender Change Program with the purpose to:

Connect – Bring advocates together to learn from experiences of prominent leaders

Reflect – Provide a forum for advocates to consider their own unique situation and aspirations for the future

Empower – Be a confidence-building catalyst, enabling advocates to be more influential in the workplace.

Over 190 members of the forensic sciences community registered for the free, three-hour, virtual event. The Symposium provided attendees the opportunity to hear from a fantastic line-up of speakers, from both within ANZFEC agencies and external organisations.

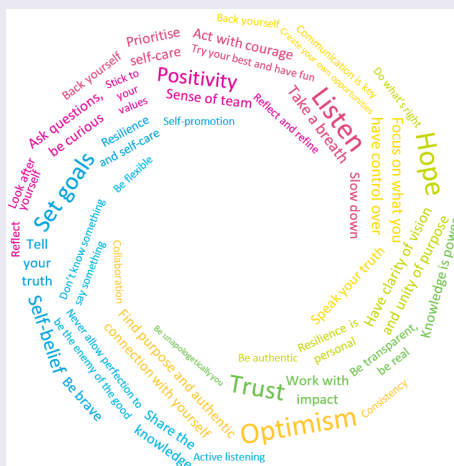
As Keynote Speaker, Deputy Commissioner Wendy Steendam, Victoria Police, provided fascinating insights into her leadership experiences as a highly respected senior executive police officer with a career spanning more than 37 years. Incorporating both operational examples and personal advice in leading through a crisis, Deputy Commissioner Steendam highlighted the value of learning from one's own experiences, and the necessity for continual reflection and flexibility as a leader.

Attendees were then provided with a professional coaching session led by Prue Gilbert and Kate Gilson from the in-demand coaching service Grace Papers. Joining the coaching session were Dr Sarah Benson PSM, Chief Forensic Scientist at the Australian Federal Police and Detective Superintendent Damian Powell, Officer in Charge, Forensic Services Branch, South Australia Police. Through the coaching session, attendees were challenged to reflect on their personal and professional strengths as leaders, and how those qualities could be utilised in rising to the challenge of leading through a crisis. It was invaluable to hear from Dr Benson and Detective Superintendent Powell throughout the coaching session, each offering examples of their own unique strengths as leaders and experiences in facing crises throughout their careers.

To conclude the Symposium, attendees heard from a diverse panel on the topic of 'Building resilience and refining your leadership style in times of crisis'. Panel moderator Dr Rebecca Kogios, Executive Director of the Victoria Police Forensic Services Department, was joined by

Amanda Lamont, who has established a career in disaster resilience and is co-founder of the Australasian Women in Emergencies Network; Andrew Colvin AO APM, former Australian Federal Police Commissioner; and Sarah Crawford, member of the NSW State Emergency (SES) senior leadership team. All panels members spoke of their personal understanding of resilience as a leader, and how they have sought to develop as leaders through a variety of challenges they have faced. In the second half of this interactive session, attendees were able to ask the panel a number of questions, gaining further insight into the different experiences of each of the panel members.

ANZPAA NIFS extends an enormous thank you to all presenters for their participation in the Symposium. It was a wonderful opportunity to listen to and learn from so many respected leaders in their fields. We thank all attendees for joining us and look forward to working with you all to transform diversity and inclusion culture in the forensic sciences community.



Engender Change Advocates

Sign up now

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News from the forensic community

Research and Innovation Roadmap

The purpose of the ANZPAA NIFS Research and Innovation Roadmap 2020-2025 is to promote the investment of funding and resources in research that is operationally relevant and of vital importance to forensic science service provision in Australia and New Zealand. ANZPAA NIFS developed the Roadmap through extensive engagement with the forensic community. It defines research areas that are important to strengthening current forensic science processes and building future capability. The figure below summarises the Roadmap research areas aligned to the ANZPAA Strategic Priorities.

Promoting Research in Forensic Science

ANZPAA Strategic Priority		Research Area	
Address Risk	→	Forensic Fundamentals	Strengthening underpinning science
		Human Factors	Improving objectivity & practice
Enhancing Practice	→	Data Sets	Developing activity level reporting
		New Tools	Automating processes & creating new capabilities
Shaping Stronger Connections	→	Forensic Intelligence	Using forensic data for broader purposes

You can find more information on the Roadmap via the following link:

<https://www.anzpaa.org.au/forensic-science/our-work/projects/research-and-innovation-project>.

2022 ANZPAA NIFS Best Paper Awards

The ANZPAA NIFS Best Paper Awards are presented yearly and recognise the contribution of members of the Australia New Zealand forensic science community in improving the forensic sciences and increasing the body of knowledge available to the forensic and wider communities.

Applications for the ANZPAA NIFS Best Paper Awards are currently being accepted via email to secretariat.nifs@anzpaa.org.au and submissions close **COB 31 August 2022**.

The entry criteria and Best Paper Award categories have recently been reviewed and updated.

For further information on the awards, entry conditions and to download the application form, please visit:

<https://www.anzpaa.org.au/forensic-science/our-work/awards/best-paper/best-paper-award>

Recognition of Roslyn Wilson on her retirement



▲ NSW Forensic and Analytical Science Service Executive Director Michael Symonds presenting Roslyn Wilson with a certificate of appreciation

ANZPAA NIFS, on behalf of all Roslyn's colleagues from the Quality Specialist Advisory Group (QSAG) and the former SMANZFL Quality Managers Forum, would like to thank Roslyn, for her contributions and engagement with ANZPAA NIFS and the groups over several years.

Roslyn brought a wealth of experience and knowledge to the QSAG and NIFS have been able to successfully deliver our work program for ANZFEC because of the assistance and contribution from SAG members such as Roslyn.

A recent example of a project Roslyn contributed to was the Double Blind System Testing project, where Roslyn assisted to develop a model framework for forensic science laboratories. Roslyn also took a lead role in the QSAG working group, developing the 'Framework for discipline specific good practice guidelines', which was distributed to all the SAGs. The Framework recently became a useful reference for the Face SAG, which is a discipline that is growing its science and the quality framework to support their work.

Thank you again Roslyn for your contributions, we celebrate and recognise your achievements, and most importantly, wish you a very happy retirement.

Congratulations on a great career in the forensic sciences and all the best for the future.

The Forensic Exhibit.

News from the forensic community

Workshop: Disaster Victim Identification Commanders Course

A/Superintendent Rod Anderson
APM (ACT Policing)
ADVIC Chair

The ANZPAA Disaster Victim Identification Committee (ADVIC) 2022 DVI Commanders Workshop was held in Adelaide from 27-29 April. The last time a DVI Commanders workshop was held was in 2018.

The venue for the workshop was the Fenwick Function Centre in the offices of the South Australian Police Association, Adelaide.

The theme for the workshop was:

- *To enhance the regional Disaster Victim Identification capacity, through the collaborative development of adaptive procedures and protocols.*

Each State and Territory was represented together with International representation from New Zealand, Singapore and Abu Dhabi, as well as a number of specialists from forensic disciplines.

The workshop was opened by the SAPOL Commissioner of Police Grant Stevens APM.

There was a combination of presentations, in the form of case studies, as well as syndicate exercises and discussions on key strategic command issues.

Workshop participants were divided into syndicate groups that consisted of a combination of police and forensic specialists. The mentor for each syndicate had experience in DVI command.

Auckland, Sydney, Brisbane, Darwin, and Adelaide were chosen as locations for the hypothetical scenarios. The events at each of these locations occurred at the same time.

Participants were provided with a workbook that contained the general idea which was 'terrorist' based and required consideration from the perspective as the DVI Commander. Participants were then provided with special ideas unique to their scenarios for consideration and discussion by the syndicate.



After discussion each syndicate responded through a group spokesperson on the issues identified as per the tasks that were allocated to their respective syndicate.

Six International members in total attended the workshop – from New Zealand, Abu Dhabi and Singapore.

Catering for the exercise was provided in house by the Police Club.

A significant amount of planning and development by many individuals went into the coordination of this workshop, particularly when you consider the variety of jurisdictions and agencies represented and the coordination required. This multi-jurisdictional, multi-agency approach brings great opportunities for learning and networking with others.



▲ South Australia Police Commissioner Grant Stevens APM presents D/Insp Simon Palmer (QPS) with a plaque in appreciation for his service as ADVIC Chair

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Policing Advisory Agency

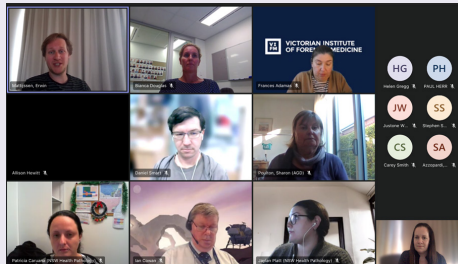


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News from the forensic community

Workshop: Bias in Forensic Science and Considerations for Quality Management

Anna Heavey
PathWest Laboratory Medicine
WA
Quality SAG Chair



▲ Quality SAG participants in the 2022 workshop series "Bias in Forensic Science and Considerations for Quality Management".

The interest in human factors and the implications they hold for forensic science has increased significantly in recent years, and the risks that factors such as contextual and cognitive bias pose to impartial and transparent decision-making is an area of concern across the field of forensic science.

The Quality Specialist Advisory Group (QSAG) hosted a Virtual Workshop series over five sessions from 27 April to 10 May to provide an overview of the fundamental psychological principles of decision-making, how these influence forensic expertise and how agencies may be able to implement practical solutions into risk-aware operational management systems.

The workshop series, Bias in Forensic Science and Considerations for Quality Management, was attended by more than 60 participants representing all ANZFEC agencies. The series consisted of presentations from experts from the fields of human perceptual expertise, cognitive science and research into operational forensic science bias mitigation.

Dr Matthew Thompson (Murdoch University) kicked off the series with a session on "Cognitive Science for Forensic Scientists" demonstrating how our expectations shape our perception of the world, and how the majority of our decisions are made using mental shortcuts based on experience and context ("System 1" processes). This is in contrast to the ideal conditions where

important judgements and thinking should occur, for example in the interpretation of analytical forensic results, which is deliberate, effortful and slow ("System 2" processes).

As our expertise as forensic practitioners grows, our familiarity with the task at hand grows with it making the interpretive process easier and more of a "System 1" thinking. While this makes us more efficient at our jobs, it may also increase our risk of overlooking critical contextual information that could influence how that result could be interpreted. This was followed by an introduction to the concept of "Bias" and the different forms that may take in forensic casework, for example Confirmation Bias (noticing things that confirm our belief and not noticing things that disconfirm them), the Availability Heuristic (the number of instances that come to mind of that particular category), and Priming (exposure to a stimulus influencing subsequent judgements).

Associate Professor Kristy Martire (University of New South Wales) continued the series with a session looking at how particular human factors can affect our roles as forensic practitioners, and how an understanding of these internal cognitive functions may help us to develop strategies to improve our analytical processes and safeguard against the influence of biases. The issues discussed included the unreliability of human memory, how expertise is domain- and task-specific (and not necessarily correlated with length of experience) and how confidence is a poor predictor of accuracy (and the danger of confidence "hardening" over time). Many of the points raised touched on the importance of robust and well-designed training and competency assessment to ensure practitioners are receiving accurate and timely feedback on their performance, not only during training but as an ongoing tool for learning and improvement for experienced practitioners.

The presentations concluded with Dr Erwin Mattijssen (Netherlands Forensic Institute (NFI)) who discussed a variety of contextual information management approaches that have been trialled in the area of firearms examination at NFI

including linear sequential unmasking, management of case information available to the examiner (e.g., removing task irrelevant information from the request form) and minimising bias during peer review. The presentation outlined how a consistent method for the removal of task irrelevant information from the examination requests was developed at NFI, along with results of studies conducted on peer review processes demonstrating the bias effects common to these processes, such as Anchoring Bias, Confirmation Bias and Status Bias.

Associate Professor Martire and Dr Mattijssen joined us again for two small group sessions where we discussed our learnings from the presentations and explored how these challenges might be met in the context of Australian and New Zealand forensic science service provision. These sessions identified several areas for potential collaboration to better equip and inform our agencies in developing robust and appropriate strategies to minimise the influence of bias in forensic casework.

The QSAG would like to thank ANZFEC for their approval to hold this workshop, the presenters for generously providing their time and expertise, and the ANZPAA NIFS team for their expert coordination of the event.

Further reading

Edmond et al., 2017, Thinking Forensics: Cognitive science for forensic practitioners, Science & Justice 57(2) 144-154 (<https://doi.org/10.1016/j.scijus.2016.11.005>)

Mattijssen et al., 2016, Implementing context information management in forensic casework: Minimizing contextual bias in firearms examination, Science & Justice 56(2) 113-122 (<https://doi.org/10.1016/j.scijus.2015.11.004>)

Mattijssen et al., 2020, Cognitive biases in the peer review of bullet and cartridge case comparison casework: A field study, Science & Justice 60(4) 337-346 (<https://doi.org/10.1016/j.scijus.2020.01.005>)

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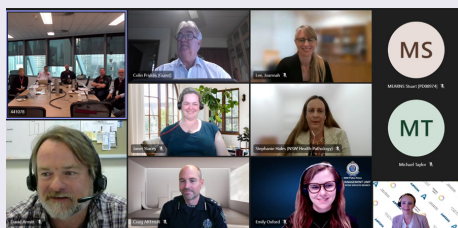
News from the forensic community

Workshop: Forensic Intelligence (FORINT) Specialist Advisory Group: Outlook

Dr Michael Taylor¹ and
Matthew Osborn²

¹ Forensics Command, Operational Science
and Technology, Australian Federal Police

² Forensic Science Service Tasmania,
Department of Police, Fire and Emergency
Management



▲ FORINT SAG participants in the 2022 hybrid workshop for "Development of a Concept of Operations for National FORINT".

Forming a FORINT Specialist Advisory Group:

In 2020, a community of interest (COI) was formed comprising members from Australian State and Territory and New Zealand law enforcement agencies and forensic laboratories, the Australian Criminal Intelligence Commission, Australian Defence Force and Defence Science and Technology Group, and chaired by the Australian Federal Police.

This COI was established under the auspices of the Australia New Zealand Policing Advisory Agency National Institute of Forensic Science (ANZPAA NIFS) with the endorsement of the Australia New Zealand Forensic Executive Committee (ANZFEC) to further Forensic Intelligence (FORINT) within Australia & New Zealand (ANZ). The principal roles of the COI included:

- Promotion of national/international collaboration, doctrinal consistency and inter-operability;
- Identifying and addressing capability gaps, emerging issues and risks;
- Informing best practice with respect to systems development and data management;
- Identifying research opportunities;
- Encouraging intelligence and information sharing;
- Determining strategic opportunities

such as policy or legislative reform; and

- Supporting cross-jurisdictional targeting (including prevention/disruption) of criminal entities.

The success of the COI in progressing these goals led to the formal establishment, in October 2021, of a FORINT Specialist Advisory Group (SAG) under ANZPAA NIFS. This reflects the wide acknowledgement of FORINT as core to the future of Forensics in ANZ as well as the unanimity of executive support for this mission.

Defining FORINT:

One of the foremost objectives of the SAG was to disambiguate the terminology associated with FORINT and provide foundational clarity. The consensus view is that "*Forensic intelligence (FORINT) is intelligence derived from technical and forensic information and expertise*". Intelligence as a process involves planning, information collection and collation, analysis and dissemination; as an output intelligence is a product derived from adding value to information, to provide insight and influence decision making. Interested readers are referred to the Forensic Intelligence Lexicon for more information.¹

Of particular importance was clarifying that forensic findings (regardless of confidence level or likelihood ratio) constitute information (cf. intelligence) that becomes the source for the FORINT capability, which generates outputs through the intelligence cycle. The SAG is keen to cement the view that FORINT is not a lower standard of evidence, nor something simply produced promptly or without full review, nor something 'not intended for court' (though such information may contribute to FORINT assessments). FORINT outputs postulate insightful propositions typically at the offence/activity level, supported by premises derived from forensic/technical (and other) information.

¹ Forensic Intelligence Lexicon (2022) Forensic Intelligence Specialist Advisory Group, National Institute of Forensic Science, Australia New Zealand Policing Advisory Agency (ANZPAA). Available via <https://www.anzpaa.org.au/ArticleDocuments/1705/Forensic%20Intelligence%20Lexicon%202022%20v1.PDF.aspx> (accessed May 2022).

The way forward:

In mid-May 2022, the FORINT SAG held its first formal workshop, entitled Development of a Concept of Operations for National FORINT. This was a hybrid meeting with participants face-to-face in Melbourne as well as online around ANZ in break-out groups. The workshop involved significant self-reflection on our environment and operating conditions, so as to clearly articulate the present state in our respective agencies with regard to FORINT. This revealed significant variation in the nature and extent of FORINT implementation between agencies.

We were also blue-sky in formulating the desired end-state of FORINT as a concept and capability across ANZ. Positively, all participants shared this vision, such that we can set clear goals at a cross-jurisdictional level.

In analysing the current and desired states, several core lines of effort (LOEs) were distilled:

1. Promoting awareness & consistency
2. Shaping the workforce
3. Developing info management frameworks
4. Guiding operational implementation

Numerous objectives were identified that align to these LOEs. These objectives will inform SAG action items to progress FORINT throughout ANZ. More detail of the concept of operations will be provided in a subsequent publication not only to provide an understanding of the outlook for FORINT in ANZ, but to encourage engagement and collaboration with academia and industry.

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News from the forensic community

Development and validation of a fast and sensitive LC–MS–MS method for the screening of 111 compounds in forensic samples

**Forough Bahadory¹,
Brett Fletcher¹, Ralph Moore²,
Jared Brown², and
Santiago Vazquez¹**

¹ NSW Health Pathology, Forensic and Analytical Science Service, Lidcombe, NSW, Australia

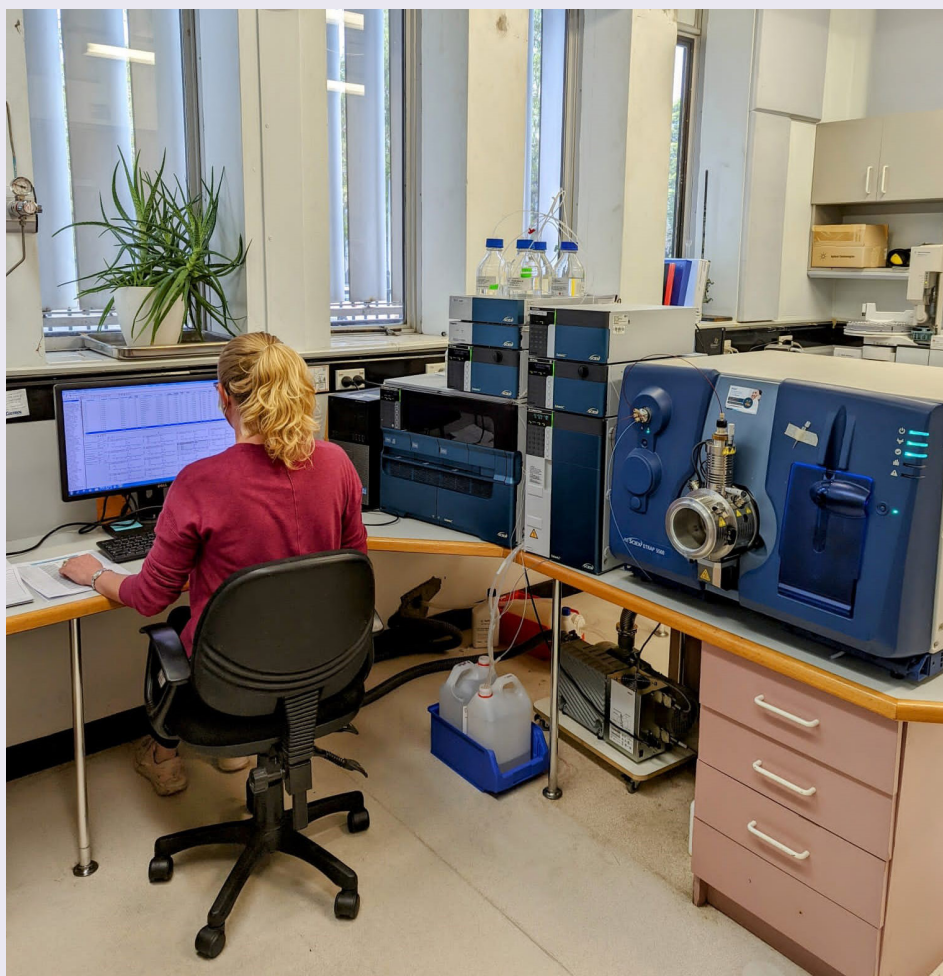
² Centre for Alcohol and Other Drugs, NSW Ministry of Health, St Leonards, NSW, Australia

The Drug and Driving Toxicology laboratory at the Forensic & Analytical Science Service routinely analyses blood, oral fluid and urine for the presence of drugs, alcohol or medications in driving under the influence, sexual assault, and acute intoxication cases. For nearly ten years, the laboratory has been reliably using a liquid chromatography tandem mass spectrometry (LC–MS/MS) based method to perform analysis in the mentioned forensic cases. This method, however, was not without its challenges, turnaround times (TAT) were long, pre-analytical sample preparation steps were complex and significant staff resources were required to perform the assay. Further, external factors such as rapidly rising case numbers and variety of drugs of interest created a crucial need for the development of an efficient method covering a wider range of compounds.

To achieve our goal we aimed to develop and validate a sensitive, simple, and efficient liquid chromatography tandem mass spectrometry (LC–MS–MS) forensic method for the detection of an expanded range of drugs in both blood and urine samples. The method was made more efficient by making a number of key method changes including: simplifying the original pre-analytical sample preparation by changing from a liquid-liquid extraction to a protein precipitation procedure; use of high efficiency room temperature enzymatic hydrolysis with a short incubation period (went from overnight incubation to a few minutes); and decreasing the instrument analysis time by half to less than thirteen minutes. The number of drugs detected in the original method was also expanded to 111 following consultations with stakeholder pharmacologists.

Importantly, the major kavalactones present in kava were included in the list. Kava is a traditional pacific beverage made from the root or stem of a plant called Piper Methysticum, and it has been used for its sedative properties reducing anxiety and fatigue. Their inclusion in the new method was in response to federal legislative changes, beginning 1 December 2021, allowing for the commercial importation of kava into Australia. Kava is listed in the Australian Standard Classification of Drugs of Concern. Further, literature indicates that it can impair driving and that excessive consumption may lead to adverse health effects.

To our knowledge this is a novel LC–MS/MS method that screens for kavalactones as well as other drugs concurrently in a forensic setting. The new method has a significantly shorter TAT, is less labour intensive and is safer for staff as it utilises non-hazardous chemicals in pre-analytical sample preparation and involves less manual handling. The method is NATA-accredited and is in active use.



▲ At drugs and driving toxicology, an LC–MS/MS instrument (SCIEX QTRAP-5500) is utilised to analyse samples for the presence of drugs in forensic cases.

The Forensic Exhibit.

News from the forensic community

SorTR: an automated system for the allele calling and re-work of single source DNA samples

Anna Lemalu, Maria van der Salm & Janet Stacey
Institute of Environmental Science and Research

Single source DNA samples collected from known individuals are routinely used in Forensic Biology laboratories to obtain DNA profiles for comparison purposes in criminal investigations. This profiling is vital in determining if the DNA obtained from the samples taken at crime scenes could have originated from the people that the reference samples have been taken from. The analysis and downstream processing of these samples is a lengthy, time-consuming process; largely based on predefined guidelines and thresholds. Currently at the Institute of Environmental Science and Research (ESR), the analysis of the average-sized batch of single source samples (60 profiles) takes three different analysts up to an hour each per day. This process involves independent analysis by two different analysts using GeneMapper® ID-X, as well as a third analyst who compares the results, identifies the profiles suitable for loading to the DNA Databank, and actions the appropriate rework strategies for profiles that require additional work.

ESR has actively been developing its data science capability through upskilling and accelerator programs for its scientists. Through these programs, scientists seek out practical use cases to apply these skills and techniques to advance their applied skills and enhance current operations.

In an effort to reduce the time taken for these processes, we have created SorTR - an automated workflow which involves two different machine learning based classifiers for the analysis and processing of Databank and reference profiles. SorTR aims to eliminate the need for one of the analysts previously required and reduce the overall processing time.

This system has been divided into two functionalities and proposes improved efficiencies to the current analysis workflow in the Forensic Biology team at ESR, by automating certain tasks

and introducing classifiers. The two functionalities are:

1. *SorTR 1: automates the analysis of profiles, including re-labelling and deletion of artefactual peaks as appropriate.*
2. *SorTR 2: automates the downstream processing of analysed profiles; including the assessment of profile quality, producing documentation required for the entry of profiles into the Databank, and prediction of a rework strategy for failed profiles.*

The workflow prototype has shown potential in reducing the processing time of single source DNA samples from three hours to less than an hour. This will provide a huge increase in efficiency and it is the intention that SorTR will be able to analyse input files from a number of commercially available DNA analysis software programs.

Machine Learning Based Classifiers

Classifiers are a type of machine learning algorithm that have the ability to assign a class label or category to input data. Classifiers are a form of supervised learning, where the algorithm learns using a ground-truth label that has been assigned to the input data. Classifiers utilise this training data to understand how values in a set of given variables relate to a class label.

SorTR utilises two classifiers; SorTR 1 aims to classify peaks into *allele* or *not allele* labels. SorTR 2 aims to predict the most appropriate re-work for a failed profile. The re-work labels are *re-run*, *re-sample*, and *check*. These classifiers have been trained and tested using data from previously analysed and processed DNA profiles.

SorTR 1 has shown an accuracy of 99.993% (for 75,030 total peaks), which means the classifier correctly predicted the label of a peak (*allele* or *not allele*) for 99.993% of the peaks (75,025 peaks). SorTR 2 has shown an accuracy of 100% out of 184 failed profiles.

The classifiers were then tested using data not previously used for training (426 samples). SorTR 1 showed an accuracy of 85.7%, which is comparable to a human analyst conducting the same work. SorTR 2 showed an accuracy of 97%. Testing has highlighted some areas of further work to be undertaken by the team before the system can be validated and implemented into Forensic Biology. This includes a user interface (which is currently being developed) and some improvements to the classifiers.

Overall, SorTR has shown that it can be a valuable tool for improving the efficiencies in reference sample processing. This gain in efficiency will enable scientists to dedicate more time on the more complex aspects of casework. Proving this prototype in case work will allow us to understand the potential and workflow benefits. It is anticipated that the learnings may be able to be adopted in commercially released software in the future.



▲ Maria van der Salm and Anna Lemalu



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News from the forensic community

Augmenting forensic intelligence (FORINT) with geographic profiling analysis

Dr Michael Taylor and FA Adam Marsden

**Forensics Command,
Operational Science and
Technology, Australian Federal
Police**

Background.

In 2020, the Australian Federal Police (AFP) implemented a geographic profiling analysis (GPA) capability within Forensics. This followed a validation project against known cases as well as interviews with GPA units in North America, to inform the capability design. The GPA capability was integrated into the AFP Forensic Intelligence (FORINT) unit. The reasoning behind this is straightforward: FORINT is a valuable tool for linking cases to serial offenders, and GPA is a valuable tool for informing resource deployment to target serial offenders.

What is the problem?

A small fraction of criminal offenders are responsible for a disproportionately large number of crimes. While serial homicide is thankfully relatively uncommon in Australia, serial offending such as burglary, arson, sexual violence and assault are sadly not uncommon.

What is FORINT?

Forensic intelligence is intelligence derived from technical and forensic information and expertise. Where: intelligence as a process involves planning, information collection and collation, analysis and dissemination; as an output it is a product derived from adding value to information, to provide insight and influence decision making¹. A long-established application of FORINT is convergence and targeting work, whereby physical traces (such as DNA, fingerprints, tool-marks, etc.) suggest linkages between scenes,

which provides the basis for further intelligence work to nominate a suspect. By proactively identifying crime series and targeting the prolific offenders, police resources can be more efficiently deployed to reduce the harm to the community.

What is GPA?

Case-linking can further be effected through consideration of behavioural attributes. Offenders will exhibit a modus operandi (MO) or signature² which can sometimes be very diagnostic. The spatiotemporal aspects of offending in particular offer a frame through which to analyse criminal activity. Informed collectively by such approaches as Zipf's law, rational choice, routine activity and geometry of crime, one may understand and anticipate behaviours. In particular, once a crime series is established (through FORINT), one may employ GPA to determine the offender's 'search base'. This is essentially the anchor point, from which the offender departs/returns when conducting crimes. It is often their residence, but might also be e.g. a workplace, past residence, or social location.

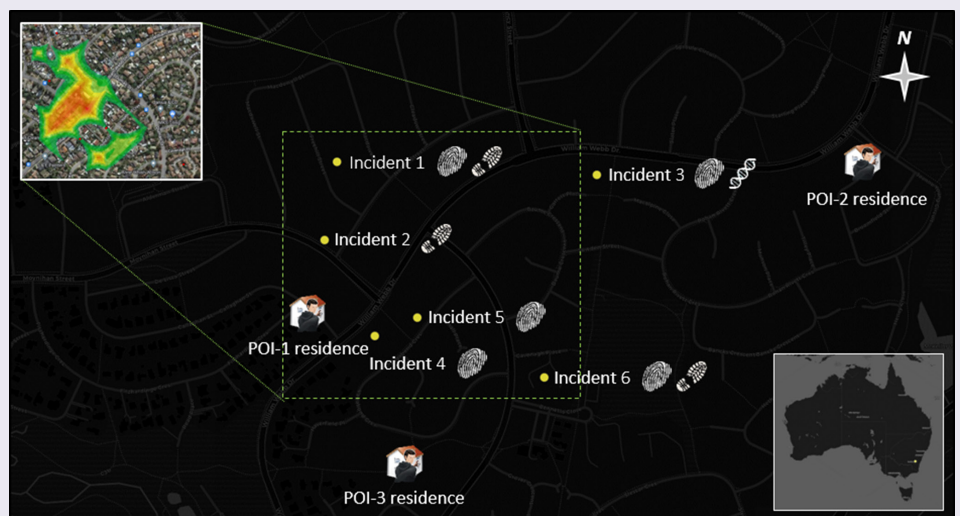
² i.e. a distinctive characteristic that is not required for the commission of the crime itself.

Example of application.

FORINT is effective at establishing a crime series. Augmenting this with GPA adds value particularly when (1) the offender is unknown, or (2) there is a known offender who can't be located, or (3) there is a long list of suspects that must be prioritised. There are various ways in which one may apply GPA to FORINT methods; for example, see **Figure 1**. In this hypothetical example, FORINT has demonstrated that six separate incidents form part of a series. There are three persons of interest with relevant MO who reside nearby; by overlaying a GPA approach, one can prioritise the targeting/investigative activities that would follow.

Want to know more?

To learn about the implementation of GPA as a new capability, and in particular as a tool to supplement FORINT in addressing serial offending, interested readers may refer to Chapters 10 and 11 respectively of the Crime Analyst's Companion (2022) Bland, Ariel and Ridgeon (Eds.) Springer, Switzerland.



▲ **Figure 1** Conceptual example showing potential application of GPA for crimes with similar MOs as well as physical traces that indicate the incidents are part of a series. Three persons of interest (POIs) known to use such an MO have nearby residences, with POI-1's residence within the peak of the geoprofile; this suggests that resources should be prioritised on POI-1 first. Other inferences may also be drawn from the spatiotemporal distribution, e.g. that the offender is likely to be a youth.

¹ Forensic Intelligence Lexicon (2022) Forensic Intelligence Specialist Advisory Group, National Institute of Forensic Science, Australia New Zealand Policing Advisory Agency (ANZPAA). Available via <https://www.anzpaa.org.au/ArticleDocuments/1705/Forensic%20Intelligence%20Lexicon%202022%20v1.PDF.aspx> (accessed May 2022).

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News from the forensic community

ANZFSS Brisbane 2022

Donna MacGregor

Forensic Services Group, Queensland Police Service

Chair of Organising Committee for ANZFSS 2022

Greetings from Queensland and the 2022 ANZFSS Organising Committee!

The 2022 ANZFSS Symposium is fast approaching. After so much uncertainty of the past few years we are almost there. The members of the organising committee are looking forward to hosting you in Brisbane in September.

The authors of the successful abstract submission have now been advised. We have to apologise for the delay in providing this advice, however, 2022 has continued to throw us curve balls that has slowed several things behind the scenes. But we are back on track and have now worked through the 480+ abstract submissions received. This number includes all the oral presentations, posters and workshops submissions.

With the help of the discipline chairs and their subcommittees, we are developing a scientific program that will have over 270 oral presentations, eight (8) workshops and 150+ posters. Not surprisingly the largest discipline representation will be biological criminalistics, followed by crime scene and illicit drugs.



For all symposium updates please see our official webpage at www.anzfss2022.com



www.facebook.com/ANZFSS2022/



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[@anzfss_2022](https://www.instagram.com/anzfss_2022)

For all enquires including sponsorship or exhibitor packages, please contact the organising committee at anzfss2022@encanta.com.au

We are refining the social events; however, we can confirm that the theme night will be held at the Queensland Museum on the Tuesday night of the symposium. The theme will be "Back to the Future." So, for all those that like to dress up start planning your costume! The symposium dinner will be held on the last night of the symposium in the Main Auditorium at Brisbane City Hall. Just a reminder that the dress code for this event is formal.

The Wellness program in partnership with Goodlife gyms is progressing well. Support from industry is also going well with a number of major sponsors coming on board to support the event. Some of the major supporters include Rolls Tech, NSW Health, Life technologies, and bdna.

The website is continually being updated as more information comes to hand. So, for all symposium updates, please see our official webpage at www.anzfss2022.com.

DFRWS APAC 2022



IAFS 2023

For any queries, please contact the IAFS 2023 Meeting Managers via iafs2023@arinex.com.au or visit www.iafs2023.com.au
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Events Calendar

2022

AUGUST

29th Congress of the International Society for Forensic Genetics (ISFG)

29 August – 2 September 2022

Washington, DC

► <http://www.isfg.org/Meeting>

SEPTEMBER

25th International Symposium of the Australian and New Zealand Forensic Science Society (ANZFSS)

11 – 15 September 2022

Brisbane, Australia

► <http://www.anzfss2022.com/>

2nd Annual DFRWS APAC 2022

28 - 30 September 2022

Adelaide, Australia

► <http://dfrws.org/conferences/dfrws-apac-2022/>

2023

NOVEMBER

23rd Triennial Meeting of the International Association of Forensic Sciences (IAFS) in conjunction with the 26th Symposium of the Australian and New Zealand Forensic Science Society (ANZFSS)

20 - 24 November 2023

Sydney, Australia

► <http://iafs2023.com.au/>

#IAFS2023

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More information

Acknowledgement of Country

ANZPAA NIFS acknowledges Aboriginal and Torres Strait Islanders are Australia's first peoples and the traditional owners and custodians of the land on which we work. ANZPAA NIFS is committed to fulfilling the principles of New Zealand's founding document The Treaty of Waitangi (Te Tiriti o Waitangi). Central to the principles is a common understanding that all parties will relate and participate with each other in good faith with mutual respect, co-operation and trust.

The Forensic Exhibit is committed to fulfilling the intent of international treaties and human rights legislation applicable to the various jurisdictions in which we operate, our obligations to Aboriginal and Torres Strait Islander peoples, and the principles of the New Zealand (Aotearoa) Treaty of Waitangi (Te Tiriti o Waitangi).

Newsletter contributions

If you would like any further information on ANZPAA NIFS or would like to contribute to the next edition of *The Forensic Exhibit* please contact ANZPAA NIFS Secretariat: secretariat.nifs@anzpaa.org.au

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