THE FORENSIC EXHIBIT.

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July 2020

Shining a spotlight on the work of the Australia New Zealand forensic science community

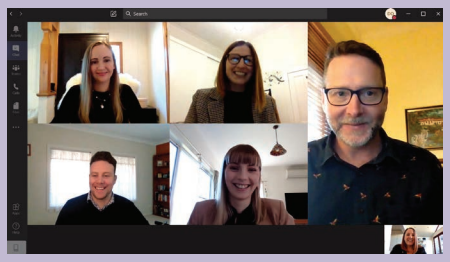
A Year to Remember

Tracie Gould,
Senior Forensic Project Officer, ANZPAA NIFS

2020 will forever be known as the year of COVID-19. The year of many lockdowns, excessive Netflix watching and the start of many cooking obsessions (did someone say sourdough). But even in the most unpleasant environments, there are some shining rays of light - these are the focus of this edition's introduction.

A virtual reality

The first half of this year has seen rapid technological advances. These advances have given us increased capacity to work from home and to stay in touch with colleagues near and far. Through video conferencing programs, ANZPAA NIFS have facilitated virtual governance (ANZFEC), Specialist Advisory Group, Technical Advisory Group, Project Working Group and other group (RIAC, AFSAB Board) meetings, as well as assessments for AFSAB. We have also had two individuals join ANZPAA NIFS virtually. While we are all enjoying the benefits of improved virtual systems in the present, it is also exciting to think of the additional opportunities these systems will provide for us into the future. We are already exploring how online platforms that have been implemented in the COVID-19 impacted environment can improve research collaboration and increase efficiencies in developing project reports with external stakeholders. While virtual platforms have aided the progression of many work items, they have also reinforced that some activities are better progressed in person. We are excited for the time when we can return to face-to-face meetings to advance these initiatives with the community. In the meantime, if you have any ideas regarding how we can facilitate work in the new environment, we would be happy to hear them!



Going from strength to strength

The ANZPAA NIFS team have been very active facilitating the exchange of COVID-19 information and learnings from our international colleagues with Australian and New Zealand agencies. We have also been busy progressing our business plan with the finalisation of a Forensic Fundamentals review of an additional three disciplines completed, a policy for Familial DNA Searching developed and a revised Research and Innovation Roadmap and RIAC Terms of Reference produced. We are also well on track to deliver the AFSAB Enhancement and Workflow Mapping – Drug Analysis projects, thanks to the continued effort of the community.

The current environment has highlighted the adaptability, flexibility and resilience of the forensic science community in Australia and New Zealand. While many industries and workforces have seen a down turn in demand, many forensic disciplines have seen a surge in requests. Cross-jurisdictional cooperation and information sharing, which was already well established, has notably increased. It has also given us pleasure to see the new communication channels used as a mechanism for people to reach out for the benefit of heath and wellbeing. Rather than limit us, the uncertain and fluid environment has improved our innovative and creative responses and opened us up to new and exciting possibilities. What an achievement! We are so proud to be a part of this community.

Sending best wishes from everyone here at the ANZPAA NIFS Team.

We look forward to seeing you in person when the time is right. Until then, feel free to get in touch with us virtually and stay safe!

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ANZPAA
Australia New Zealand Policing Advisory Agency

NIFS
National Institute of Forensic Science Australia New Zealand

Welcome
Natalie Price

Please join us in welcoming Natalie Price to the ANZPAA NIFS team. Natalie is taking on an Administration Officer role from 13 July 2020 for six months.

Natalie recently graduated from Deakin University with a Bachelor Science Forensic Science Honours (First Class). Her honours project focused on the validity of using diatoms (microscopic algae) in aquatic forensic investigations and standardising their collection from the environment. During her time at Deakin, Natalie was a student representative on the Forensic Science Advisory Board and was a member of the Deakin University Forensic Research Group. This will be Natalie's first full-time position in the forensic sciences, and she is looking forward to obtaining some real-world experience and applying some of the knowledge and skills that she obtained at University.

Natalie's focus will be progressing the administrative components of the AFSAB Enhancement project, including scanning and auditing of AFSAB files and data entry into the newly developed AFSAB Digital Management System.

Congratulations – Queen's Birthday Honours

We would like to congratulate Dr Rebecca Johnson on being appointed a Member of the Order of Australia (AM) and Professor Adrian Linacre on being awarded a Medal in the Order of Australia (OAM) on the recent Queen's Birthday 2020 Honours List.

Dr Johnson was recognised for her significant service to wildlife forensic science, having been a major contributor to developing the first complete sequence of the Koala genome and leading the first wildlife crime laboratory to gain NATA accreditation to ISO17025. Dr Johnson was also recognised for her contribution to young women scientists and was a Superstar of STEM in 2017. Dr Johnson was also immediate past President of the NSW branch of the Australia New Zealand Forensic Science Society (ANZFSS).

Professor Adrian Linacre was recognised for his service to forensic science. Prof Linacre is a strong advocator for research and innovation in forensic science, contributing extensively to the advancement of forensic science, having been recognised in national awards for research conferred by ANZPAA NIFS. Prof Linacre was President of the International Society of Forensic Genetics (ISFG) conference held in Melbourne in 2013. He is also the current President of the Australia New Zealand Forensic Science Society (ANZFSS) and is their representative on the ANZPAA NIFS Research and Innovation Advisory Committee.

Retirement

Des Carroll announced that he will be leaving his role as Director of Forensic Sciences Branch at Northern Territory Police with his last day at work being 17 July. Des made an important contribution to the advancement of forensic science across Australia and New Zealand through his role on many ANZPAA NIFS strategic and Specialist Advisory Groups (SAG), including the Biology SAG. As Director of the Forensic Science Branch, Des has been the Northern Territory Police representative on the Australia New Zealand Forensic Executive Committee (ANZFEC) from its very first meeting held in 2015. Prior to that he was a long-time member of the Senior Managers of Australia and New Zealand Forensic Laboratories. As Mentor to the ANZPAA Disaster Victim Identification Committee (ADVIC), Des supported the committee in its ongoing mission to standardise DVI practices and enhance DVI capacity. Over the years Des has hosted several cross-jurisdictional group meetings on behalf of the Northern Territory Police, including most recently ADVIC and the Toxicology Specialist Advisory Group. The ANZPAA NIFS team will miss Des's mentorship and good humour and wish him also the best for the future.

The Big Move - 311 Spencer Street, Melbourne

The new state-of-the art police precinct in Melbourne's CBD was officially opened on 25 June 2020 by Chief Commissioner Graham Ashton as his final official act.

Victoria Police have started the move across to the new building with ANZPAA NIFS expecting a move date in September or October. With the upcoming move, ANZPAA NIFS now has a new mailing address:

ANZPAA NIFS
Unit 73H
63-85 Turner Street
PORT MELBOURNE VIC 3207

Research and Innovation Roadmap

The next ANZPAA NIFS Research and Innovation Roadmap is currently being developed. The purpose of the Roadmap will be 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. The Roadmap is being developed with critical advice from the ANZPAA NIFS Research and Innovation Advisory Committee (RIAC) and will represent an agreed position on the priority areas for research that best positions forensic science for the future. The Roadmap will define research areas important to strengthening current forensic science processes and building future capability. The Roadmap is expected to be finalised over the next few months.

Under the current Roadmap 2017-20, ANZPAA NIFS provided funding support for 11 research projects. In each edition of the Forensic Exhibit we provide the forensic science community with an update on a select few projects. We thank the lead researchers for sharing their project updates in the following ANZPAA NIFS Project Support section.

ANZPAA NIFS Project Support

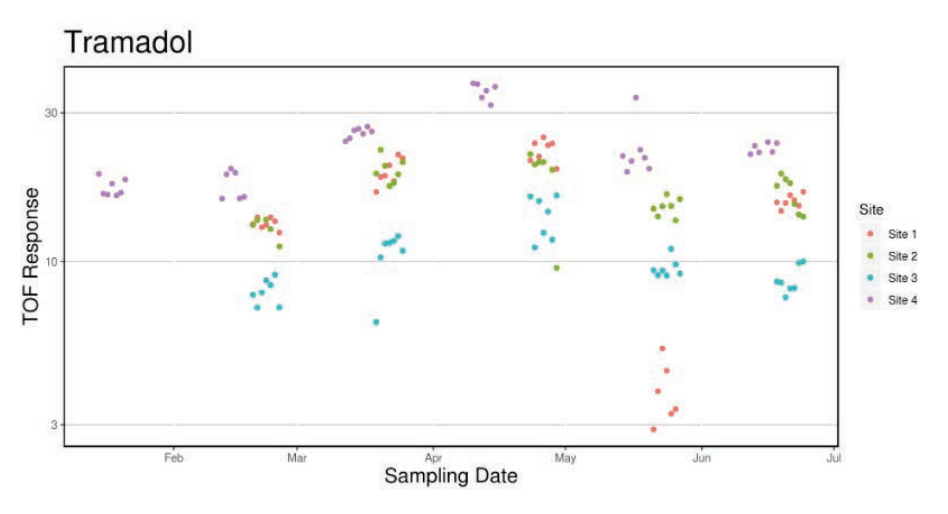
Automated Detection of Sperm Cells

Amelia Gamblin, Mark Hareb, Gemma Nancollis, and Lucy Law
Institute of Environmental Science and Research (ESR)

ESR, with the support of ANZPAA NIFS funding, has undertaken a research project to develop an automated sperm cell detection system for sexual assault cases. The aim of the project was to improve the laboratory throughput of microscope slides from medical examination kits (MEK). The project investigated opportunities to automate the images capture phase as well as develop a machine-learning tool for the detection of sperm cells.

During the project, ESR collaborated with Massey University to evaluate a prototype robotic microscope for slide image capture. Considering the high industrial standard for an automated microscope and existing patent landscape, it is a formidable path for ESR to enter a highly competitive and mature microscope field with our automated microscope prototype. Consequently, we are focusing on creating a scalable automated microscopy image analysis software, which could be potentially compatible with automated microscopes and whole slide scanners.

In the past few years, whole slide scanners have been getting more powerful and affordable. As whole slide scanners are adapted rapidly in pathology, we are exploring the feasibility of using the scanner for high volume MEK slide scanning. ESR is currently collaborating with microscope manufacturers to compare the reliability of their whole slide scanners and the image quality. The input of new slide images from the scanner providers and further training of our existing convolutional neural network are underway.



Exploring Further Value in the Wastewater Stream: a Multi-Drug Analytical Approach

Glenn Rowland
Institute of Environmental Science and Research (ESR)

ESR operates a nationwide wastewater testing programme to monitor the use of illicit drugs in wastewater (DIWW) on behalf of the NZ Police Investigations Group. The programme has expanded from an initial 38 waste water sites to 43 sites, as of mid-2019, and provides coverage of approximately 75% of the population. This monitoring programme tests for use of a defined set of illicit drugs prevalent in the community, including methamphetamine, MDMA, cocaine and fentanyl, while a parallel programme tests for cannabis use. It was recognized that many other licit drugs and pharmaceuticals were likely to be contained in the waste water that was being collected and analysed for illicit drugs and their metabolites. Funding was obtained from ANZPAA-NIFS and ESR internal sources to evaluate the utility of analytical methods that are routinely used in the ESR Forensic Toxicology laboratory for performing additional analyses on DIWW samples that were already being collected.

Samples from four sites (representing large and mid-sized urban communities distributed across New Zealand) were analysed over five months using an LC-MS/TOF (Liquid Chromatography-Time of Flight Mass Spectrometry) screening method, and the resulting data were matched against the standard Coronial database used by ESR's Forensic Toxicology group. Of the ~1500 drug compounds included in the database, approximately 70 were regularly "detected" or "probably detected". These were typically licit pharmaceuticals that are routinely prescribed and used in New Zealand, and included antidepressants, anticonvulsants, heart medication and opioid narcotics. Compounds that were included in the database but not found in wastewater were typically either novel drugs of abuse (which would be present at very low levels, if at all) and drugs which are extensively metabolized by the user prior to excretion (such as benzodiazepine sedatives). We estimate that the limit of detection for most pharmaceutical compounds using this method was on the order of 200 parts per trillion, although there was substantial variability between compounds.

The LC-MS/TOF method is not designed to provide accurate, quantitative information about the concentrations

of drugs present; that task is better performed by LC-MS/MS instruments. However – unlike LC-MS/MS testing – the strength of the MS/TOF is that the data acquired can be matched against additional databases as required, without the need to collect fresh samples or perform additional laboratory testing. Thus, the samples that were analysed as part of this study serve as a resource for future investigations or queries.

Furthermore, when averaged across a week, the levels of methamphetamine and MDMA measured using the TOF were found to be comparable to those found in the LC-MS/MS based DIWW testing. Thus, while TOF screening cannot be used as a substitute for targeted LC-MS/MS testing, there is evidence suggesting that it can still provide a broad-brush indication of the amounts of different drugs present, and especially of the relative amounts present when comparing between sites. As an example, the relative data for tramadol, a potent narcotic, is presented, showing measured levels at Site 4 being consistently higher than those at Site 3 (by 100-150%).

This study has demonstrated the viability of collecting additional information about licit drug use in communities through further analysis of the samples already collected and analysed for the National Wastewater Monitoring Programme. Future work could investigate whether these variations match differences in the prescribing rate of drugs in the communities served by these wastewater treatment plants.

ANZFSS – Forensics Intelligence

Professor Adrian Linacre OAM
(ANZFSS President)

Forensic science can play a pivotal role as an intelligence tool. Biometric information such as fingermarks, facial recognition, and DNA by directing a criminal investigation and can eliminate an individual as a person of interest.

> **"Further, it underscores how developments in forensic science can be used for beneficial purposes ..."**

Such biometric data are used for specific cases and safeguards are in place to protect personal liberty. In terms of genetic data, it is possible to extract extensive information regarding a person's appearance and ancestry – currently such applications are few and far between and only used in specific circumstances.

A very recent report from the Australian Strategic Policy Institute (APSI) highlighted what can occur if a less than benevolent authority uses these personal biometric data. The publication, called 'Genomic Surveillance' published under the auspices of the International Cyber Policy Centre, details how biometric data can be used for purposes beyond criminal investigations, but can play a much greater role in the monitoring of individuals. The reading of this report is troublesome and details the misuse of powerful biometric forensic tests with an emphasis on facial recognition and also genetic profiling.

The findings in this report detail the use, or misuse, of forensic tools which contrasts with the current situation in Australia and New Zealand. A recent case in South Australia was resolved through the use of familiar searching where Y-chromosome data were used to identify a person of interest who was subsequently found guilty of three counts of rape and one of attempted rape. This is a case that may not have been resolved in such a timely fashion without the use of these additional genetic tools. Further, it underscores how developments in forensic science can used for beneficial purposes and specifically for the reasons for which they were developed. Forensic intelligence is integral to forensic practice and by its nature can be used as a powerful means in resolving serious crimes.

ANZPAA NIFS Best Paper Award

Entries are currently open for the ANZPAA NIFS Best Paper Awards. These awards encourage 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.

Best Paper Award Categories

- **Best Paper: Forensic Fundamentals** *(New Category)*
- **Best Paper: Capability Enhancement and Innovation** *(New Category)*
- **Best New Publisher in a Refereed Journal** *(New Category)*
- **Best Technical Article or Note**
- **Best Literature Review**
- **Best Case Study**
- **The Henry Delaforce Award**

Visit http://www.anzpaa.org.au/forensic-science/our-work/awards/best-paper for further information about the awards and to download an application form. Entries close 31 August 2020.

Nominations Now Closed for the John Harber Phillips Award

ANZPAA NIFS created the John Harber Phillips Award (JHP Award) in 2009 to recognise the Honourable Professor John Harber Phillips AC QC contributions to Australian law, and in particular the field of forensic sciences.

The John Harber Phillips Award is a symbol of commitment, leadership, diligence, hard work and pioneering in forensic science. The Award recognises an individual's innovative leadership and outstanding contributions to the advancement of knowledge in the field. It is the only award in Australia and New Zealand awarded to forensic scientists that consistently strive for excellence in the profession.

The Award is peer reviewed by expert judges across the industry and carries the weight of acknowledgment by colleagues and the profession.

Applications have now closed. More information to come.

In brief:

Workflow Mapping for Drug Analysis

Update

Initial Data Collection for the Workflow Mapping Drug Analysis project has been completed and the review and statistical analysis of the data has commenced. An overarching Outcomes Report and individual Jurisdictional Reports will be developed and presented to ANZFEC in October 2020 which will conclude the project.

AFSAB Overview

Update

Australasian Forensic Science Assessment Body

AFSAB Enhancement Project

The Australasian Forensic Science Assessment Body (AFSAB) Enhancement project was established at the time of closing of the AFSAB Review Implementation project (July 2019) and is the next phase of improvements to the AFSAB framework.

An AFSAB Digital Management System is in the final stages of in-house development. Beta testing will commence by the end of July. AFSAB records are currently being scanned and the contents of these records audited.

If you are an AFSAB certified practitioner (or are involved in the training or oversight of AFSAB certified practitioners) you may be contacted shortly regarding your AFSAB certification documentation. This forms part of the auditing process. We would greatly appreciate your cooperation and assistance in providing any information requested during this audit.

Data entry will be the final stage of the digitisation process and will occur at the completion of Beta testing.

Impacts of COVID-19

Although the COVID-19 environment has had an impact on the development of new assessment components for all three disciplines, we are essentially business as normal when it comes to progressing candidates through the AFSAB assessment process. We have implemented a video conferencing system for candidates to conduct their oral assessment until face-to-face panels can be re-instated. We are also continuing to work offline to progress as many development activities as possible and are investigating new electronic alternatives to progress these project items.

AFSAB Recertifications

Due to work from home arrangements implemented in response to COVID-19, there has been a delay in the processing of AFSAB annual and five-yearly recertifications. We will be in touch with practitioners directly if we require additional information regarding your recertification and you will receive a confirmation email once your recertification has been approved.

Please be advised that applications are overdue, and any outstanding application should be forwarded to secretariat.nifs@anzpaa.org.au immediately. Relevant ANZFEC members will be notified of non-compliance.

Forensic Fundamentals -Phase 2

Update

Overview

The aim of the Forensic Fundamentals project is to identify the underpinning science and validation requirements for forensic science disciplines. This project involves conducting a gap analysis for multiple forensic science disciplines. These gap analyses will inform ongoing updates to the Research and Innovation Roadmap Annual Projects document.

Claim Assessment & Gap Analysis

The assessment of bloodstain pattern analysis, gunshot residue analysis and toxicology has been completed with the assistance of expert practitioners from each discipline. Each working group mapped the claims made within their discipline, including claims surrounding underpinning principles and expert knowledge and interpretative ability. Literature was then assessed for each claim to determine the level of empirical support that exists (assessed in accordance with the Empirical Study Guideline available on the NIFS website).

▶ *http://www.anzpaa.org.au/forensic-science/our-work/products/publications*

The final gap assessment and claim analysis will be presented to ANZFEC at the end of July for approval. Once approved these documents will be disseminated to working group members, SAGs and ANZFEC agencies, along with the collated literature review information.

In brief:

Forensic Standards Development

Update

The following ISO TC272 standards are in development:

- ISO/CD 21043:3 – Forensic Sciences – Analysis
- ISO/CD 21043:4 – Forensic Sciences – Interpretation
- ISO/CD 21043:5 – Forensic Sciences – Reporting

Country member comments for the standards have been received, however due to COVID-19, face-to-face meetings are not possible. Therefore, meetings have now been moved to the virtual environment. TC272 will be meeting once per week, for three hours each meeting, for at least 13 weeks commencing in 29 July 2020. This will unfortunately extend the duration of the project; however, the project will continue to progress with the ultimate aim of publishing the standards. Once the current round of country members comments have been resolved in the virtual meetings, the standards will be updated and sent for another round of commenting.

Standards Australia committee CH041, the mirror committee to TC272, met virtually on 16 July 2020 to discuss the country members for ISO/CD 21043:3 – Forensic Sciences – Analysis. The committee will meet again at the end of August 2020 to discuss the country member comments for ISO/CD 21043:4 – Forensic Sciences – Interpretation.

Events Calendar

2020

SEPTEMBER

ISHI: International Symposium on Human Identification

14-15 September 2020

Virtual Event

https://www.ishinews.com/

2021

AUGUST

9th European Academy of Forensic Science Conference (EAFS)

20 August – 3 September 2021

Stockholm, Sweden

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

23-28 August 2021

Washington, DC

http://www.isfg2021.org

OCTOBER

58th Annual The International Association of Forensic Toxicologists (TIAFT) Meeting

24-28 October 2021

Cape Town, South Africa

http://www.tiaft.org/tiaft-agenda.html

In the next issue:

- Updates from meetings of the ANZPAA NIFS Specialist Advisory Groups
- Ian Riebeling New Practitioner Workshop Registration Details
- COVID-19 Update
- ANZPAA NIFS Projects Update

More information:

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 Tracie Gould: tracie.gould@anzpaa.org.au

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