



Australian and New Zealand FORENSIC SCIENCE SOCIETY



August 2008
Issue 25

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NSW Branch Newsletter

NSW Branch ANZFSS Inc ABN 33-502-753-392

ANZFSS News

Well, it has been quite some time since the last instalment of our branch newsletter, and as you can imagine, a lot has changed in that time!

Late last year, Lisa decided to relinquish her role as Secretary due to her increasing study load, a decision fully supported by the Committee. We would like to thank Lisa for her contribution in this capacity and her continued support as a Committee Member. I subsequently agreed to step into the role of Secretary, however, this demanding role did not allow me time to work on the quarterly newsletter, and the correspondence was cut back to essential meeting flyers only.

The dwindling Committee also influenced our decision to hold meetings every second month in 2008 rather than monthly. In addition, the Committee has agreed that all members ratified after the AGM will not have the option of receiving correspondence by hard copy. This significantly reduces the workload on the Committee and makes our Society correspondence more convenient, timely and even eco-friendly!

Due to my added commitments, Philip kindly agreed to maintain the website, which is looking fantastic as a result of the recent attention he has afforded it. I encourage you to regularly look at the website (given below) for updates, particularly because of the issues we have been having with mail recently:

www.anzfss.org.au/nsw

In December last year, NIFS discontinued the ANZFSS email accounts without the knowledge of the ANZFSS branch (it is unclear where the breakdown in communication occurred here). Consequently we have a new email address which (after some ironing out) is as follows:

nswbranch@anzfss.org.au

As usual, our branch meetings over the past year have featured extremely interesting speakers and these reviews are presented in the remainder of the newsletter.

Continued overleaf...



ANZFSS News, continued...

The AGM was supposed to be combined with the talk at our last branch meeting, however, it was disappointing to note that we fell short of our quorum once again. In accordance with our constitution, an emergency AGM was held between members of the Committee to pass essential business relating to the Society. While Lisa Mingari, Donnah Day and Julie Sinuks retire from the Committee this year, we have the immense pleasure of welcoming back our most recent Lifetime Member Paul Donkin into the role of Secretary. Details of the AGM are given in the remainder of the newsletter.

The 2008 ANZFSS Symposium will shortly be held in Melbourne. A NSW Branch scholarship application form is available on the website. Ap-

plications must be received by the Secretary no later than 1st September to be eligible. If you have already applied for a National ANZFSS scholarship, there is no need to re-apply for the Branch scholarship as your original application will be recycled.

I hope you enjoy this much-anticipated edition of the newsletter, and would like to thank the contributors who are acknowledged throughout.

Best regards, and hope to see you at the next meeting!

Shaheen Aumeer-Donovan
Newsletter Editor



Welcome to New Society Members

The Society extends a warm welcome to our newly ratified members:



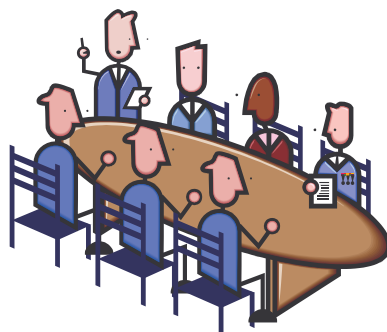
Arnulfo AQUINO
Debby ATKINSON
Jessica BERTRAND
Fatima DABLAN
Mark EDWARDS
Laura ENNIS
Shanlin FU
Toni FULLER
Jodie GREEN

Natalie HAU
Robert HEYWOOD
Peter HOLSTEIN
Jill HUMPHRIES
Karen KAVANAGH-STEER
Gregory KELLY
ShelleyAnne LAFFIN
Kym McNAMARA
Candice MOUSSA

William OWEN
Andrew PARKINSON
Julian RUSSO
Helen SALOUROS
Linda SMITH
Nikola STREIBER
Hilton SWAN
Paul WELDON

Your New Committee

At the AGM, the new NSW Branch Committee was sworn in:



President: James Wallman
Vice President: Claude Roux
Treasurer: Peter Jamieson
Secretary / Merchandise: Paul Donkin

Memberships: Aldo Severino
Public Officer: Denise Donlon
Newsletter: Shaheen Aumeer-Donovan
Website: Philip Maynard
Committee Members: Shirleyann Gibbs
Aaron Heagney
Eric Murray
Alison Sears
Meiya Sutisno



AGM - President's Report 2007

Welcome to the 37th Annual General Meeting of the NSW Branch of the Society. This is my first report to the Branch as your new President.

There is no question that 2007 was a rather mixed year for the Society, at least from an administrative perspective. To begin with, in the middle of the year, we were forced to give up our long-standing premises in the Department of Forensic Medicine. This was due to an exorbitant and unaffordable increase in the fee for the use of their facilities. We also endured some unfortunate problems with our post office box, which meant that the mail of some members was misdirected or badly delayed.

Fortunately, these troubles are now behind us, our society is thriving and we have a lot to look forward to and be excited about. For a start, we are the biggest branch in the country; our membership peaked at 203 in 2007. This number included 50 new members, 35 of whom were students. 2007 also saw the welcome induction of a new life member, Paul Donkin. There are now six Life Members in total.

As usual, 2007 had an excellent and diverse calendar of events for you, the members, to be enlightened by. I attach the list to this report for your information. Our June meeting was memorable not only because of an excellent speaker, Alison Sears, but also because of the launch, by national president Bill Crick, of a fund in memory of our past President, Allan Hodda. This fund, administered by the National Executive, will support the educational travel of one fortunate member every year. The first applications were sought late in 2007. The inaugural winner of the National Allan Hodda Travel Award is Duncan McCarthy, a fingerprint expert in the Queensland Police.

Another of the 2007 highlights was our educational event in July, 'Inside the forensic world'. While always successful, IFW takes a huge amount of time to organise. As a result, we have decided to streamline our approach to it by holding the event only every two years. The next one will therefore be in 2009. Of course, IFW was an initiative of Allan Hodda's, so we should en-

deavour to ensure that it continues as another means of perpetuating his memory.

Our end-of-year dinner was another big success. It was held at the same great location as 2006, the Courtyard by Marriott, and was addressed by forensic psychiatrist, Dr Stephen Allnutt, on the captivating topic of sexual deviancy. Dr Allnutt certainly held the audience's attention! Shaheen Aumeer-Donovan and Alison Sears did a great job of organising this dinner, and have our grateful thanks. This was also the happy occasion at which Paul Donkin was presented with a special certificate to acknowledge his long-standing contributions to the Branch and be publicly recognised as the Society's newest life member.

The NSW Branch continues to attract international speakers of high repute in the forensic sciences. In 2007 we enjoyed visits from Dr Didier Meuwly from Switzerland, speaking about biometrics (March), and one of the world's leading forensic DNA experts, Dr Peter Gill from the UK (September).

We all look forward to New South Wales hosting the 20th ANZFSS Symposium in 2010. In late 2007 a small Organising Committee, an offshoot of the Branch Executive, selected *Tour Hosts* as the organisation to help us prepare for the Symposium. We signed a contract with them in December. The dates for the conference have been set as 5-10 September, 2010. *Tour Hosts* have booked the Convention Centre at Darling Harbour and have many other important preparations, including a website, under way. More information will follow as *Tour Hosts* and the Organising Committee work hard to make the Symposium a success for all concerned. The science underpinning the Symposium should be as strong as ever. In this regard, we are very fortunate to have secured the assistance of Dr Chris Lennard, Professor of Forensic Studies at the University of Canberra, as the Chair of the Scientific Subcommittee.

In 2006 and early 2007 there was some lively debate among the branches concerning changes to the constitution of the Society being proposed by the National Executive. The changes were

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AGM - President's Report 2007, continued...

intended to streamline the Society's business, and to make the application for membership more rigorous. In May I attended a Special General Meeting of the ANZFSS in Brisbane at which these changes were voted on and subsequently passed. There is some discretion as to how these changes can be applied to the constitutions of each of the branches; fortunately there have not yet been any significant effects on our own branch.

Finally, I give my heartfelt thanks to my fellow committee members for their support during the year. It is sometimes forgotten that all us work in an entirely voluntary capacity, but we are delighted to do so. I never cease to be amazed by the hard work and dedication of my colleagues on the Committee. In particular, I thank:

- Professor Claude Roux, your Vice-President, for acting as an invaluable sounding board for me to discuss matters concerned with management of the Branch;
- Shaheen Aumeer-Donovan, your Secretary and Newsletter editor, for her super organisational skills. At this AGM Shaheen will be passing on the secretarial duties to someone else so that she can concentrate on the newsletter;
- Denise Donlon, your Public Officer, for her superior knowledge of the legal requirements to which we are bound;
- Peter Jamieson, your Treasurer, for unfailing good humour in dealing with the economic necessities

of running a society;

- Aldo Severino, your Membership Officer, for his incredible grip of his area of responsibility, and his comprehensive reports;
- Meiya Sutisno and her colleague Audrey for their help with emailing meeting notices; and
- Phil Maynard, for his splendid work with the website.

I pay special tribute to Lisa Mingari, who retired as Secretary in late 2007, to be replaced by Shaheen. Lisa's tireless efforts and good humour in a very important role were highly valued by all. She leaves the NSW Branch, and Sydney, with our best wishes for her new life in Melbourne. Two other members of the committee also leave to pursue other activities: Donnah Day and Julie Sinuks – we thank both of them very much for their varied contributions to the Branch over the considerable period of their involvement.

Your committee and I continue to work hard to promote and develop the interests of the forensic sciences in New South Wales. Thank you for your ongoing support.

James Wallman
President
 16 June 2008



REVIEW: "Forensic Imaging Technology Within NSW Police"

by Christine Golbach

ANZFSS Meeting, Wednesday 24th October 2007

Christine Golbach from the NSW Police Forensic Imaging Unit gave an excellent presentation detailing the types of technology that the Police Force use in recording crime scenes, and very kindly brought along a lot of the equipment so we could see first-hand how they are set up and how they can be used.

The NSW Police Forensic Imaging Unit is responsible for major crime in NSW and they cover the whole state. Their services include forensic surveying, computer aided drafting, interactive scene recording, COM-FIT, 3-D and 2-D anima-

tion, photography services, blood spatter, etc. Christine is a civilian who was employed for her photography skills, and she works alongside the sworn officers at the crime scene.

ISRAPS is an acronym for Interactive Scene Recording and Presentation System. This product uses digital still photography and computer software to create a virtual version of a crime scene, enabling such scenes to be 'walked through' in court. The technique essentially produces a 360° view of the scene.

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REVIEW: "Forensic Imaging Technology Within NSW Police", Continued... by Christine Golbach ANZFSS Meeting, Wednesday 24th October 2007

The Police Officers are the first on the scene, and they will direct the ISRAPS team to capture the scene. They usually come in before the fingerprint team to capture the scene raw. It is possible to incorporate SOCO photographs; however, it is difficult to do that at the moment because they are still on film. The Forensic Imaging Unit is fully digital, so the ISRAPS team may take their own photographs of the evidence to ensure that the scene recording is complete. As an aside, Christine mentioned that there is no digital security needed for the work they do – operating to procedures is enough security for this work.



Christine Golbach captivating her audience!

The most challenging aspects of the job are the climate and environmental conditions. Small spaces are the most difficult, and it is hard work carrying the equipment around!

Christine showed us the final product obtained from ISRAPS during investigation of the 2003 Waterfall train disaster. The team recorded 360° images of 49 areas. An aerial photograph is used as an overall orientation tool on which nodes representing the 49 areas can be selected. The aerial views are captured because they are easier to use than maps. The ISRAPS team is also responsible for capturing the aerial shots. Clicking on a node leads to the 360° view of that area of the scene.

Christine then showed us a mock scene in which video demonstrations are incorporated into the system.

Spheron technology has been specifically designed for crime scene recording. This technology uses a continuous digital capturing device and computer software to incorporate video, CAD plans, DNA, maps and other forms of evidence. Spheron is essentially a platform for all the evidence (including plans, 360° views and 000 calls) to be viewed in one place, although fingerprints and DNA evidence is usually not kept there. The technology has in-built measurement capabilities, however, it is not quite sophisticated enough to eliminate the need for taking measurements at the scene. It produces acceptable measurement over approximately 10 m at

the moment; however, more development is needed. The system works by taking a measured pair, for example, at the lowest and highest position of the camera. This allows the measurements to be calculated.

The choice between ISRAPS and SPHERON depends on the scene and circumstances.

COM-FIT is an acronym for Computer Facial Identification Technique and is used to create life-like composite images of the known characteristics of an individual. The result is a realistic representation of the facial characteristics described by a witness. The Queensland-based system allows the witness to choose facial features from a book of different styles. It works in black and white only so that there is no colour influence. The resulting composite is finished in Photoshop by smoothing out lines and fixing excess skin.

COM-FIT is the most recent development in the creation of images of individuals from eyewitnesses. Originally artist sketches were used, followed by IDENTIKIT, PENRY (which used clear plastic overlays), and Facial Automated Composition and Editing (FACE) system. The latter was in colour and not very life-like.

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REVIEW: "Forensic Imaging Technology Within NSW Police", Continued...

by Christine Golbach

ANZFSS Meeting, Wednesday 24th October 2007

Christine went to court with COM-FIT, which is used in conjunction with known standards of operation to protect the operators. Interestingly, the questions asked about the technique were very general, and mainly about the capabilities of Photoshop.

Crime Scene Photography is currently on film, and the methodology is to start from the outside and move inside. The photographer uses a quarter end technique for general photographs. A macro technique is used for fingerprints and footprints. The philosophy is that more photographs are better. Care is needed with perspectives, and so long, mid-range and close-up photographs are always taken. The great advantage of going digital would be the ability to review images. There is no watermarking, however, raw images with meta data are stored on a server for security purposes.

During the security for APEC, a decision was made to apply Spheron to each relevant place, therefore they bought another unit.

The future lies in interaction with national data-



Shaheen Aumeer-Donovan & Christine Golbach

bases – in Christine's opinion it should be transferred over since DNA has gone that way.

An interesting point is that the Forensic Imaging Unit does not deal with the media, and Christine comments that normally they are respectful of this.

Review by Shaheen Aumeer-Donovan

REVIEW: "Odd Sex: A Psychiatric Perspective on Sexual Deviancy"

by Dr Steven Allnut

ANZFSS Annual Dinner, Friday 23rd November 2007

Guests from a wide variety of disciplines in Forensic Science attended the ANZFSS NSW Branch Annual Dinner held at the Courtyard by Marriott at Parramatta. The guest speaker for the dinner was Dr Allnut, Forensic Psychiatrist who spoke on the fascinating subject of sexual paraphilias and fetishism. The talk was given during the consumption of summer berry tarts and chocolate mousse layered with dark milk and white chocolate with whipped cream and strawberries, the dessert an aphrodisiac in itself complimenting the entertaining, informative and sometimes humorous aspects of paraphilias and fetichisms, and perfect for those of us inclined toward sitophilia activities (food sex play).

Dr Allnut detailed the DSM IV characteristics of paraphilias defining the many dozens of types as recurrent, intense fantasies, urges or behaviours

usually of at least six months duration, involving specific acts that involve inanimate objects, involving suffering and humiliation of oneself or another, and being non consenting, which causes great distress and personal, social and occupational dysfunction with certain paraphilias having significant legal consequences. Some people have the fantasies but do not act them out, whereas others perform the acts followed by arousal and or orgasm with masturbation. The average age of persons with paraphilias is 15 to 25 years of age with onset as early as primary school age, with majority being males. The cause of paraphilias is theorized to be associated with anxieties and or emotional trauma interfering with psychosexual development, or consisting of a form of psychosexual conditioning. Abnormalities of the brain have also been implicated.

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REVIEW: "Odd Sex: A Psychiatric Perspective on Sexual Deviancy"

by Dr Steven Allnut

ANZFSS Annual Dinner, Friday 23rd November 2007

Richard Von Krafft-Ebing a German Psychiatrist identified paraphilias in 1886 in *Psychopathia Sexualis*. Fetishism is associated with non living objects common being clothing like lingerie, rubber latex clothing, and shoes. *Partialism* is where an individual is sexually aroused by a specific body part such as feet, breasts, legs, the buttocks etc, which probably most of us, male and female have experienced. The woman turned on by a muscular body and the demonstration of flexing muscles is known as *Sthenolagnia*.

Dr Allnut gave an outline of the major paraphilias which attract attention of authorities such as paedophilia, exhibitionism, voyeurism, sado-masochism and frotterism. Other less common forms were mentioned such as scatologia (abusive telephone calls), necrophilia (sexual arousal from dead bodies). A lot of European and American pornographic movies advertised on the internet cater for many paraphilias and fetishism behaviours such as zoophilia (sex arousal with animals), biastophilia (aroused by assaults and rape), urolagnia, klismaphilia, and copraphilia, involving sexual arousal from urine, enemas and faeces. Copraphagia is not uncommon in institutional settings for severe profound developmental disabilities and patients suffering various organic brain syndromes. Copraphilia as a form of sexual arousal is known as 'scat play' and combined with other bodily secretions. The dangerous practice of autoerotic asphyxiation (AeA) was mentioned which normally only enters the public domain with a celebrity death. Autoerotic asphyxiation is not an uncommon practice involving males and extremely rare in females. It is found in all races and crosses all socioeconomic levels. The youngest case I have personally seen is a 13 year old male.

Atypical Autoerotic Asphyxiation (AAA) is when methods other than ligatures are used to induce a hypoxic state, such chemical substances and agents for example nitrous oxide, or the individual succumbs to the mechanism of self torture such as electrocuting themselves. Dr Allnut mentioned one case of a tractor being used to cause hypoxic state using the machinery to compress

the individual's chest which resulted in a traumatic asphyxiation death. Forensic Mortuary staff will testify to have observed a number of these fatalities over many years and in cases of ligature deaths the scene requires careful assessment to determine the manner of death as accidental in contrast to a ligature suicide. Family members who have been aware of such practices have, on finding the individual deceased due to AAA, tried to change the environment to make it look as though it was suicide, this being more socially acceptable than a 'deviant' form of sexual activity. Scenes of death involving AAA may involve evidence of repetitive isolation behaviour in a secluded area, or behind locked doors, the individual male, naked, with possibly evidence of sexual paraphernalia such as pornographic literature, movies and DVD's, wearing of women's clothing and underwear, evidence of repetitive behaviour, for example, marks on roof trusses in dust where rope has been or hooks in the ceiling for purpose of suspension. Other activities such as elaborate bondage practices and self torture are evident such as electrotorture using TENS machines, use of candles, whips and clamps etc. Usually the wrists and neck are covered with material to prevent ligature abrasions and raising suspicions. There is also usually no suicidal ideation.

The talk was very informative and entertaining and for some in the audience sexual naivety was evident with the laughter, and for others reassurance from Dr Allnut that as long as you are not hurting anyone and activities are consensual between adults and kept in the privacy of your bedroom and not exposing yourself to dangerous potentially lethal activities then you can go on enjoying yourself.

Review by Glenn Wilcher
Forensic Technician.

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Unfortunately we have been having a little difficulty tracking down the photographs of the annual dinner. We hope to have those for you in the next newsletter.



REVIEW: "2007 Honours Research from UTS" ANZFSS Meeting, Wednesday 20th February 2008

We heard about the latest research in forensic science from 3 UTS graduands. We would like to thank them for sharing their work with us.

1 - "*Methods for the detection of illicit substances in latent fingerprints by infrared chemical imaging*" by **Ronnie (Ping Hei) Ng**

The detection of foreign substances in fingerprints using infrared chemical imaging requires spectral searching algorithms that have the ability to search sets of data which consist of a few target spectra among a large number of noisy or "empty" spectra. In this project, different spectral searching algorithms were tested on such data sets. These were the Euclidean distance, the Manhattan distance, Tanimoto Similarity, Correlation, Spectral Angle Mapper (SAM), Spectral Similarity Scale (SSS), Principal Component Analysis (PCA) and Spectral Identity Mapper. Using image of fingerprints contaminated with pharmaceuticals, the results showed that converting the truncated image spectra to their second derivatives and then applying SAM had the best outcome. SAM showed its ability to identify individual components of contaminant mixtures and to avoid false positives in which "empty" spectra would more likely to be ranked higher in a search for a substance that was not present in the image. The second derivative SAM approach was tested successfully on some real data (fingerprints contaminated with the explosives ammonium nitrate and PETN), and only a lack of reference spectra of other explosives and GSR components prevented further testing on more contaminated fingerprints.

2 - "*Analysis of organic explosives via rapid resolution liquid chromatography with diode array detection and triple quadrupole mass spectrometry*" by **Jessica Booth**

A rapid resolution LC method was developed for the baseline separation of 11 organic explosives, namely: HMX, RDX, 1,3-dinitrobenzene, 1,3,5-trinitrobenzene, tetryl, 2,4,6-trinitrotoluene, 3,4-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, 4-nitrotoluene, and PETN. This 2.4 minute separation was achieved with an Agilent™ 1200 series rapid resolution HPLC system, utilising a Zorbax SB-C18 column (50 x 2.1mm ID, 1.8mm particles). The water/methanol gradient mobile phase required a column temperature of 85°C and a flow rate of 1.3mL/min. The small dimensions of the column facilitated both rapid analysis times, and the use of small sample sizes. This was highly desirable as the intended application involved the analysis of post-

blast residues, in which explosives are often present at very low concentrations. A diode array detector was used to monitor the separation at an optimal UV wavelength of 214nm. Problematic baseline absorbance was overcome by subtracting blank runs from the sample chromatograms. In related work, the developed separation was monitored using a triple quadrupole mass spectrometer (QqQ-MS). The Agilent 6410 QqQ-MS was capable of operation in both electrospray and atmospheric pressure chemical ionisation modes. This multimode ion source allowed simultaneous detection of nitroaromatic, nitramine and nitrate esters. The sensitivity and selectivity offered by the QqQ-MS detector was superior to conventional UV detection with a significant reduction in the sample clean up time.

3 - "*Investigation into a screening method for trace DNA detection at the crime scene*" by **Kate Howson**

Trace DNA (less than one hundred picograms of DNA) has become more commonly collected at crime scenes and submitted for analysis. However, sampling is mostly achieved in a blind manner, although based on common sense and on the context of the case. It would be desirable to identify a reagent (amino acid stains, histological stains, or reagents used to quantify DNA during profiling) or a lighting system that could visualise areas where DNA is present, even at very low concentrations. In this study, five reagents and filtered light illumination were chosen, based on low toxicity, availability of the reagent and techniques and their potential to visualise low levels of DNA. These were subsequently tested for sensitivity using serial dilutions of buffy coat cells on porous and non-porous surfaces. Real-time PCR was used to quantify the amount of DNA present which was indicative of the damage that the reagent had caused to the quantity of DNA. Powdering and forensic lighting systems had very high sensitivity and low specificity; while reagents such as fluorescamine and DAPI, had low sensitivity but high specificity. The DNA testing did not indicate that any reagent was particularly damaging to DNA. Overall, it is recommended that a light source such as a Polilight® or Crime-lites® is initially used to identify areas of DNA on all surfaces, followed by fingerprint powdering on non-porous surfaces and ninhydrin spraying on porous surfaces. Fingerprint detection techniques may help to simultaneously indirectly identify DNA-rich areas, as well as developing fingerprints.

For further information, please contact Prof. Claude Roux at claudio.roux@uts.edu.au or (02) 9514-1718.



REVIEW: "Current Issues Relating to Sports Drug Testing"

by Dr Ray Kazlauskas

ANZFSS Meeting, Tuesday 8th April 2008

Dr Ray Kazlauskas is the Director of the Australian Sports Drug Testing Laboratory (ASDTL) within the National Measurements Institute (NMI). Ray gave us an overview of the NMI organisation and how the sports drugs testing branch interrelates to the other branches of NMI.

In sports drug testing, some drugs require only qualitative analysis while others require quantitative analysis. It is very important to use pure reference materials with certified properties during testing. The laboratory has World Anti Doping Authority (WADA) accreditation on top of NATA 17025 accreditation as drugs testing is an important part of the international anti-doping program and analysis of international samples requires WADA accreditation. The testing of an athlete's urine must be accepted internationally because the athlete may be from any country, for example, in the case of the Olympic Games. The Copenhagen Declaration has been signed by 192 countries, and many of these have also signed the UNESCO convention. The process of accreditation is ongoing, and there are also ethical considerations, such as not testing outside of the sporting event. For example, some athletes want to be tested to find out if they are clean before entering a competition. There is also scope for research in order to keep up with emerging drugs and other issues.

The Australian Sports Anti-Doping Authority (ASADA) initially had an education and advocacy role in the industry. In addition to this role, they now also have other powers to investigate suspected anti-doping rule violations, make recommendations and present cases against alleged offenders at sports tribunals. They can also exchange sensitive information with the Australian Federal Police and Australian Customs Service.

WADA provides a list of prohibited substances. In order to be on the list, the substance must have two of the following properties:

- it enhances performance
- it damages health
- it is against the spirit of sport

The list is reviewed every year, and can be found



Aaron Heagney & Ray Kazlauskas

on the WADA website (www.wada-ama.org/en/). Ray took us through the different classes of prohibited substances and commented that they are banned as drug classes, for example, "anabolic agents". Therefore, if a new drug emerges that fits into that group it is automatically treated as being prohibited.

Sex hormones are taken because they enhance performance efficiently and are endogenous. In order to determine whether testosterone has been used in doping, the testosterone/epitestosterone (T/E) ratio can be useful (in most cases). A ratio of above 4 is considered suspicious. There are, however, some problems with using the T/E ratio. Normally the ratio is around 1, however, some Asians can have a natural T/E ratio of <0.5, and this may not be raised above 4 even on testosterone application. If a suspicious result is obtained with T/E ratio, the isotope ratios can be looked at. Elevated T/E ratio can be caused by the application of a testosterone precursor (which are also banned). WADA has set the suspicious level as a 4:1 ratio so that most of the doping athletes will be caught, however, some people naturally have a level this high. Ray explained the concept of the "athlete passport" which contains readings over time for T/E for the athlete. This way, naturally high T/E readings will be recorded. Ray showed



REVIEW: "Current Issues Relating to Sports Drug Testing", Continued... by Dr Ray Kazlauskas ANZFSS Meeting, Tuesday 8th April 2008

us different drug profiles with metabolites of testosterone present. They can also be used to determine which precursor was used. It is important to look at the overall amounts present, as it is possible to dope epitestosterone along with testosterone. Therefore, abnormally high values would be seen for both epitestosterone and testosterone, even if the ratio is not skewed. The process uses deuterated standards. Ray then showed us isotope ratio mass spectrometry (IRMS).

Exogenous steroids are much easier to test for, as it is only necessary to show that it is present, since they are not supposed to be there! A screen is done first by GC/MS, HR/MS, and LC/MS/MS, and then the positive results are confirmed. There are strict criteria for how it must be detected. Ray showed us an example of a drug and how it is detected.

Most stimulants are not available commercially, and most have no published metabolism studies in humans or animals. Many have to be synthesised by NMI for testing. In fact, for a lot of new drugs (although not drugs like narcotics), ethics approval is obtained and volunteers take the drugs so that they can do metabolic studies.

Peptide hormones like EPO, hCG, insulin and hGH are more difficult to analyse for and develop test methods for. Solutions for these problems are only just now being developed.

There are indirect and direct methods to analyse for EPO. Indirect methods include analysing blood parameters, for example, haemoglobin content, percentage of reticulocytes and EPO concentration. However, indirect methods have not been accepted as proof of doping because the question arises as to where the line can be drawn. Direct methods examine the isoform distribution of EPO in urine. The technique involves gel electrophoresis separation and a double blotting technique, which is expensive, difficult and time-consuming (it can take 2-3 days per test).

hCG is only measured in men as it is the pregnancy hormone. There have been two hCG cases

reported in which the result was caused by testicular cancer. Confirmation can be made by using two different immunoassays, and now the analysis is done on an LC/MS/MS. Quantification is done using isotopically labelled samples of hCG.

Recombinant human insulin is available and indistinguishable from native insulin. Although insulin is a very dangerous substance, it is still abused. Blood samples are taken for insulin testing. Immune affinity chromatography and LC/MS/MS analysis is done on intact proteins. The problem with using MS is that an isotopically labelled and certified standard must be used, concentrations are low, and matrix interferences from other abundant proteins are high. They are also sticky, therefore high sample losses occur on glassware, etc.

An isoform analysis method was developed for hGH in Germany and used at the Athens Olympic Games. A commercial version of this method is now being validated. The challenge is to determine whether the hGH present is from a bottle or the body. The test looks at the level of PitGH (which measures all isoforms of GH) and RecGH (which measures only at 22kDa as this is the isoform for RecGH). An elevated ratio of RecGH:PitGH indicates doping.

The challenge with designer drugs is how to find something that nobody else has used before. This phenomenon was first noted in the USA with the steroid norbolethone. When doping with steroids, all endogenous steroids are suppressed. Ray explained the Balco scandal, which involved testing of tetrahydrogestrinone and T/E mixtures at a local laboratory. Madol (dimethyltestosterone) was also found in the USA and Canada. Steroids are prolific in the USA, and are marketed on bodybuilding websites as supplements. Many of these "supplements" are quickly withdrawn when attention has been drawn to it. Examples are prostanazol and dimethylIDMT. Ray showed us some of the chemical structures of the drugs and explained how synthesis of the drugs might be effected. When screens were done using selective

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REVIEW: “Current Issues Relating to Sports Drug Testing”, Continued... by Dr Ray Kazlauskas ANZFSS Meeting, Tuesday 8th April 2008

ion monitoring (SIM) analysis, detected drugs would just be synthesised with an additional methyl group so that it would no longer show up. Consequently, full scans are now done, so that when new information is presented, it is easy to refer back to the original scan. Ray has done very interesting analyses on steroid “supplements” that he has bought – some have very scary results, with toxic additives showing up.

When it comes to supplements, ASADA gives the advice that it is the athlete’s responsibility for

any substance found in their body. This is especially interesting in light of the disqualification of entire teams at Olympic Games in the past, and the current litigation involving the German body-builders suing their government for health problems that have emerged as a consequence of doping.

We would like to thank Ray for his very detailed and interesting presentation.

Review by Shaheen Aumeer-Donovan

It was our pleasure to welcome Detective Inspector Peter Bains of the NSW Police to the meeting. As a representative of NIFS, Peter presented members of our NSW Branch with Best Paper awards.

Best Paper in a Refereed Journal

Leigh A Nelson, James F Wallman and Mark Dowton. Using COI barcodes to identify forensically and medically important blowflies. *Medical and Veterinary Entomology* (2007) 21, 44-52.

Best Technical Article or Note

Christie Wallace-Kunkel, Chris Lennard, Milutin Stoilovic and Claude Roux. Optimisation and Evaluation of 1,2-Indanedione for Use as a Fingerprint Reagent and its Application to Real Samples. *Forensic Science International*, 2007, Vol 168, pp 14-26.



Leigh Nelson (top), James Wallman (above) and Claude Roux (left) receive their awards from Peter Bains



REVIEW: “The Expansion of Forensic DNA Databases and Associated Evidentiary Issues” by Simon J Walsh ANZFSS Meeting, Wednesday 14th May 2008

DNA databases have been in operation since the mid 90s, pioneered by countries such as the United Kingdom, and have been the focal point for development of DNA technology. One of the major benefits of such databases is that they greatly assist the investigation of volume crime cases (burglary, stolen motor vehicles etc) which are difficult to investigate with traditional methods due to the lack of witnesses or suspects, and the sheer number of offences. The basic premise of DNA databases is a collection of person (usually ‘offender’) samples and a collection of crime scene samples, which are compared within and between to produce links and intelligence information.

Simon began his presentation with an overview of Australian and international DNA databases. The Australian national database (NCIDD) is still in its inception, and currently holds around 475 000 profiles from people and crime scenes. Since interstate comparison of data has been permissible, there have been around 9000 links across borders. New South Wales has the largest state database with 50 000 person samples and 15 000 crime scene samples. Internationally, the United Kingdom and the United States have the largest national databases with around 4.4 million and 5.5 million profiles respectively. 48 countries have signed an agreement to allow international database comparison through Interpol. It is estimated that 1 million investigations have been ‘aided’ by DNA database results across the U.K, U.S.A., Europe and Canada.

Needless to say, the growth of DNA database has been exponential. Simon emphasised that to date the process of DNA database matching has been simple and taken for granted, with little strategic thought on the reasoning behind sampling and legislation to maximise results. He warns that there is a growing redundancy in the data given the age of the databases, and that we are approaching a stage of increasing complexity in analysis of results.

Simon then outlined statistical modelling of the growth of DNA databases, using residual plots to

show the correlation between the steep rise in case submissions and increases in government funding in a number of countries. An interesting example was the Netherlands, where Simon explained several years ago had very complicated legislation which greatly hindered the collection of known samples from suspects. As a result, the Dutch had a large collection of crime scene samples without many people to compare these to. However they were able to use this to their advantage, becoming very effective in the intelligence linking of volume crime offences. Once legislation changed to allow more DNA sampling of suspects, they were able to link suspects to not just one small offence, but large series of offences. This intelligence networking is something we have yet to capitalise on in Australia.

The presentation moved onto suggestions as to why the databases are so effective – whether the proportion of the population on the database, the size of the database or the ratio of crime samples to offenders. The question was then raised: should we put everyone on the database? We would get a ‘hit’ for every crime scene sample, but Simon does not recommend this given the ethical and cost implications.

He then went on to provide eloquent reasoning for his opinion using a logical model. The model showed that the size of the database is not necessarily important but rather the quality of samples and the strategy behind sampling protocols and legislation. Whilst the United Kingdom and the state of California have large percentages of their population on DNA databases, their ‘hit’ rates are far lower than New Zealand, where the database includes a comparatively miniscule percentage of the population.

In his conclusion, Simon stated that in the coming years our DNA databases will become far more complex to manage and we will begin to see more meaningless links or links with limited value. Given the size of the databases, adventitious matches will occur. DNA statisticians have taken great pains to avoid declaring a profile

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REVIEW: “The Expansion of Forensic DNA Databases and Associated Evidentiary Issues” by Simon J Walsh ANZFSS Meeting, Wednesday 14th May 2008

‘unique’, however given the extremely small match probabilities involved, the legal community and the general public tend to be willing to describe profiles as such. Simon is worried that adventitious matches, whilst predicted and expected by statisticians, will alarm the community with the potential to lower the value of DNA as evidence. However with careful consideration and legislation, valuable intelligence information will continue to be produced from the databases.

The presentation was extremely informative and thought provoking, addressing points not often considered by the forensic community. Simon articulated his points clearly, a considerable feat given this author’s limited statistical knowledge! We would like to thank Simon sharing these insights and his time, and wish him all the best in the lead up to becoming a dad!

Simon is currently employed as the Coordinator Laboratory Services, Forensic & Technical Operations, AFP, having joined this organisation in November 2006. In this role Simon oversees the Biological Criminalistics and Chemical Criminalistics Teams and still takes an active command or case management role in major operations. Prior to his current role, Simon has held a variety of forensic professional and academic positions in Australia and New Zealand after beginning his career in Brisbane in 1994. As a

practitioner Simon has supervised the analysis of over 2,000 criminal cases including serious crimes, volume crimes and international incidents and presented expert testimony in court on over 55 occasions including as a specialist consultant supporting forensic DNA evidence interpretation throughout Australia. Whilst working in New Zealand Simon assisted the establishment and development of the New Zealand National DNA Database and is currently undertaking a PhD in Forensic Science at the University of Technology, Sydney which focuses on the impact of forensic DNA databases on the criminal justice system. Simon is also an active researcher with a high research output including one internationally published textbook, eight book chapters and over 45 refereed articles. Simon has received numerous awards and acknowledgements including five NIFS Best Paper Awards, three best paper/poster awards at International Symposia, and the 2005 Young Tall Poppy Award for Excellence in Science Research Communication and Community Engagement from the Australian Institute of Political Science.

*Review by Jen Raymond
Specialist Location and Recovery Unit
FSSB, NSW Police*

Addendum: Simon’s baby Jake was born on 7th June. Congratulations from us all!!

REVIEW: “Is a Good Science Grounding Enough for Today’s Forensic Science Leaders?” by Dr Tony Raymond ANZFSS Meeting, Tuesday 17th June 2008



Tony set the scene with the history of the development of forensic science and explained how the forensic science environment has changed and evolved over time. He explained the need for leadership excellence in the field and warned of the dangers that are imminent if we should fail on this front. Tony then described the attributes that a leader should possess and related this to the concepts articulated by some of the great leaders in history.

This thought-provoking presentation is extremely difficult to capture in a third-party review, so Tony has kindly agreed to make his presentation available to ANZFSS members. Please email us if you would like a copy (nswbranch@anzfss.org.au).



Planet Earth Chemistry

Yes, this is a page from an actual chemistry exam last year from a university in NSW...

Thank you very much to Erin Ziolkowski for sharing this with us.

Symposium Scholarships

The NSW Branch is now offering Scholarships to attend the 2008 Melbourne ANZFSS Symposium. The deadline for receipt of submissions is **1st September 2008**. Please see the website to obtain a copy of the application form.

If you have already submitted a National Scholarship application, there is no need to re-apply as these will also be considered.

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THIS PAGE FOR ROUGH WORKING ONLY

Dear exam person,
 please be kind to me —
 I am an alien from a distant planet — I am not used to this "Strange" planet Earth chemistry.
 On my home turf we have simplified everything — actually I don't know what I'm talking about. Ignore this page! I should be checking my work! Pronto!
 Sincerely,
baffled student
 P.S. It's time for me to board the mother ship.

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Final Words (I thought it pertinent to choose a quote from Tony Raymond's presentation):

"Great spirits have always found violent opposition from mediocrities. The latter cannot understand it when a man does not thoughtlessly submit to hereditary prejudices but honestly and courageously uses his intelligence"
Albert Einstein