APRIL 2024

ABNA EXCHANGE

OFFICIAL NEWSLETTER OF THE AUSTRALASIAN BIOSPECIMEN NETWORK ASSOCIATION

ABNA Annual Conference

30 May
Registration and Abstract submission opens
31 July
Early-Bird registration ends
2 September
Abstract submission closes
23 September
Abstracts outcome notification

For more details head to the conference website HERE

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Exploring this Month's Marvels

Welcome to another installment of the ABNA Exchange! April is in full swing, and our newsletter is packed with exciting content. As we prepare to mark ANZAC Day in Australia and New Zealand we look at the pivotal role of biobanks in repatriating fallen soldiers, linking to "5 Minutes with a Biobanker" featuring distinguished professor Lyn Griffith, and a fantastic recap by Cassandra Griffin of ISBERs 2024 annual conference held on Australian soil.

We're thrilled to share updates on our upcoming ABNA annual conference and with our amazing platinum sponsors 'ThermoFisher Scientific, MVE' and 'Bio-Strategy, Hamilton, Askion Biobanking' already on board the conference planning is well underway! Please take note of the key dates provided and be sure to put these in your calendar!

Our ABNA seminar series, "Revolutionising Biobanking Models: Centralised, Distributed, Harmonised," kicked off this month with a focus on Centralised Models in Biobanking. We were treated to enlightening presentations from Professor Jennifer Byrne, Director of Biobanking at the NSW Statewide Biobank, Dr. Alan Humphries, Curator of the Australian Pastures, and Dr. Alison Parry-Jones, Operations Director of the Wales Cancer Biobank. The session underscored commonalities and challenges spanning various fields and geographic locations. Stay tuned for Seminar 2, "Thinking Outside the Box - Breaking Away from Centralised Models," scheduled for June 25th, featuring another amazing line-up of experts in the field of biobanking. Watch this space for further details!

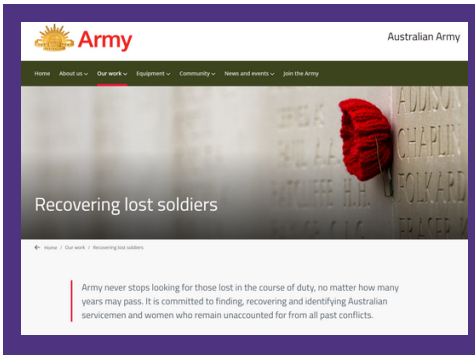
Finding Australia's lost ANZACs: A key role for biobanking in bringing fallen soldiers home

By Carmel Quinn

When an opportunity presents itself to include a focus article in ABNA Exchange that links to current events, the ABNA Exchange team likes to rise to the challenge. As all ABNA members will be aware, on 25 April Australia and New Zealand will commemorate the ANZAC tradition, so we have used this as inspiration for this month's edition to write about how biobanking is playing an important role in identifying the remains of unknown soldiers.

This ties in with this month's '5 Minutes with a Biobanker', featuring Distinguished Professor Lyn Griffiths of Queensland University of Technology (QUT) who has played a lead role in some of this important work; some readers may recognise Professor Griffiths from the fascinating presentation she delivered on this subject at the ABNA 2022 Annual Meeting in Perth.

There is a staggering ~30,000 Australian soldiers who remain unaccounted for, whether missing or unidentified, from historical conflicts including World Wars I and II (Ref 1). In the Asia Pacific region alone, there are ~6400 Australian soldiers who remain missing or presumed deceased from WWII, in Papua New Guinea, Malaysia, Singapore, China, Indonesia, and Korea (Ref 2). The Australian Defence Force has departments within the Army and Airforce that seek to identify remains of unknown soldiers and airmen, the former being the Unrecovered War Casualties – Army (UWC-A).



Relatives of Australian soldiers missing in action or presumed dead can register their details with Army. Family members are encouraged to register even if they are not the most direct relative or another relative has already registered. This helps Army in reaching out to family for notifications, funerals, and ceremonial activities. The contact information is also useful when DNA samples are required for identification.

UWC-A combines expertise from different areas, both historical and forensic, in order to identify remains. These include traditional techniques which focus on the circumstances around the loss of soldiers; there may be several possible identities for an individual soldier based around circumstantial and anthropological data, including the location where remains were found, artefacts found with remains, and anthropological data including genealogy. As forensic technology has improved, the incorporation of DNA evidence has become increasingly important, although this is used in combination with the more traditional techniques – a multidisciplinary approach is key.

Forensic Evidence & Forensic DNA

When a grave of an unidentified soldier is discovered, 'traditional' forensic evidence is amongst the earliest data to be collected, including gender, age, height, ancestry and pre-existing injuries. When combined with other historical evidence, a shortlist of potential identities is produced and families are contacted; this allows a deeper dive into the family history of the soldiers, including DNA matching where possible. The Australian Army has been including forensic DNA analysis in its identification efforts for several years, with the identification of DNA from human remains predicated on the availability of DNA samples from known relatives. DNA Family Reference Samples are requested from the relatives – to aid confirmation of the suspected identify an individual soldier, or to be part of a set of reference samples which can be tested for matches when an unknown soldier is found.

The matching in these cases often relies on one of two genetic profiling markers: 'Y-STR' and 'Mitochondrial DNA':

- Y-STR – Single Tandem Repeats on the Y chromosome, passed from fathers to sons, it is a marker for the male lineage
- Mitochondrial DNA – passed from mothers to both male and female children, but subsequently can only be passed on by female children so is a marker of the female lineage.

On both instances, due to a low mutation rate, markers identified via Y-STR and Mitochondrial DNS sequencing are extremely stable, so pass down the generations essentially unchanged, making them ideal candidates for establishing lineages. However, the climatic and environmental conditions in which the human remains are found e.g. those of tropical SE Asia, mean that isolated DNA is often highly degraded and of limited use.

Next Generation Sequencing (NGS) technology aiding in identification

NGS technology is broadly recognized as being a 'game changer' in genetic analysis due to the speed, throughput and accuracy of sequencing that is now possible. Prof Griffiths' group utilise NGS technology to establish a biobank from the DNA of descendants of missing servicemen.

The broader project had 3 main objectives, all of great potential benefit in forensic identification:

- To create the Family Reference DNA database (biobank) – incorporating genealogy data for the families taking part
- To improve upon methods for extraction of DNA profiles from severely degraded human remains
- To develop techniques for using DNA to predict biogeographical ancestry and externally visible characteristics; this can distinguish between the remains of e.g. an Australian and a Japanese soldier so they can be returned to their country of origin, even if their precise identify is unresolved (Ref 2).

Prior to this research, often, the level of degradation of the DNA had limited its utility in aiding identification: common forensic analysis techniques cannot yield information in such case. However, a point of difference in this approach was the inclusion of expertise in 'ancient DNA'.

Ancient DNA

Typically, the study of ancient DNA (aDNA) resides in the domain of paleogenetists, who may be investigating DNA from remains and fossils, from 10's to 100's of thousands of years old – the oldest aDNA currently known was discovered recently in Greenland and is 2 million years old (Ref 3). However, techniques developed in these circumstances are being adapted and used for forensic purposes and have allowed degraded human remains to be identified. Recent improvements in extraction, NGS, and bioinformatics of ancient DNA have advanced the approach used to identify soldiers' remains adding data above and beyond the traditional forensic methods although these remain important.

COMMONWEALTH WAR GRAVES

The Commonwealth War Graves Commision (CWGC) is a global organisation, caring for war graves at 23,000 locations in more than 150 countries and territories. Where human remains are discovered in former battlefield areas during farming, building work or land developments the local police will confirm that they are First or Second World War casualties. The CWGC will then coordinate with the relevant military authorities who will carry out any investigation as to identity.

Occasionally artefacts found with the remains, together with historical information, might suggest that the remains belong to a particular regiment/unit or a named individual. Every effort is then made by the military authorities to trace present day relatives and, where appropriate carry out DNA identification.

Armed Forces DNA Identification Laboratory

U.S. Department of Defense

The Armed Forces DNA Identification Laboratory is the US Department of Defence's only human remains testing laboratory. It performs DNA tests on service members who've died in current operations, as well as those who have been missing for decades. The lab works in tandem with the Armed Forces Repository of Specimen Samples for the Identification of Remains (AFRSSIR), which maintains millions of blood samples from those who have served over the past 32 years.

Over the years, collection efforts steadily expanded from the initial 10,000 DNA reference cards and today, the AFRSSIR accessions approximately 225 thousand new DNA reference cards each year, with the 9 millionth DNA reference card processed in October 2023. The dedication to maintaining this extensive collection is a testament to the staff's commitment to preserving the AFRSSIR's legacy and ensuring the identification of fallen military personnel.

Since 2015, donors may request that individual specimen samples be destroyed following the conclusion by the donor of completed military service or other applicable relationship to the Department of Defence.

Nearly 81,000 American service members remain missing after having served in World War II, the Korean War, the Vietnam War, and other conflicts involving the U.S.

These activities, and so many more initiatives, are a challenging undertaking for practical, technological and social reasons. Curating the DNA samples, ensuring provonance and making them available for comparison analysis is just a small part biobanking is playing but it is the best hope for closure for thousands of families who lost their loved ones long ago.

5 Minutes with a Biobanker

We approach a different professional in the biobanking arena with the same five questions each month.

This month Professor Lyn Griffiths, Director Genomics and Personalised Health Centre at Genomics Research Centre is featured.

THE QUICK QUESTIONS

Chilli on food?

Yes

What is better the book or the movie?

Book

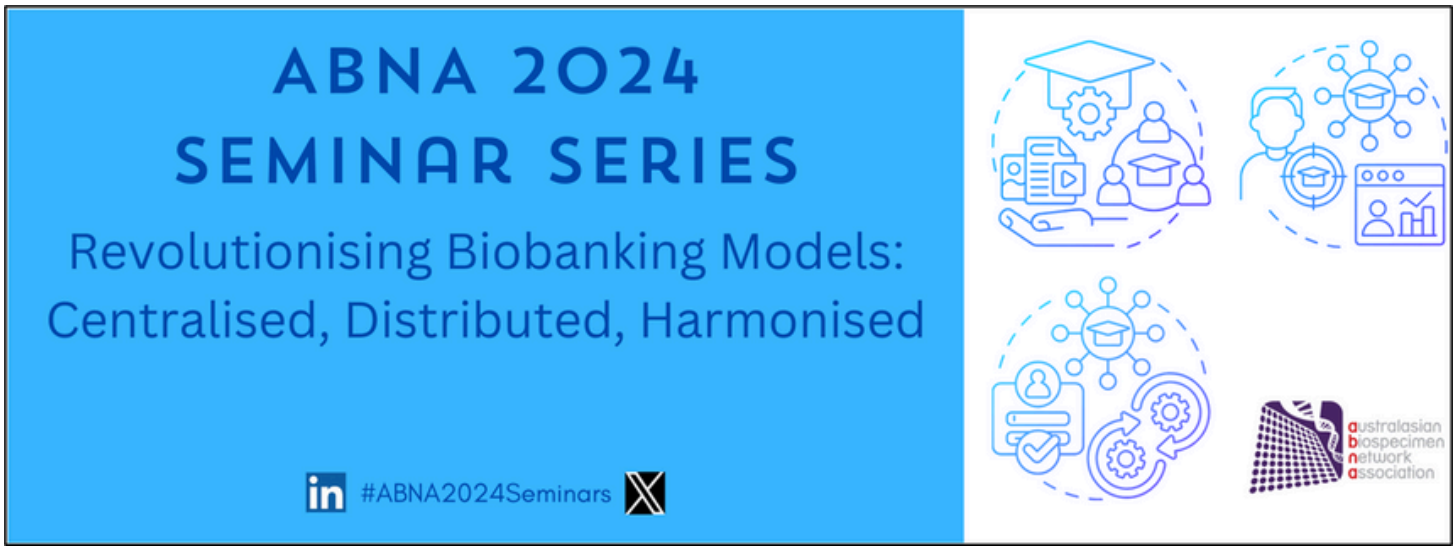
Is it football or soccer?

Soccer

Are you usually 5min early or 5min late?

5 minutes late

1. **How long have you been working in biobanking?**
   Over 20 years for many different genomics research projects.
2. **What has shaped your views on biobanking?**
   Knowing how essential it is to have well characterised collected samples from cases and controls and from families to undertake genetics research. We have collected > 10,000 samples including recent collections from Norfolk island plus from relatives of missing servicemen for our defence genomics research.
3. **What is the craziest thing you have done to save a sample/s?**
   Not so much to save as collect samples- have collected from families and individuals in remote locations including rural Australia, and more remote islands including Norfolk Island and Hawaii. We have collected blood in peoples homes or businesses, and even at family reunions and sporting events.
4. **What has been your favourite moment (so far) in your biobanking career?**
   Living on Norfolk Island for 6 months to enable collections from two thirds of the island's adult population in the year 2000 and again in 2021/22 undertaking a 20 year longitudinal collection of the island's inhabitants for genetics research.
5. **What was the last conference you attended and where was it?**
   Aust Society Diagnostic Genomics in Queenstown NZ in March 24



‘Dare to Dream’ – Australia Welcomes You!

By Cassandra Griffin

These were words that felt surreal to utter after a year of preparation and planning for one of the biggest biobanking conferences on the 2024 calendar. Just two weeks ago we were fortunate enough to host the International Society for Biological and Environmental Repositories (ISBER) on Aussie shores and for anyone who was present, I think you’ll agree it was a raging success! Our meeting was grounded in the spirit of the Dreaming and the shared values of governance, stewardship altruism and one health. It was a pleasure as always to come together with friends and colleagues from across the globe to share our thoughts on how we can bring these values with us into the next generation of biobanking.

Monday saw national and international delegates arriving from all corners of globe but as soon as they arrived and checked their bags, they were on busses to some of Melbourne’s best-known biobanking institutions – MCRI Biobank, Biobank Victoria Precision Medicine and Peter MacCallum Cancer Centre. Accounts from all who attended were glowing and those who coordinated and delivered the tours really did ABNA proud in showing what Aussie Biobanking is all about! For a smaller group of us there was a fourth site visit, to the seed bank at Melbourne Botanic Gardens. One of the largest collections in Australia it was fascinating to see the approaches taken and the challenges they are facing. Knowing our colleagues were currently mid tour of some of our premier biomedical institutes, it was an opportunity to reflect on the synergies and similarities present between the different disciplines that make up our profession.


Tuesday: With my co-chairs Greg Grossman and Amanda Moores as the delegates start arriving managing to weave John Farnham and Oliva Newton-John into my opening, watching Andy Pask present and determined to NOT look at the giant tarantula behind me.

Tuesday we hit the ground running – cue nerves for your local program chair! It was an absolute privilege and honour to officially open the meeting with the words of Dorothea Mackellar and John Farnham alike and to share the experience with two incredible Co-Chairs, ISBER’s President-Elect Gregory Grossman and the powerhouse marine banker that is Amanda Moors. Symposium 1 kicked off with a riveting keynote on de-extinction efforts and the work of Professor Andrew Pask on the Tasmanian Tiger or the Thylacine. Delegates were captivated as he spoke of his proactive biobanking efforts to avoid future extinction events and shared his progress on returning this much loved native species to Tasmania. The session that followed took us on a journey exploring the role of biobanking for conservation featuring ABNA members David Merritt and Greta Frankham, the importance of environmental conservation for human health and then came full circle with consideration on the impact of biobanking on the environment. Spoiler alert, this was not the last conversation we had on decarbonisation – a theme that continued to arise throughout the week and I predict will continue to be a hot topic! Our next session was Part 1 of ISBER’s 25th anniversary celebration and we heard from two former ISBER presidents Marrianna Bledsoe and ABNA’s Dan Catchpoole. Tuesday ended with a mixture of workshops including strategies for overcoming publication barriers, a workshop co-facilitated by ABNA’s own Amanda Rush and a dedicated ‘Green Biobanking’ workshop, before opening of the sponsor hall and welcome reception. ABNA’s poster was proudly on display throughout the event and received some wonderful feedback!

Wednesday was an early start for those of us who signed up for the fun run (a concept I still find an oxymoron). For me personally, this was a sentimental moment - turning up bleary eyed and in no way awake (I don't do mornings) I was met by co-chair Amanda Moors and ABNA member Kate Merlin. I was immediately taken to 2019 and my first ISBER meeting during which I completed the Shanghai fun run (walk) with these two wonderful women - sparking a personal connection that remains 5 years later. For me, the personal connections and networking really are the most valuable aspects of these meetings. I'll spare you the details of getting lost and blisters and skip to Symposium 2A and 2B. 2A was a fascinating symposium titled "Transforming Biobanking and Research with AI: A New Era of Discovery and Innovation" and covered fascinating topics on synthetic data, blockchain, Artificial Intelligence and Computational Biology. Again, these conversations were fascinating and thought provoking and are likely to be key points of consideration in future ABNA and ISBER meetings. Symposium 2B was co-chaired by ABNA Secretary Sam Higgins and was titled "A BioBank Blueprint: Human-Centered Design & Improvement" and focused on the human elements of our biobanking ecosystem, exploring various approaches to workflow development and stakeholder engagement. Both were incredibly well received. Corporate workshops and innovative technology abstracts followed a scrumptious lunch before the first of two concurrent abstract sessions. Delegates spent the evening enjoying the sights and tastes of Melbourne which certainly didn't disappoint!

Thursday started with a series of Roundtable discussions, and I was fortunate enough to attend one hosted by Director At Large for the Indo Pacific Rim Wayne Ng and Australia's ISBER Regional Ambassador Anusha Hettiaratchi. The conversation centred on biobank utilisation and how we measured success against this metric. It was interesting to consider the different contexts our colleagues found themselves in and how while utilisation may be an ideal metric for one, it may not be the most representative for another. Much food for thought! In the following session I was lucky enough to join ABNA Editor Anusha Hettiaratchi chairing a symposium co-developed with ABNA President Georget Reaiche-Miller on the role of DNA in biobanking. We heard from researchers biobanking DNA from violent offenders, the UK Home Office using DNA to identify missing persons, those banking DNA from echidna poo (fun fact, echidna poo - it' called a scat and it's shiny!!), from those working with Ancient DNA and then a fascinating discussion on wastewater biobanking and the social and ethical issues associated with it. Symposium 3B was titled "The Power of Biobanks in the Era of Precision Medicine" and while I wasn't able to attend (still working on my time turner) it sounded like a resounding success with fascinating points for consideration. The afternoon saw ISBER members come together to discuss global perspectives on the future of biobanking and again our region was well represented with panellists including Anusha (it was a busy day for her) on behalf of ABNA, Dave Merrit on behalf of the Australian Seed Bank Partnership and ABNA's vice president Louise Ludlow for ANZCHOG.

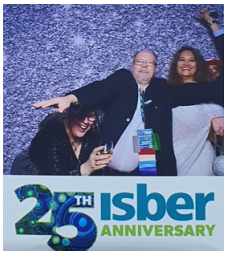
Wednesday: 'Fun' Run with Amanda Moores and Kate Merlin, watching Sam Higgins introduce Symposium 2B, my time at the ISBER booth promoting the 5th edition Best Practice (of course).
Thursday: Roundtable discussion, Symposium 3B co-chairs with our speakers, the global session panel.

The ISBER AGM followed and special awards bestowed upon Cornell Veterinary Biobank Director Marta Castelhano, Diane McGarvey from the University of Pennsylvania, Koh Furuta from Japan and Rocío Aguilar-Quesada from Spain. We send our congratulations to all four and were delighted to celebrate their achievements. We then witnessed the transition of presidency from Alison Parry-Jones to incoming President Dayong Gao. Alison has been a wonderful colleague to the ABNA committee and we want to congratulate her on her term as president. We'd also like to welcome incoming President Dayong Gao and hope to continue a successful collaborative relationship. Special mention goes to outgoing Past-President Clare Allocca who has previously presented at ABNA seminars and would be well known to ABNA members. Thank you, Clare, for all you have done over your term in leadership.

Thursday did not finish early and the AGM was followed by the Silver Celebration – a gala networking evening that included dancing, trivia, scavenger hunts and a wonderful banquet topped off with signature event cocktail. As host of the trivia I'm still a little traumatised by the sight and sound of past ISBER presidents bleating like goats and founding ABNA members frantically squawking like magpies, but I was proud beyond measure to see a tribe of Aussie biobankers rise to the occasion when the Nutbush was played!









Thursday: 25th Anniversary Silver Celebration done many different ways, all of them enjoyed to the fullest!

Friday with slightly sore heads we fronted up for a 7am workshop exploring the Communities of Practice (CoP) embedded within the ISBER community. It was great to hear about the work of the Science policy CoP, Standards CoP and the Education and Training CoP. Again, we were proud to see representation from the ABNA crew on each of these groups. Following more roundtables and contributed paper sessions we proceeded into the final symposium – rising stars! It was a privilege to attend this session with representatives from China, Uganda and Malaysia and the experiences shared of overcoming adversity and disaster were truly inspiring! The future of biobanking is bright and I'm sure of it after this session. After our final workshops we returned for Anniversary celebrations part two and closing remarks. We heard from President-Elect Greg Grossman and were inspired by his words. The future of biobanking is here and it's within our power to shape it into whatever we dream it could be!

ISBER in Australia was an event we can all be proud of, and I would like to convey my sincerest thanks to all of the ABNA members who contributed – be it through the program task force, local task force, communities of practice or as delegates bringing ideas and energy throughout the marathon 5 days. Now on to ABNA 2024, see you in Adelaide!