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Preserving Australia's Audio-Visual Heritage and Culture | Natalie Rose Cassaniti, 2023



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Report by Natalie Rose Cassaniti

Typeset by Danielle Cull

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The International Specialised Skills Institute

1/189 Faraday St,
Carlton VIC 3053

info@issinstitute.org.au
+61 03 9347 4583

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1. Acknowledgments

The Awarding Body – International Specialised Skills (ISS) Institute

The Fellow sincerely thanks The Italian Australian Foundation for providing funding support for the ISS Institute and for this Fellowship.

The ISS Institute plays a pivotal role in creating value and opportunity, encouraging new thinking and early adoption of ideas and practice by investing in individuals. The overarching aim of the ISS Institute is to support the development of a 'Better Skilled Australia'. The Institute does this via the provision of Fellowships that allow Australians to undertake international skills development and applied research that will positively impact Australian industry and the broader community.

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The Italian Australian Foundation (previously the Italian Services Institute Inc.) is an association dedicated to providing welfare and education services for disadvantaged persons of Italian descent who are a resident of Australia who would not have access to these services.

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- Todd Wiener, Motion Picture Curator, and the staff of the UCLA Film & Television Archive
- Pat Loughney, Director and the staff of the Packard Humanities Institute at the PHI Stoa
- Hannah Frost, Associate Director for Digital Services and the staff of the Stanford Media Preservation Lab and Born-Digital Preservation Lab, Stanford Libraries
- Jon Shibata, Film Archivist, Susan Oxtoby, Director of Film and Senior Film Curator, Jason Sanders, Film Research Specialist/Film Notes Writer, Antonella Bonfanti, former Film Collection Supervisor at the Berkley Art and Pacific Film Archive
- David Walsh, Training and Outreach Coordinator, FIAF (International Federation of Film Archives)
- Ray Edmondson, Director, Archive Associates Pty Ltd / President, Friends of the NFSA Inc.
- Jon Steiner, Preservation Team Lead, ABC Content Management
- Annie Breslin, former Moving Image Specialist, State Library of South Wales
- Damien Cassidy, Digital Media Technical Analyst, State Library of South Wales / President, Australasian Sound Recordings Association
- Janelle Blucher, Research and Collection Services Coordinator, City of Parramatta
- John Kelcher, Freelance Sound Archivist, Christchurch, New Zealand

2. Executive Summary

“Audiovisual documents, such as films, radio and television programmes, audio and video recordings, contain the primary records of the 20th and 21st centuries. Transcending language and cultural boundaries, appealing immediately to the eye and the ear, to the literate and illiterate, audiovisual documents have transformed society by becoming a permanent complement to the traditional written record. However, they are extremely vulnerable, and it is estimated that we have few years to transfer audiovisual records to digital to prevent their loss. Much of the world’s audiovisual heritage has already been irrevocably lost through neglect, destruction, decay and the lack of resources, skills, and structures, thus impoverishing the memory of mankind. Much more will be lost if stronger and concerted international action is not taken.”¹

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This statement from the International Council on Archives, sums up the importance of audiovisual archives in preserving cultural heritage and identity, and the need for skilled professionals to be able to safeguard material for future access. In Australia, the Audiovisual (AV) preservation industry is relatively small. There are very limited opportunities to train and work in the field and limited access to current experts who are reaching retirement age. The only formal education course in Australia is the Charles Sturt University (CSU) *Graduate Certificate in Audiovisual Archiving*, which is offered online but does not provide practical experience. Archivists, either emerging or wishing to expand their knowledge in this field, often rely on learning on the job or attending conferences and workshops.

Recognising these issues fuelled a strong incentive for the Fellow to apply for the **Italian Australian Foundation Fellowship**, which supports Italian Australians with professional development, to become a leader in their field of interest. The Fellowship is awarded on the basis that there is a genuine need of skills in Australia and that learnings would be disseminated within the relevant industry. The Fellow advocated for the need for specialised training and skills in AV Archiving and devised the Fellowship program through her own initiative, self-motivation and passion for this industry, with the intent to represent Australia abroad.

The Fellow visited leading AV archives in the United States of America between October and December 2022. These included the George Eastman Museum (GEM) - *L. Jeffrey Selznick School of Film Preservation*; the Library of Congress National Audio-Visual Conservation Centre (LOC NAVCC); Indiana University (IU); University of California Los Angeles Library Film & Television Archive (UCLA FTVA) and Packard Humanities Institute (PHI); Stanford Libraries and the Berkeley Art Museum and Pacific Film Archive (BAMPFA). In addition, she attended the annual Association of Moving Image Archivists (AMIA) conference.

¹ International Council on Archives, World Day for Audiovisual Heritage, ICA, 2016 [website], <https://www.ica.org/en/world-day-for-audiovisual-heritage> (accessed: 22 May 2023).

The purpose of undertaking the Fellowship was to enhance the Fellow's collection management, conservation/restoration and digitisation skills through practical experience, observation and discussions, and foster connections with international AV institutions and experts. By sharing her knowledge, skills and experience with the AV community in Australia, she aims to inspire other archivists, increase knowledge and awareness, and strengthen collaboration and networking across institutions.

The Fellow has worked in the GLAM (Galleries, Libraries, Archives and Museums) sector for a decade in various Collection Management and Conservation positions. She is currently the Registrar Team Lead for the Digitisation Team at the Powerhouse, where she establishes digitisation workflows and projects and manages a team of seven Assistant Registrars who assist the photographers with object handling and administration. Previously she managed City of Parramatta's Cultural Collections (three years), and prior to that worked as an Assistant Conservator at the State Library of NSW (SLNSW) for five years, assigned to the Digital Excellence Program (DEP) massed digitisation project, where she developed her knowledge, skills and passion for AV conservation/preservation. She also undertook a short contract as a Preservation Officer at the Australian Broadcasting Corporation (ABC), digitising, inspecting and cataloguing film and radio collections.

The Fellowship program enabled the Fellow to expand on her existing experience and develop confidence not only in handling and preserving physical and digital AV material, but also in networking, advocacy and building professional connections to foster the exchange of knowledge. Some of the highlights of her learnings include: handling, inspecting and storing 35mm film (nitrate) and 16mm film (acetate & polyester); video digitisation and quality control of digitised files; cleaning and using playback technology to play and digitise audio and moving image formats; using software to undertake digitisation, digital restoration and colour grading of moving image; observation of photochemical processing labs; site visits to discuss and investigate collection management procedures/practices, workflows and outreach methods applied in the various institutions.

This Fellowship program has created a positive personal, professional and sectoral impact, including the acquisition of skills and knowledge of best practice latest industry standards for preserving AV material; and enhancement of the Fellow's archival/museum practice which she has implemented in her workplace through better project management, more informed decision making and collaboration across departments. As both a Fellow and recently appointed Vice President of the Australasian Sound Recordings Association (ASRA), the Fellow believes she can add value and offer support and encouragement to other emerging industry professionals and those seeking guidance on managing AV collections.

Addressing Australia's challenges of limited education opportunities in AV Archiving and preservation issues necessitates collaborative efforts among various stakeholders and experts.

The Fellow makes considerations and recommendations to disseminate expertise widely across institutions, benefiting professionals and emerging archivists alike. This involves cross-institutional partnerships, knowledge sharing, and training programs to enhance skills in AV archiving. Support from governments and institutions is crucial, advocating for funding, policies and increased public awareness about AV preservation. Digitisation, international collaborations, continuous education, capturing expert insights, and exchange initiatives contribute to a comprehensive strategy. Through these measures, Australia can establish a resilient AV archiving ecosystem, ensuring the protection of its cultural heritage for present and future generations.

3. Fellowship Background

Fellowship Context

“Given the pivotal importance in the history of humankind, one might expect that the task of preserving the world’s audiovisual memory would have a commensurately large profile and resource base. Not so. The number of people engaged in the task worldwide barely reaches five figures. This small community, committed and tenacious, yet largely unknown and unsung, carries an immense responsibility. As a profession, though they may little reflect on it, the audiovisual archivists of the world also possess great power. How they use it will determine much of what posterity knows of this age.”¹

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The AV industry in Australia exists to safeguard and share the treasured AV collections which the nation has embraced and produced as far back as the 1880s. AV collections contribute significantly to our cultural history and heritage because they tell the story of a growing nation. AV Archiving refers to the development, management, preservation and provision of access to collections of audiovisual resources.² Audiovisual Archivists are responsible for the guardianship of AV material and enabling its access and use, and requires a specialised skillset to achieve this.

Yet, as Australia’s leading AV advocate and ‘pioneer of film and sound archiving’³ Ray Edmondson points out in the above excerpt, this industry has not traditionally been formally recognised as a profession in its own right. The AV Archiving industry has not been regarded as a priority on many levels such as government funding, resourcing and dedicated skilled staff. This is particularly evident in institutions (both large and small) where AV material does not form part of their primary collections.

There has also traditionally been a lack of training and education opportunities in Australia for emerging AV archivists to develop their profession. The industry mainly relies on the dedication and self-motivation of individuals who advocate for, and take initiative in, upskilling and/or learning on the job. As mentioned earlier, the only formal course available is the CSU *Graduate Certificate in Audiovisual Archiving* which is “designed and delivered in partnership with the National Film and Sound Archive of Australia (NFSA) and focuses on the acquisition, collection, maintenance and preservation of audiovisual materials in analogue and virtual environments.⁴ This course covers key areas including AV history, collection management/archiving, ethics, preservation of AV materials and digital curation and preservation. The course was established in the 1990s and

1 R. Edmondson, ‘Audiovisual Archiving Philosophy and Principles’, Third Edition, UNESCO, France, 2016, p.vi [website] <https://unesdoc.unesco.org/ark:/48223/pf0000243973> (Accessed: 22 April 2023).

2 R. Edmondson, ‘A Philosophy of Audiovisual Archiving’, UNESCO, France, 1998, p.8 [website] <https://unesdoc.unesco.org/ark:/48223/pf0000113127#:~:text=3.4.5%20The%20following%20definition,media%20and%20the%20audiovisual%20heritage> (accessed: 22 April 2023)

3 University of Canberra, ‘Ray Edmondson OAM Ray is a pioneer of film and sound archiving and recipient of an OAM’, Canberra University, n.d [website] <https://www.canberra.edu.au/uc-alumni-profiles/alumni-profiles/profile/ray-edmondson-oam> (accessed: 02 April 2023).

4 Charles Sturt University, ‘Graduate Certificate in Audiovisual Archiving’, Marketing, 2023 [website] <https://study.csu.edu.au/courses/graduate-certificate-audiovisual-archiving> (accessed: 22 April 2023).

delivered by distance via printed and CD learning material and now is conducted online, making it accessible to a broader audience. It is the only online course of its kind, but although it delivers comprehensive content created by experts in the field, it does not offer an internship or practical component. Students do not receive hands on experience working with materials and equipment unless they are already employed in the industry.

Other opportunities for professional development include attending conferences (such as the annual ASRA conference) and training workshops conducted by collecting institutions, which are not regular occurrences. Further, the NFSA and GEM L. Jeffrey Selznick School of Film Preservation offer an exchange program between NFSA staff Selznick School students, to 'promote the sharing of knowledge and skills' between the institutions.⁵ This program was established by Ray Edmondson, who was one of the founders of the NFSA and a former teacher at the Selznick School. It provides an invaluable experience for the exchange candidates but is only available to NFSA staff.

Without supporting emerging AV archivists, the risk of losing expertise is imminent, as many highly trained and skills archivists and technicians are nearing retirement. Leaving collections in the hands of inexperienced archivists risks the damage and loss of AV material to neglect and obsolescence.

Outside of Australia's leading AV institutions, there is little opportunity for AV archivists employed in other organisations to develop and maintain their practice.

Identifying this lack of recognition and opportunity for specialisation, was the motivation for reaching out to the International Specialised Skills Institute (ISSI), to create a network of support and advocate for the need of developing knowledge, skills and expertise in the AV archiving industry, and to disseminate this within the broader Australian AV community. The AV archiving industry is globally more "widely recognized among memory institutions, the information and audiovisual industries and within academia, where it is now the focus of several postgraduate and undergraduate courses around the world."⁶ However, overseas study is not a reachable goal for many.

As part of her Fellowship program, the Fellow connected with both local and international AV institutions and experts. She then travelled to the United States of America to gain first-hand practical experience and knowledge at world-leading AV institutions; establish meaningful networks; and strengthen connections with experts she had previously met. This will be detailed in the following section.

5 C. Dingwall, 'George Eastman House Exchange', National Film and Sound Archive of Australia, Canberra, n.d [website] <https://www.nfsa.gov.au/latest/george-eastman> (accessed: 06 August 2023).

6 Edmondson, 2016, op. cit. p.viii

The Fellow aimed to enhance her collection and project management experience, and develop knowledge and skills in the handling, conservation, digitisation, restoration and preservation of a range of AV formats including nitrate film.

Upon her return, the Fellow was appointed a Vice President of ASRA and aims to use her position to be a strong advocate and voice for the Australian AV community, build a broader awareness of the AV industry across the GLAM sector, engage with emerging archivists to further promote the industry and share her knowledge and skills.

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Fellowship Period and Methodology

This Fellowship was awarded in 2020 but was unable to be fulfilled at the time due to the COVID-19 pandemic preventing overseas travel. While awaiting travel restrictions to ease, the Fellow continued to undertake research and to develop her Fellowship program through networking with AV professionals and institutions both nationally and internationally.

In 2021, the Fellow attended the International Association of Sound and Audiovisual Archives (IASA) online conference and presented at the “Show & Tell at the Archives” session. On the topic of ‘Connecting Collections and Communities’, she showcased how City of Parramatta (CoP) shares its history and heritage with its communities through collection digitisation, video programs and animation. She also attended the Australian Institute of Aboriginal and Torres Strait Islander (AIATSIS) and NFA joint ‘Common Problems Shared Solutions Symposium’. This online event provided a forum for AV institutions to “work together to identify and solve common problems and provide shared solutions to facilitate and support the ongoing preservation of the at-risk magnetic media in Australia’s cultural heritage collections beyond 2025.”

In early 2022, the Fellow met virtually with John Kelcher, a freelance audio engineer from New Zealand. They engaged in an in-depth discussion of his role and experience in the recovery of AV collections after the 2011 Christchurch earthquake. He also shared his personal journey of becoming an AV archivist, some great advice on maintaining an archive and the importance of teamwork in sustaining a robust preservation/archiving program.

When international travel resumed later in 2022, the Fellow was able to pursue her Fellowship program, visiting leading AV archives in the USA. Having researched the various AV archives and communicating with Collection Managers, she developed a comprehensive program that spanned two and a half months between October and December. It comprised the following:

1. **L. Jeffrey Selznick School of Film Preservation - George Eastman Museum:** Three-week placement with the Selznick School in which the Fellow observed lectures on the topics of Collection Management and Information Gathering, Moving Image Cataloging and Cataloging Standards, Challenges of Cataloging, Principles and Ethics of Film Restoration, and Philosophy and Ethics. She also participated in weekly rotations to gain practical experience in the areas of digital film colour grading and restoration; film and video digitisation; handling, inspection, winding and preservation of 35mm nitrate and acetate film & 16mm film. In addition, she attended a tour of the Rochester Institute of Technology (RIT) - Image Permanence Institute (IPI). The class was given a lecture on implementing low-temperature storage environments, with discussion topics including ideal climate and storage for long-term preservation of AV material; prevention/control of chemical, mechanical and biological deterioration; and acid testing material to identify level of deterioration.
2. **Library of Congress National Audio-Visual Conservation Centre (Packard Campus):** Three-week placement where the Fellow was immersed into the operational workflows of the NAVCC, experiencing first-hand working in a major AV archive. She gained invaluable practical experience in the identification, preservation and digitisation of film and video collections. She also observed processes for digitisation, digital restoration, preservation of paper prints (motion picture films printed on paper rolls, used as copyright deposits), photochemical processing/copying of film, preservation of gaming media and audio digitisation.
3. **AMIA 2022:** Attendance of the annual AMIA conference, held in Pittsburgh over three days in December. AMIA is the world's largest "nonprofit international association dedicated to the preservation and use of moving image media." The conference provides a forum for the international media archivist community to network, share projects and achievements, and discuss latest research and best practice via presentations and poster sessions. It also invites sponsors to share their latest technologies/products and offers a range of workshops and committees for members to be involved in key areas of personal interest.
4. **Indiana University:** Two-day site visit to the Archives of Traditional Music (ATM), Audio-Visual Preservation Services (A-VPS) and Indiana University Libraries Moving Image Archive (IULMIA). The Fellow met with the Director and the Collections and Cataloging Librarian of the ATM to discuss the workflows and systems used in managing the collections and attended a tour of the stored collections. The A-VPS team provided the Fellow with hands-on experience in cleaning/preparing AV material and using play back equipment to digitise magnetic tape, wax cylinders, gramophone records and video. The Fellow also engaged in a discussion of management issues regarding the massed digitisation projects with the Head of Department. With the IULMIA team, she undertook a tour of the state-of-the-art Ruth Lilly Auxiliary Library Facility (storage facility), and engaged in feedback discussions concerning 'lessons learnt'

from undertaking the large-scale massed digitisation project known as the Media Digitization Preservation Initiative (MDPI). This was a six-year long digitisation initiative beginning in 2015, which the Fellow had encountered during the Biennial Audio-Visual Archival Summer School (BAVASS) in 2019.

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5. **UCLA Library Film & Television Archive, and Packard Humanities Institute:** Two-day site visit involving a comprehensive tour of the PHI Stoa facilities, including the Safety and Nitrate vaults, film preservation work rooms and digitisation labs; discussions with UCLA and PHI staff about collection management, workflows, advocacy, inventory, inspection, preservation, the functions of the TV Office, digital preservation and restoration, and insight into the Hearst Metrotone Newsreel collection digitisation project.
6. **Stanford Libraries | Digital Library Systems and Services:** One-day visit comprising a tour of the preservation facilities (audio labs) and discussions with the Digital Library Services team regarding digitisation workflows and tools/resources, digital preservation, Quality Control, and access to collections via the Stanford Libraries website; tour of the conservation lab to observe non-AV preservation practices including paper conservation treatment of a piano roll from the Denis Condon Collection of Reproducing Pianos and Rolls.
7. **Berkeley Art Museum and Pacific Film Archive:** Two-day site visit comprising a tour of the offsite AV collection store with the Senior Film Archivist; tour of the Film Library and Study Centre and insight into access platforms in which the public can view collection material; and a discussion with the Director of Film and Senior Film Curator regarding public programming of film screenings at BAMPFA. The Fellow also assisted the Senior Film Archivist with undertaking visual quality control inspection of two animations in preparation for screening in the museum's public theatre.

In addition to the formal program, the Fellow also attended a variety of film screenings at the Dryden Theatre (GEM), Shea's Buffalo Theater (Buffalo, NY), Rome Capitol Theater (Rome, NY), and The Packard Campus Theater at the NAVCC (Culpeper, VA). The Dryden Theater and Packard Campus Theater in particular, have regular weekly programs to showcase restored films from their respective collections, enabling audiences to experience the films as they would have been experienced on initial release. This is achieved through ethical restoration that does not alter the integrity of the original film, and sensory experience using live musical accompaniment for silent films. America celebrates a rich and diverse film culture through festivals and screenings throughout the year, and by attending such screenings the Fellow was able to truly immerse herself in this culture and see the product of the magnitude of effort that goes behind preserving collections and keeping history alive.

The Fellow also was fortunate to have an online consultation with Ray Edmondson who provided excellent advice on industry and networking with various AV organisations.

Fellow Biography

If you had asked Natalie 10 years ago what Audiovisual Archiving is, she could not have answered. She had not heard of such a thing, nor did she know it is a specialised field in which people can train and build a career, or just how significant it is to the preservation of our history, heritage and culture. The closest she came to handling legacy formats was during her childhood, sneaking off to listen to her dad's Red and Blue albums (The Beatles, obviously!) on cassette, collecting Backstreet Boys CDs and dancing along to her uncle's 1990 smash hit vinyl, Do the Bartman!

Natalie had grown up with a passion for art. In 2011, she graduated from The University of Sydney (USYD) with a Bachelor of Visual Arts, specialising in glass artmaking. In 2013, she graduated again from USYD with a Master of Museum Studies. While studying, Natalie began to explore the museum collection management field. She volunteered

at the Australian Museum in the Digivol massed digitisation program and with the Anthropology department where she conducted inventory and database management of collections, and researched and wrote online articles about Ethnographic collections. This is where her passion evolved into preserving historical collections.

It was at the SLNSW where Natalie was first exposed to AV Archiving and preservation as a profession. In 2015, she joined the Collection Care team for the Digital Excellence Program (a 10-year government funded massed digitisation initiative). Her role was to prepare collections for internal and outsourced digitisation, which involved the assessment, conservation treatment, rehusing and packing of a range of material such as books and manuscripts, 2D artworks and portrait miniatures, glass plate negatives, glass slides, photographs and AV material. Magnetic Media (cassettes, reel-to-reel tapes, video) was the first AV preservation priority due to the need



Figure 1. Natalie exploring the collection at the LOC Packard Campus, photo by Jason Butler, Digital Preservation Specialist

to capture content from obsolete formats, and a few years later came the Moving Image and Gramophone Record digitisation projects.

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Although Natalie worked across collection types, she found herself utterly driven to the AV collections. Not even the act of cleaning hundreds of mouldy cassettes and earning the unofficial and rather unfortunate title of “Mould Queen” could deter her! There were no dedicated AV conservators at the SLNSW and it became evident that lack of, or limited expertise was an issue across many GLAM institutions. For this reason, she made it her mission to develop her expertise in the industry of film and sound preservation.



Figure 2. Natalie's last day at the LOC Packard Campus, Photo by Mike Mashon, former Head of Moving Image Department

Natalie's collection management passion evolved into a desire not only to specialise in this area, but to be involved with a strong, supportive national and international community of AV archivists who share the same passion and common goals of preserving and sharing AV heritage. She has dedicated the last eight years to immersing herself in the AV industry through professional development opportunities and networking. This included: attending the inaugural *Biennial Audio-Visual Archival Summer School* hosted at Indiana University in 2019 as one of 50 candidates worldwide; attending and presenting at conferences in Australia and internationally (such as ASRA, IASA and AMIA); and undertaking her Fellowship through the ISSI.

This experience has helped shape Natalie's career and define her position within the industry. She has been fortunate in building a successful career in the GLAM sector, managing and preserving cultural collections for City of Parramatta, Fairfield City Museum & Gallery, Club Five Dock R.S.L., SLNSW and the ABC. She is now the Registrar Team Leader for the Digitisation Team at the Powerhouse, where she is currently reviewing and revising projects, procedures and workflows.

Natalie was also appointed a Vice President for the *Australasian Sound Recordings Association* in March 2023 and is looking forward to working closer with the broader AV community and disseminating her knowledge and experiences within the industry.

Abbreviations / Acronyms

ABC	Australian Broadcasting Corporation
AIATSIS	Australian Institute of Aboriginal and Torres Strait Islander Studies
AMIA	Association of Moving Image Archivists
ASRA	Australasian Sound Recordings Association
ATM	Archives of Traditional Music
AV	Audiovisual
A-VPS	Audio-Visual Preservation Services
BAMPFA	Berkley Art and Pacific Film Archive
BAVASS	Biennial Audio-Visual Archival Summer School
CSU	Charles Sturt University
DEP	Digital Excellence Program
FL&SC	Film Library and Study Centre
FTVA	Film & Television Archive
GEM	George East Museum
GLAM	Galleries, Libraries, Archives and Museums
IASA	International Association of Sound and Audiovisual Archives
ISSI	International Specialised Skills Institute
IU	Indiana University
IULMIA	Indiana University Libraries Moving Image Archive
LOC	Library of Congress
MDPI	Media Digitization Preservation Initiative
NAVCC	National Audiovisual Conservation Center

NFSA	National Film and Sound Archive
PHI	Packard Humanities Institute
QA	Quality Assurance
QC	Quality Control
Selznick School	The L. Jeffrey Selznick School of Film Preservation
SL	Stanford Libraries
SLNSW	State Library of New South Wales
UCLA	University of California, Los Angeles
USA	United States of America
USYD	University of Sydney

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Definitions

For definitions of a range of terms used in this report, the Fellow recommends viewing the NFSA Glossary located on its website: <https://www.nfsa.gov.au/preservation/preservation-glossary>

4. Fellowship Learnings

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As evident from the Fellowship Period and Methodology section above, this Fellowship program provided a comprehensive and in-depth examination of the diverse dimensions within AV archiving. This is significant because while AV custodians may specialise in areas like digitisation, conservation or collection management, the role of an AV archivist often demands a versatile skill set, particularly in smaller institutions with limited staff. The Fellow recognised the importance of a well-rounded understanding across all domains, even when not specialising in each facet. However, this made it challenging to address the Fellow's learnings fully in this report. This section is therefore devoted to sharing some of the Fellow's key highlights.

TECHNICAL SKILLS

The first half of the Fellowship program was devoted to broadening the Fellow's technical knowledge and skills in AV preservation and digitisation. She was especially interested in working with nitrate film, learning to use digitisation equipment, and learning methods of digital preservation and restoration, as she had not previously had the opportunity to gain experience in these areas.

During the Fellow's three-week placement at the **Selznick School**, she participated in the following programs:

35mm film handling and preservation: inspection/assessment, winding, re-canning and acid testing of black and white and coloured 35mm nitrate, acetate and polyester film. The Fellow refined her skills in film handling, storage, restoration (repairing broken splices and edge damage) and identification [e.g. film stock types and their characteristics, colouring techniques (e.g. hand-painted, tints, tones), preservation issues]. These activities were undertaken at the Louis B. Mayer Conservation Centre (nitrate facility) and the GEM film preservation lab, where she used equipment such as upright and flat winding benches, footage counters, splicing tape, A-D (acid detecting) strips and archival canisters and cores to rehouse film. She also completed inspection forms as she assessed and identified films (inspection forms are a cataloguing procedure that records type of film and condition on date of inspection). The Fellow developed her confidence in identifying types and characteristics of a variety of film, and safely handling nitrate film stock.

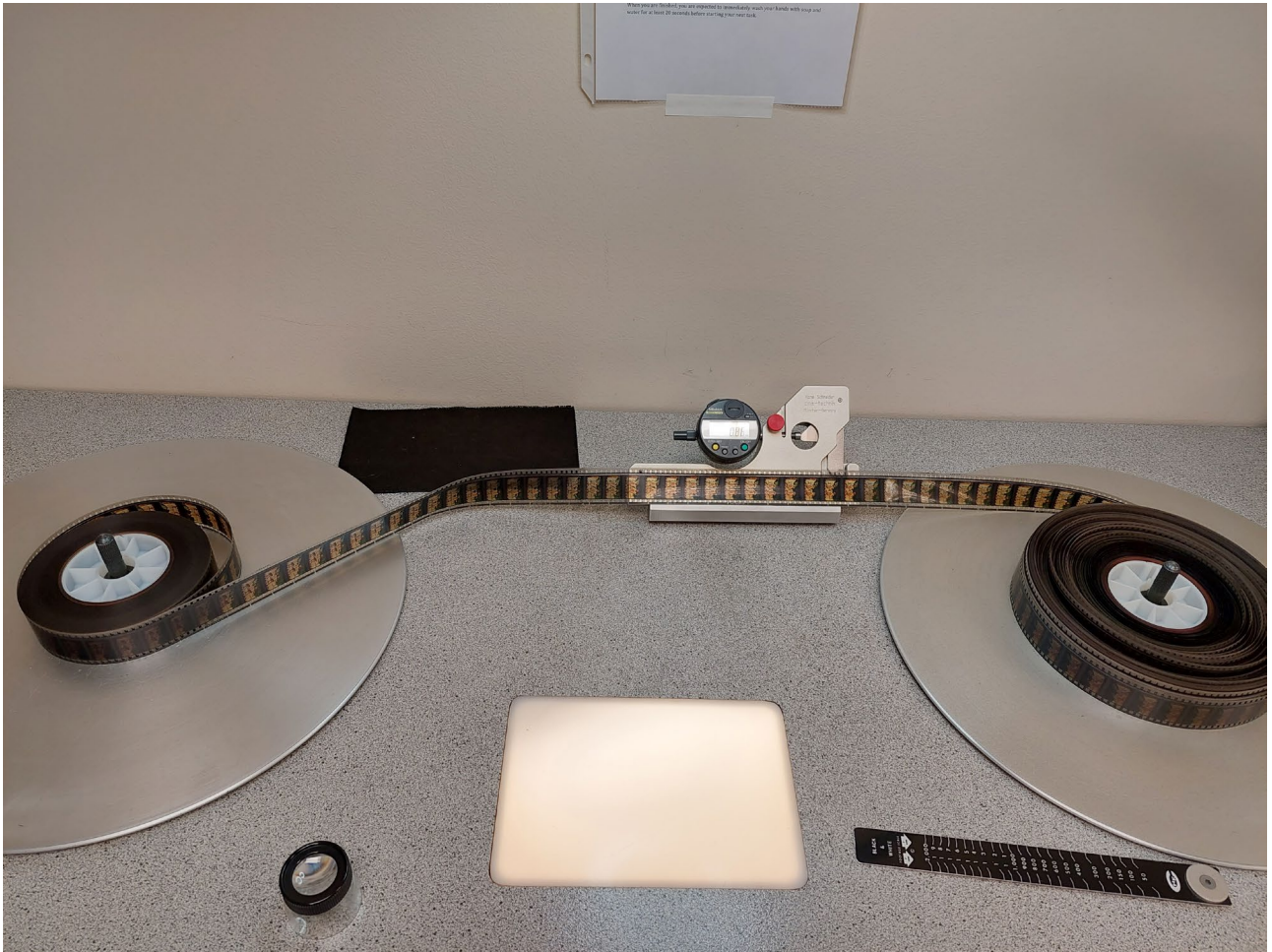


Figure 3. Inspecting nitrate film using a loupe, film measuring stick and digital film shrinkage gauge.

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Digitising tape sources: identified and discussed preservation issues such as sticky shed syndrome for video tapes including Betacam, DigiBeta and U-matic; observed and practiced digitisation of tapes using legacy tape decks connected to Black Magic computer software; observed editing using Da Vinci Resolve computer software. The instructor opened the lid of Sony U-matic SP videocassette player to show the students the inner mechanisms of the machine, how it works, how to attach the cables, how to correctly insert tapes and how to safely clean the heads. The Fellow also used an inspection form to identify and assess some tapes.



Figure 4. Tape digitisation suite.

Digitisation: observed film scanning undertaken using GEM's new ARRISCAN XT¹ – a new sophisticated film scanner which is designed to safely scan damaged film, with interchangeable gates to suit the specific needs of each film and it does not heat up, making it safe to scan nitrate stock. Of particular interest was the scanning of an extremely fragile piece of hand-coloured nitrate film which had to be scanned frame-by-frame by the scanner operator as it was too delicate to pass through the machine automatically. Although this was a very time-consuming activity and likely not practicable to undertake on large masses of film stock, it was interesting to see that it is possible to scan deteriorated and highly fragile material to high archival standards.

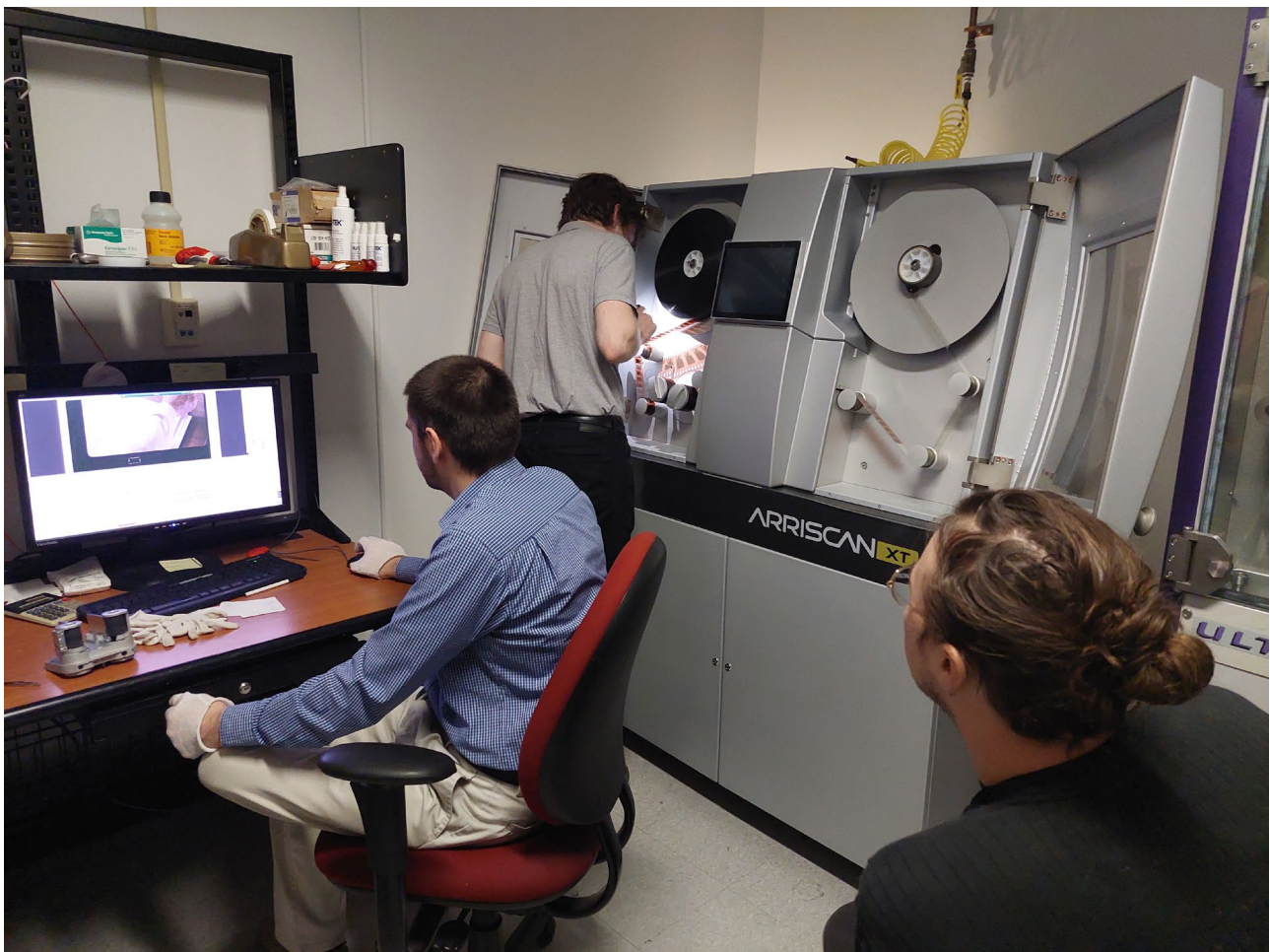


Figure 5. The instructors scan a fragile nitrate film using the ARRISCAN XT

1 ARRI, 'ARRISCAN XT', ARRI, 2023 [website] <https://www.arri.com/en/camera-systems/archive-solutions/arriscan-xt> (accessed: 06 May 2023).

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Digital Preservation & Restoration: The Fellow was grateful to have had the opportunity to gain hands-on experience in using software for digital preservation and restoration at GEM's Film Preservation Services studio. Under the guidance of two highly experienced former Selznick students, now GEM staff and instructors, she used the Da Vinci Resolve software to colour grade the digitised film, *The Philistine in Bohemia* (1920). The editing suite had an incredible and unique setup within the former Kodak facility. A film winding bench was stationed beside the computer with the software program, while the digital film was projected on the wall ahead in a theatre/cinema format. The projector and computer were calibrated to ensure the projected colours matched the computer screen. The projector and computer were calibrated to ensure the projected colours matched the computer screen.

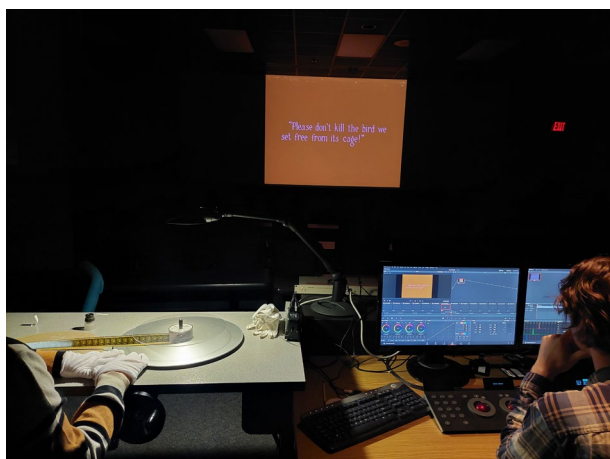


Figure 6. The Digital Restoration set-up at the Film Preservation Services studio

The students worked together to make digital adjustments - one inspected the physical film and compared it to the projected film, then communicated necessary adjustments to the other student who would edit the digital film through using the software. The process of colour grading involved matching the tints and tones of the digital film to the physical film exactly, or as close as possible to maintain the integrity of the original material. This was achieved by using software to manipulate the lift, gamma and gain until the desired look was achieved.

The Fellow used the PFClean software program produced by The Pixel Farm,² to clean and restore digitised film, learning basic techniques for removing dirt, dust, and scratches, repairing severe damage and loss of image, and stabilising film. This was achieved by applying automatic filters and manual techniques such as the clone tool, brush tool and deflicker function.

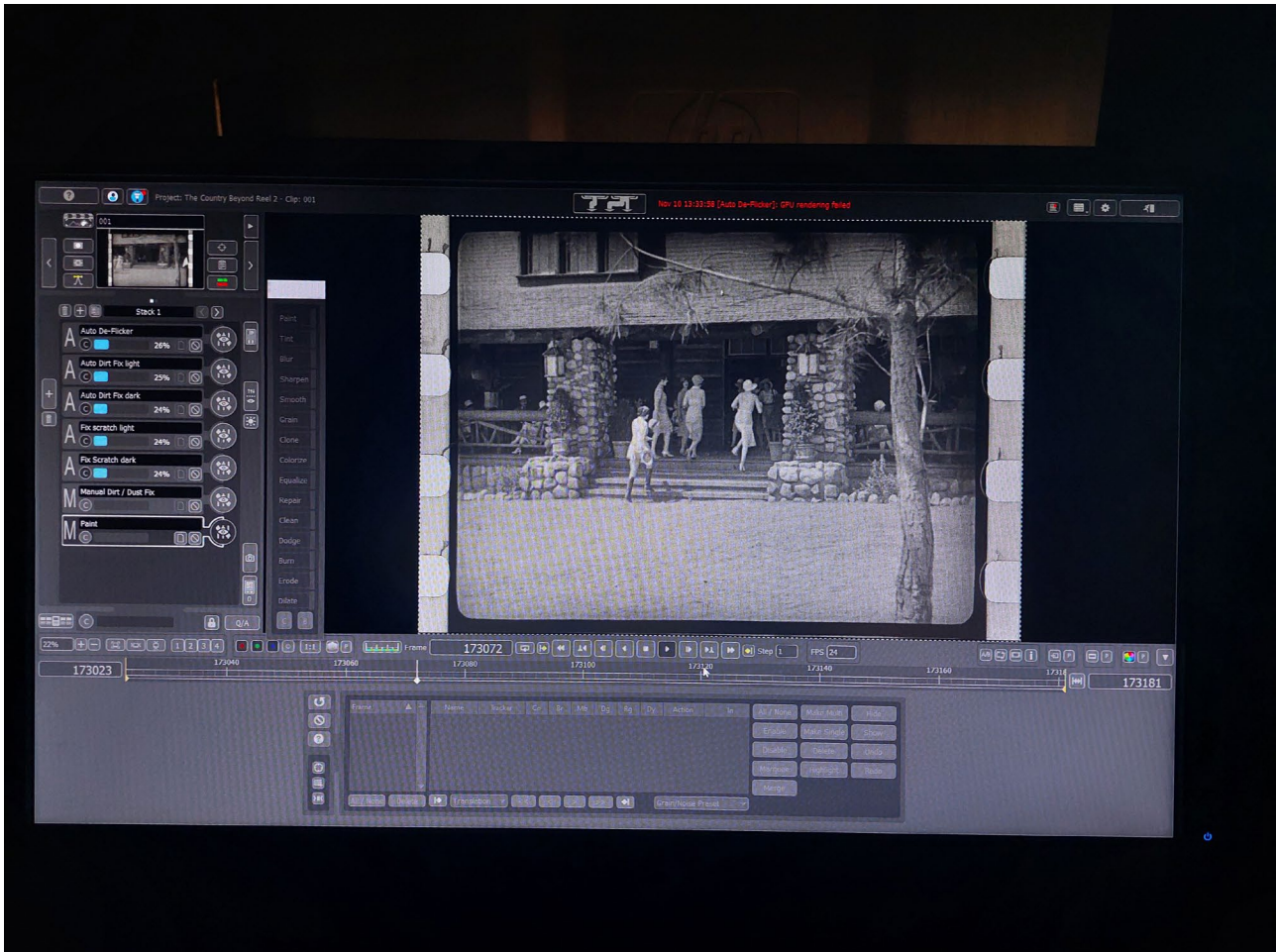


Figure 7. Using PFClean to clean and restore footage.

The most important lesson learnt about digital restoration and preservation of archival material is to always maintain the integrity of the original film as it would have first been produced and presented to audiences. For example, digitally removing film grain would be unfaithful to the original material as grain is a natural characteristic of film (“film grain is the random physical texture made from small metallic silver particles found on process photographic celluloid”³ – creates an organic, textured appearance). Original splices also should not be removed as they would have been seen

2 The Pixel Farm, 'Restore, Remaster, Repurpose', PFClean, n.d [website] <https://www.thepixelfarm.co.uk/pfclean/> (accessed: 23 February 2023).

3 R, Abreu, 'The Storytelling Value of Film Grain', Studio Binder, 2020 [website] <https://www.studiobinder.com/blog/what-is-film-grain-definition/> (accessed: 23 February 2023).

by audiences of the time. Similarly incorrect use of editing software can accidentally introduce digital artefacts (“signal disturbances due to the techniques of acquisition and coding which cause a distortion in the final result”⁴). This adds a new element to the film which is not true to the original material. The objective is to remove imperfections such as dirt and scratches that were developed overtime from overuse and poor handling and storage.

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During the Fellow’s three-week placement at the **LOC NAVCC** (Packard Campus), she had the opportunity to immerse herself in the operations of the world’s largest library AV institution, working directly with the preservation experts and observing their practices. The focus was mainly on film and video preservation and she undertook the following activities:

Nitrate film handling and inspection: building upon skills learnt at GEM, the Fellow inspected and identified previously unidentified nitrate films using various clues such as film stock, manufacture, colourisation techniques (colours/tints) and film titles/subtitles. This information was essential for cataloguing, thus preserving the integrity of the film. The Fellow also undertook basic preservation and rehousing by winding films onto cores with a larger diameter (this prevents the film base developing a dangerous tight curl as is the risk on a core with a small diameter) and storing in an archival film can. She also cleaned mouldy nitrate films using a vacuum with a HEPA (high efficiency particulate air) filter and adequate Personal Protective Equipment (PPE) to minimise risk to health; and assisted the Vault Manager with inventorying films that had returned from loans and returning them to the vaults.

The Fellow learnt about hazards and best-practice safety standards when handling and storing nitrate film. Nitrate can be a highly flammable, dangerous material if exposed to a heat source, and a nitrate fire cannot be extinguished, as it generates its own oxygen in the combustion process.⁵

The Vault Manager took the Fellow on a fascinating tour through the nitrate film vaults and back-of-house operation units and explained the five different systems of fire suppressions:

1. Co2 detector, if activated will send a warning signal to the Architect of the Capitol Office in the building, no alarm is sounded;
2. Smoke detector, if activated will set off an evacuation alarm and will turn on the water deluge system inside the vault in which the smoke is detected;
3. Protector wire, a red cable that runs the entire length of the vault and if damaged by fire will set off the deluge system and alarm;

4 R, Catanese, 'The digital restoration of film', BiD, 2014 [website] <https://bid.ub.edu/en/33/catanese3.htm> (accessed: 16 February 2023).

5 AMIA Nitrate Film Interest Group, 'Identifying and Handling Nitrate Film', AMIA, 2008, p.1 [website] <https://amianet.org/wp-content/uploads/Resource-Nitrate-Identifying-and-Handling.pdf> (accessed: 04 March 2023).

4. Deluge system – a huge water tank situated on the hill behind the institution brings down 200 pounds per square inch of a water curtain that covers the cabinets in the vaults. This will slow down the fire and keep nitrate film from combusting but will not put out what is already burning;
5. Blowout panels – if pressure from the fire in the vault increases significantly, these panels which are situated high in the back of each vault will open and draw the oxygen out, preventing the vault doors blowing out into the hallway.

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The LOC takes serious precautions to ensure there is no risk of fire in the nitrate vaults, including banning any technology such as mobile phones, iPads/tablets and watches in the vault and workrooms unless they are intrinsically safe.

Film preparation/preservation: The Fellow enjoyed learning about early copyright film deposits - rolls of paper strips which were deposited in the Copyright Office as part of registration of motion picture productions. "Prior to 1912 copyright law made no explicit provision for motion pictures, so some entrepreneurs protected their properties by registering them as photographs, submitting contact prints on photographic paper."⁶ This collection is the most important single collection of motion picture film at the LOC, with over 3,000 titles spanning 1894-1915 and all period genres.

The Fellow observed a Méliès paper film being preserved through basic paper conservation treatment of tear repairs and splice reinforcement using re-moistenable tissue to stabilise it for transfer on the scanner. She was informed that due to the high significance and fragility of the paper collection, the LOC only sends material offsite if there are two copies (prioritising the one in better condition), as sending the sole copy can risk loss or damage.

6 Library of Congress, 'Early Motion Pictures Free of Copyright Restriction in the Library of Congress', LOC, n.d [website] <https://www.loc.gov/rr/mopic/earlymps.html> (accessed: 04 March 2023).



Figure 8. Repairing a tear with re-moistenable tissue and a heated spatula.

The paper collection is extremely rare and significant as many are the only remaining copies of a film - "while the nitrate copies of so many of these films were scattered or self-destructed, the paper-based photographs survived in relatively good condition..."⁷

The Fellow also observed the different workflows for preparing safety film for either scanning or photochemical duplication. Building on her knowledge from GEM, she was shown techniques for repairing perforation damage to ensure the film is stabilised for running through a scanner. She was also shown other things to look out for such as different shrinkage measurements throughout the film which will become problematic in the scanning phase - some films are compiled of multiple stock (film bases) spliced together which may deteriorate at different rates, causing shrinkage to differ throughout the length of the film.

7 Ibid.

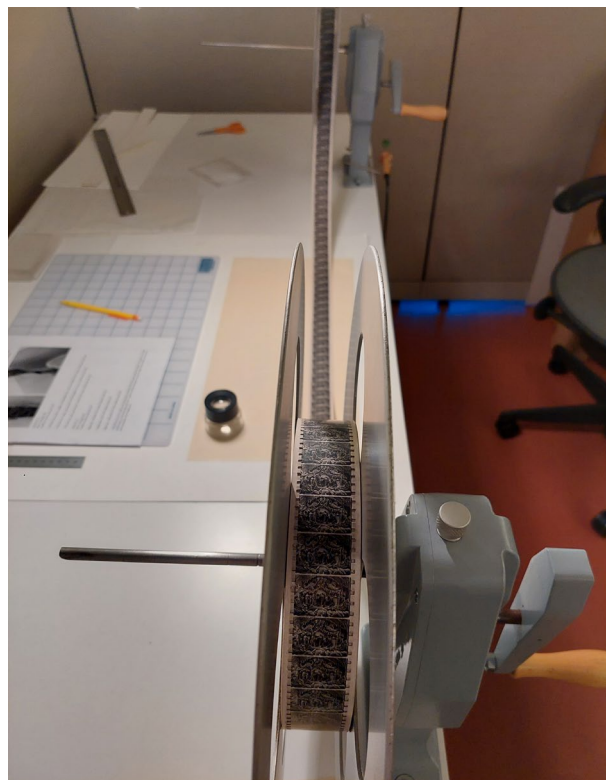


Figure 9. Inspection of a Geo. Méliès 1903 paper film.



Figure 10. Close up of paper film.

Photochemical duplication of film: One of the most fascinating aspects of the Fellow's visit to LOC NAVCC was observing the process of photochemical duplication of a film and viewing the front and back of house systems of the laboratory. The labs are dedicated spaces where specialised equipment and skilled technicians are employed to duplicate and preserve various formats of photographic and motion picture films. The lab contains six processors capable of producing black and white as well as colour films. Only the two black and white processors are operational, due to environmental regulations governing the disposal of chemical waste generated by colour processing. To maintain the required quality, an on-site chemist prepares the chemicals and continually supervises the solutions for their adherence to the required standards.



Figure 11. The Photochemical processing lab

Within the department, two distinct workflows are implemented for film preservation – digitisation and film-to-film duplication. Digitisation involves the scanning of film elements at either 2K or 4K resolution, a choice contingent upon the characteristics of the film. For instance, a 16mm film might not undergo a 4K scan if its quality does not necessitate such a high resolution. Decisions regarding preservation strategies, such as creating new prints, conducting scans, or a combination

of both, are guided by factors such as the condition and quality of the film, its historical significance and insights from curatorial experts.

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Film-to-film duplication remains a superior preservation method despite the digital shift, due to its physical integrity, longevity, uncompressed preservation, non-proprietary nature, future-proofing, authenticity, high resolution and proven success. Film's tangible and stable qualities offer long-term protection and access, overcoming challenges such as digital obsolescence and compression. However, it's important to acknowledge that film-to-film duplication also has its challenges, including the need for proper storage conditions, skilled technicians and appropriate equipment.

Many photochemical duplication laboratories across the world, including Australia, have been discontinued because of factors such as the digital transition, cost and efficiency of maintaining equipment, materials and skilled labour, space and infrastructure (labs require specific large-scale equipment and stable environmental conditions). There is a trend to digitise material or outsource photochemical duplication to remaining labs.

If possible and feasible, a balanced approach involving both film and digital preservation is ideal for ensuring comprehensive and sustainable audiovisual preservation. Digital technologies can complement film preservation efforts, offering accessibility, ease of distribution and additional opportunities for restoration and access. A combination of film and digital preservation strategies can ensure the long-term accessibility and integrity of audiovisual materials.

The Fellow also observed digital preservation workflows. The LOC Digitisation section is responsible for film scanning, Quality Control of files, data ingest, colour correction and restoration. The Scanity film scanner is the principal tool used to scan nitrate prints and fine grains. A new wet gate component addresses the challenges of warped film, flattening film and using a perchloroethylene solution to gently relax the film during scanning. The scanner also has the ability to read frame lines and accurately count perforations - should any irregularities surface, the scanner halts and resets, in order to maintain the integrity of the scan.

Video Digitisation: Under the guidance of the Digital Preservation Specialist, the Fellow performed the complete workflow for digitising videotapes. This comprised creating barcode labels and adhering them to videotapes; loading videos into the SAMMA robots for massed digitisation; then undertaking basic visual QC using the Baton software, to ensure there were no issues during transfer. Any tapes that presented issues were re-assessed and re-digitised via 1:1 transfer on the appropriate playback machine under the guidance of an operator. SAMMA (System for Automated Migration of Media Assets) robots were developed by Front Porch Digital, originally specifically for the LOC, as a solution to fully-automated massed digitisation of analogue videotapes. Sixty videotapes are loaded into each robot at a time; a mechanical arm feeds the tapes into the tape



Figure 12. A SAMMA robot for VHS massed digitisation



Figure 13. The 1:1 transfer station

decks, and then the digitisation process runs until complete. The LOC has four machines to digitise VHS, U-Matic and Betacam tapes, which contributes to the majority of the library's digitisation output.

The Fellow observed certain similarities to the LOC, during her visit to the **PHI (Packard Humanities Institute) Stoa** – the USA's largest film archive on the West Coast. The PHI Stoa is one of PHI's most significant projects - a purpose-built facility designed to house the staff and collections of the **UCLA Film and Television Archive**, with which PHI has had a long-standing partnership (PHI is a major funder and collaborator of the UCLA Archive⁸). The PHI Stoa serves as a counterpart to the LOC Packard Campus and shares the common goal of the storage, preservation, study and accessibility of America's AV heritage.⁹ The Fellow received a very comprehensive tour of the facilities from both the UCLA FTVA and PHI Film Laboratory experts, gaining insight into the workflows and set-up of the archive and workspaces relevant to both organisations.

Within the Stoa, there are offices and workrooms shared by both the UCLA Archive (located in the East wing) and PHI (in the North wing). Similar to the LOC, the workrooms are allocated for specific types of activities such as digital work, film inspecting and grading (aka

timing - adjusting brightness and contrast of the film). The building houses 120 nitrate film vaults, as well as larger vaults for safety film and other material. The vaults are equipped with precise temperature and humidity control systems and the nitrate vaults meet strict fire safety standards.

8 Packard Humanities Institute, 'The PHI Stoa' PHI, n.d [website] <https://packhum.org/stoa.html> (accessed: 02 September 2023).

9 Ibid.

The building also contains a lab dedicated to undertaking photochemical (film-to-film) processing of film, which involves creating new preservation elements from original film materials, and dry lab operations involving printing, cleaning and preparing film. It has the capability to create 35mm and 16mm films. Like the LOC NAVCC, the PHI Film Laboratory also faces environmental regulations which prevent it from undertaking wet lab operations.

Digitisation and digital restoration also form part of the workflow. Restoration is undertaken using a software program called Phoenix by the company Filmworkz. Methods include converting a negative to a positive, then colour correcting and removing elements such as splices, vertical scratches and specks of dust/dirt, first by an automated application then detailed cleans are undertaken by hand if required. They often do not have existing prints to compare to when colour grading, so unless the film is tinted, grading is undertaken by eye. The Fellow observed digital restoration in practice on an episode of the television show *Ship's Reporter*, from the 1950s.

Architecturally, the building bears no resemblance to the LOC. The exterior resembles an ancient Greek Stoa, while the interior draws inspiration from the 15th-century Convent of San Marco in Florence. The Stoa is intentionally designed as a quiet place for people to preserve and study films – this imitates the work of monks who copied and preserved literature from antiquity.¹⁰ For this reason, it is not open to the public, but gives staff the opportunity to immerse themselves in their work and environment.

At **IU**, the Fellow was offered a one-day intensive workshop with the A-VPS team, on rotation with each staff member. She had met this team during the 2019 BAVASS where she'd been introduced to basic methods of preparing and digitising audio and video formats. This time she was fortunate to gain an exclusive hands-on experience under the guidance of the experts. She broadened her knowledge and skills in cleaning and preparing audio and video tapes, wax cylinders and gramophone records for digitisation and practised correctly setting the items onto playback



Figure 14. The nitrate vaults

¹⁰ Ibid.



Figure 15. The video digitisation suite

machines for digitisation (this included adjusting azimuth on magnetic tapes and selecting appropriate styli to ensure best transfer of sound and to minimise risk of damage to record grooves). The team also provided insight into their digitisation workflows and systems, which will be addressed in the next section.

During her visit to **BAMPFA**, the Fellow undertook a tour of the film collection offsite storage vaults, guided by the Film Archivist, and gained insight into the workflows around accessing/loaning and tracking material; curatorial scoping for exhibition programming and the acquisition process.



Figure 16. Inside the film vault

The Fellow also gained some practical experience when she was invited to assist the Film Archivist with undertaking visual QC of two short films in preparation for public screening in BAMPFA's cinema. This involved watching the films from start to finish to ensure it is presentable and identify issues. This is the process undertaken at the institution to approve films for shows. The institution's inhouse projectionist screens films as well as undertakes film preparation and scanning.



Figure 17. The cinema (above) and the projection room (right)



COLLECTION MANAGEMENT

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Collection Management involves the development, storage, and preservation of collections and cultural heritage with the objective of the long-term safety and sustainability of cultural objects.¹¹ Best practice collection management should comprise thorough research and cataloguing, standard housing and storage in an appropriate environmentally controlled space, and that both the physical object and associated information are made accessible. Often the level of management is determined by available resources – financial, equipment, specialised staff. A common issue the Fellow discovered across all the institutions visited, whether considered large or small, was limited access to funding and the need to rely on advocacy, philanthropy and grant opportunities to support specific preservation projects. This prompts organisations to think laterally and use effective strategies to maintain ongoing collection management.

The Collection Manager and the Archivist at the GEM, in their lecture on *Collection Management and Information Gathering*, provided good advice for managing the documentation of collections. They emphasised that documentation should be a tiered approach so it is progressive, as information can be accumulated over time, and priorities of what to capture should be determined. This will ensure that the fundamental information is captured and documented at the time of acquisition, making retrospective documentation and collection management more efficient in the long-term. They also advised that minimal processing should be the baseline for describing collections and that it is better to process more collections with less content rather than processing few collections with detailed content.

The Fellow was interested in the GEM's approach to maintaining its vast collection. As well as advocacy and seeking grant opportunities to fund preservation projects, the museum largely relies on the labour of the *Selznick School* students to support collection management. The students are taught by GEM staff and guest lecturers and learn all aspects of AV archiving including museum practice, collection management/archiving, ethics, film history and curation, conservation and restoration. They then apply their knowledge to practical activities in the labs, working on films from the GEM collection, and are also allocated a personal project to specialise in an area of interest.

This resourceful model has two major benefits. First, the students develop a solid foundation for a career in AV archiving through first-hand experience in working in a professional archive under the guidance of experts. Second, this strategic integration of students into the workflow, largely enables the GEM to manage and preserve a significant portion of their collection with less funding/staff resources, and maintain overall productivity.

11 Scholarly Community Encyclopedia, 'Collections Management (Museum)', Encyclopedia, 2002 [website] <https://encyclopedia.pub/entry/35274> (accessed: 19 March 2023).

Similar tactics are applied to the *Archive of Traditional Music* at IU, though on a smaller scale. The Archivist explained that the bigger the collection, the more general the catalogue descriptions. It is not efficient to spend too much time thoroughly cataloguing collections when there is a vast amount of material to get through and limited staff. The ATM offers a Graduate Assistantship in which students work 20 hours a week, with their tuition financially covered. This opportunity enables the students to put their knowledge into practice as they gain hands-on experience working with the collection, while supporting the archive with collection management. The students assist with workflow processes including entering content from indexes onto a spreadsheet, which is then checked by the library manager and transferred to XML and finally uploaded to a database for accessibility.

During her visit to the A-VPS, the Fellow engaged in a very informative conversation with the Head of A-VPS at the time, who explained some of the challenges associated with transitioning a large-scale project which largely involved outsourcing production, to a reduced-scale in-house project and adapting to new workflows. One challenge was due a change of administration which made it difficult to advocate for resources to support ongoing digitisation. Another was the decrease in productivity due to no longer having access to outsourced digitisation providers and the necessary cleaning, playback and digitisation equipment required to support a massed digitisation output. The Fellow also gained good advice on the management of digitisation programs, such as using automation for QA of digitised files to drive productivity and keep error rate down, and striving for simplicity as much as possible – not complicating workflows and management systems.

During a discussion with the IULMIA team, the Fellow gained great insight and advice concerning project management and outsourcing. This included:

- Advocating for support from 'higher up' in the organisation, but being aware that this may mean decisions are controlled from above, thus the advocator risks losing power in decision making.
- Setting clear standards and expectations for external vendors (e.g. digitisation providers) to prevent or minimise issues arising that may impact on workflows and reaching deadlines.
- Making 'access' the focus of a digitisation project rather than 'preservation'.
- Developing the project 'in-house' and extending the project period rather than outsourcing work to external suppliers for a reduced timeframe. By slowing the process, the team can be in better control of the project, its outcomes and of the collection material; and staff can be maintained longer, so the institution does not lose its skilled and knowledgeable experts within a short project period. This would also provide an opportunity to thoroughly plan and prepare procedures and workflows and avoid risk of issues such as damage to physical objects and failed files that did not meet QC standards if the project is rushed.

PRESERVATION AND ACCESS STRATEGIES

With the inevitable obsolescence of technology-based formats and deterioration process of certain materials such as acetate, preservation is fundamental to AV archives. Preservation encompasses various measures to ensure ongoing access to content such as conservation and archival storage of physical media, and digital migration and restoration of content. Without preservation, we will lose the ability to access AV media and in turn, the ability to share cultural history and heritage – the essence of collecting institutions. The Fellow gained valuable insight into some of methods applied by the institutions she visited, to ensure the longevity and accessibility of their collections.

The **BAMPFA**, which is affiliated with the University of California, takes an impressive approach to making its collections available. The institution, which comprises a fusion of art, theatre and an archive, contains almost “28,000 works of art and 18,000 films and videos” that represent diverse global cultures and historical periods.¹² Education is the heart of its mission and it achieves this through a range of outreach programs from public screenings of its unique film collections to online databases and collections.

The BAMFA's onsite **Film Library and Study Centre (FL&SC)**, which is freely open to the public, is run by a small team on minimal funding. But despite this, it demonstrates the tremendous possibilities of connecting collections with communities. While they do not have the rights to distribute and screen films outside the institution, hundreds of digitised films are made available via a platform called Plex Media Server. This user-friendly platform has the capacity to store a significant amount of large file sizes and provides easy-to-use search functions for locating content.

The FL&SC uses various online platforms to share its extraordinary collection of digitised movie and local cinema ephemera such as books, magazines, photographs, posters, newspaper clippings/articles, audio recordings, film festival notes, press kits and souvenir programs. Some examples include:

- **Cinefiles:** “a website, run on the open source Blacklight framework, contains scanned images of reviews, press kits, film festival and repertory theater program notes, newspaper articles, and other ephemera from our extensive collections.”¹³
- **Blog Series Online:** contains blog posts written by the FL&SC team using digitised material from the collection, centred on subjects/filmmakers and cultural events such as Asian American History Month and Black History Month.

12 The Regents of the University of California, 'BAMPFA Collections', BAMPFA, 2023 [website] <https://bampfa.org/about/bampfa-collection> (accessed: 19 September 2023).

13 The Regents of the University of California, 'Cinefiles', BAMPFA,n.d [website] <https://cinefiles.bampfa.berkeley.edu/> (accessed: 19 September 2023).

- **California Revealed:** this is a California State Library initiative designed to help other heritage organisations digitise, preserve and provide online access to their collections.¹⁴ In 2016, BAMPFA was aided by funding to contribute to the project and promote its collection of texts, moving image and audio recordings spanning the 1910s to 2012s, relating to Berkeley and San Francisco Bay culture. The collaboration is an effective method of connecting and sharing collections.

The Fellow found the overall presentation of these platforms very engaging, easily accessible and extremely user-friendly, particularly the database used to share films.

The Fellow met with the Director of Film and Senior Film Curator who described the BAMPFA's diverse and dynamic cinema program, for which it is renowned. The institution makes its collections readily available to the community by providing an enriching cultural and cinematic experience. This includes an extensive range of film screenings, series and events from classical to contemporary genres and delves into the collection's unique archival material. Filmmakers are often invited to make guest appearances at events. The cinema program also includes educational and community outreach programs to foster creativity and encourage appreciation of film.

The Fellow's visit to **Stanford Libraries** (Stanford University), involved an extensive tour with the Stanford Media Preservation Lab (SMPL) team to observe the workflows and methods undertaken to digitise and make accessible, its archival collections. The University collects and preserves a comprehensive range of cultural heritage material including medieval manuscripts, antiquarian maps, AV media, and so on.¹⁵ The focus of the visit was on AV digitisation and preservation undertaken by the SMPL and Born-Digital Preservation Lab (BDLP), and conservation of cultural material (with particular insight into the Denis Condon Piano rolls).

The Fellow observed the SMPL's two audio labs, one of which is dedicated to massed cassette digitisation and one to various other audio formats. This arrangement, equipped with multiple playback machines, contributes to an efficient workflow as multiple formats can be digitised at a time. In addition, digitisation may be outsourced if the SMPL does not have the appropriate playback equipment for certain formats, or if supported with funding to digitise a large-scale collection.

14 California Revealed, 'Introduction', California Revealed, n.d [website] <https://californiarevealed.org/about> (accessed: 19 July 2023).

15 Stanford University, 'Digitization Exemplars', Spotlight at Stanford, n.d [website] <https://exhibits.stanford.edu/exemplars> (accessed: 26 July 2023).



Figure 18. The Audio Digitisation Lab

Digitisation and user access to collection material is largely informed by input from curators, archivists, conservators and collection managers. This group effort ensures that the material is handled and represented correctly to maintain its integrity. The workflow is shaped by internal requests made using a project management 'proprietary issue tracking' software called JIRA.¹⁶ This tool is effective for communicating with the relevant stakeholders involved in the request and tracking status, progress, etc. The Fellow is now experiencing using this system first-hand in her new role and understands the benefits of such a system for communication, project tracking and scheduling.

16 Atlassian, 'Jira: Issue & Project Tracking Software', Atlassian, 2023 [website] https://www.atlassian.com/software/jira?aceid=&adposition=&adgroup=148251130767&campaign=19306728945&creative=660800619313&device=c&keyword=jira&matchtype=e&network=g&placement=&ds_kids=p74602247110&ds_e=GOOGLE&ds_eid=70000001558501&ds_e1=GOOGLE&gclid=Cj0KCCQjwwilBhCFARIsADvYi7JcmE146rqPnhOGtVhYq2tZk1rRk3G5QJ8bLHpnGTXFSUqDs0Uc48gaAgmAEALw_wcB&gclsrc=aw.ds (accessed: 03 August 2023).

The workflow at SMPL comprises initial assessment, treatment and rehousing of material, followed by digitisation, then a manual QC check of the files to check that titles match content, and to identify issues such as interstitial errors (errors that occur during digitisation...resulting in lost samples),¹⁷ and sound dropouts (brief signal loss caused by a tape head clog, defect in the tape, debris or other features, or missing magnetic material that causes an increase in the head-to-tape spacing).¹⁸ Restoration work is kept to a minimum, usually a light automated noise reduction, as altering the sound too much risks damaging the integrity of the original material. If a more detailed restoration is required for listenability, this is performed on the derivative access copy, not the preservation master file.

The University presents its collection online through the Stanford Digital Repository and the *Digitization Exemplars* exhibit.¹⁹ The exhibit features samples of digitised material undertaken by the three specialised areas, SMPL, BDPL and the Digital Production Group, and shares details of the technical and curatorial decisions, and methods and workflows for preserving and digitising collections. This is a highly useful resource for other archivists, librarians, researchers and organisations looking for guidance on managing their collections.

One project that particularly inspired the Fellow was the preservation of the Denis Condon Collection of Reproducing Piano Rolls. Condon was an Australian music teacher, choral singer and conductor, and was internationally renowned as a reproducing piano collector and expert.²⁰ His collection comprises over 7500 piano rolls containing music from major historical composers as early as 1904; and players.²¹ The collection is considered “one of the most important collections of reproducing pianos and piano rolls in private hands.”²² It was acquired by the Stanford Archive of Recorded Sound (SARS) and Department of Music and is housed at the Archive on the Stanford University campus.

The SARS has been undertaking a major Player Piano Project since 2014 which involves cataloguing, researching, scanning and digitising the collection, with the intention of making streaming audio files available to the public.²³ The Project has so far resulted in the preservation

17 AVAA, 'Interstitial Error', AV Artifact Atlas, 2023 [website] http://www.avartifactatlas.com/artifacts/interstitial_error.html#:~:text=Coined%20by%20AudioVisual%20Preservation%20Solutions,is%20being%20written%20to%20disk.&text=This%20error%20results%20in%20lost,by%20an%20abrupt%20vertical%20drop (accessed: 03 August 2023).

18 NFSA, 'Drop Out', National Film and Sound Archive of Australia, Canberra, n.d [website] <https://www.nfsa.gov.au/preservation/preservation-glossary/dropout> (accessed: 06 August 2023).

19 Stanford University, *Digitization Exemplars*, n.d. op. cit.

20 G. Jaksic & R. Mitchell, 'Piano man's legacy a sustaining note', *The Sydney Morning Herald*, 2012, [website] <https://www.smh.com.au/national/piano-mans-legacy-a-sustaining-note-20120921-26c2t.html> (accessed: 02 April 2023).

21 Stanford University, 'Denis Condon Collection of Reproducing Pianos and Rolls', Stanford Libraries, n.d [website] <https://library.stanford.edu/collections/denis-condon-collection-reproducing-pianos-and-rolls> (accessed: 26 February 2023).

22 Stanford University, 'Introducing the Denis Condon Collection of Reproducing Pianos and Rolls', Stanford Libraries, n.d [website] <https://library.stanford.edu/blogs/stanford-libraries-blog/2014/09/introducing-denis-condon-collection-reproducing-pianos-and> (accessed: 26 February 2023).

23 Ibid.

of 400 piano rolls in Stanford's collection. Both the images and audio files are accessible online via the Stanford University Piano Roll Archive (SUPRA) and Garcia Sampedro exhibits.

During her visit to the conservation lab, the Fellow met with a conservator and observed the physical treatment of a piano roll. The conservator described the process for repairing paper damage using heat set filmoplast tissue or wheatstarch paste and Japanese tissue. Damage usually occurs on the edge of the rolls, the leader (which may become detached from the core) and in the middle on rare occasions. The conservator advised that when repairing rolls, it is important to think about how the roll will pass through the scanner during digitisation and how the software may interpret it.

In order to digitise piano rolls and create audio files, a custom optical scanner was "built in conjunction with Swope Design Solutions and based on designs by Anthony Robinson" (an expert in this area).²⁴ The process involved "scanning paper rolls, digitizing the hole punches, and translating the pneumatic expression codings into MIDI format to create expressive performance files."²⁵ This was a highly innovative approach to emulating the music held on piano rolls and enabling public access to researchers.

A major long-term project that the **PHI** and **UCLA FTVA** are collaborating on, and which both institutions shared details with the Fellow, involves the digitisation of the Hearst Metrotone newsreel collection – one of the largest newsreel collections in the world – and making it publicly accessible. The entire collection was acquired by the UCLA FTVA in 1981 and the preservation project (which was still in progress) formed in 2014.²⁶ A Scanity High Dynamic Range Film Scanner was purchased to digitise the film and staff were hired to manage facets such as storage, backup,

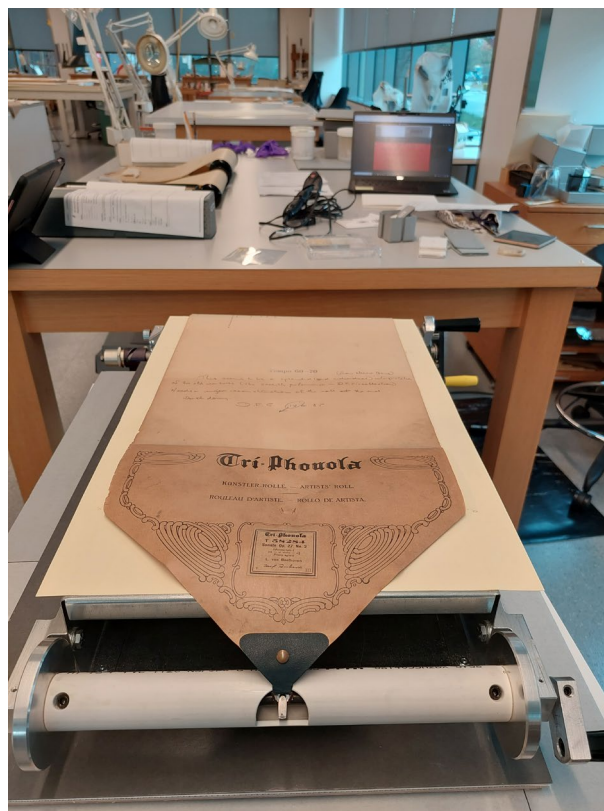


Figure 19. A piano roll in preparation for conservation treatment

24 Z. Shi, C. S. Sapp, K. Arul, J. McBride, J. O. Smith III, 'SUPRA: Digitizing The Stanford University Piano Roll Archive', Archives ISMIR, Stanford University, 2019, p. 3 <https://archives.ismir.net/ismir2019/paper/000062.pdf> (accessed: 24 September 2023).

25 Z. Shi, C. S. Sapp, K. Arul, J. McBride, J. O. Smith III, op. cit. p. 1.

26 UCLA, 'Hearst Metrotone News Collection', UCLA Library Film & Television Archive, California, n.d [website] <https://www.cinema.ucla.edu/hearst-metrotone-news> (accessed: 02 September 2023).

copies and post-production work. The Fellow was interested to hear that Packard hired people without film backgrounds to undertake timing, allowing them the opportunity to gain skills on the job.

The collection is presented on a website developed by PHI and samples are also presented on the UCLA FTVA's YouTube channel. The project is significant as it helps promote public interest in the past and provides a resource for historical and cultural research.²⁷ The collection also contains the documentation which aids the cataloguing process, because it helps piece the narrative together, where some footage no longer exists. The intention is to make this information available too.

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27 Packard Humanities Institute, 'Newsreels from the UCLA Library Film & Television Archive', PHI, n.d [website] <https://www.newsreels.net/> (accessed:02 September 2023).

During discussion with a UCLA staff, the Fellow learnt about methods of funding to develop initiatives for the preservation and access of the collections. UCLA's preservation initiatives are often dependent on the acquisition of grant funding and financial backing from esteemed organisations and foundations, including but not limited to PHI, the David & Lucille Packard Foundation, the Stanford Theatre Foundation, the Film Foundation, the Louis B. Meyer Foundation and the National Film Preservation Foundation. The decision-making process regarding which films to prioritise for restoration is a collaborative effort between the organisation and its esteemed founders. At times, UCLA identifies films in need of restoration, while in other instances, the founders themselves specify their preferences for restoration projects. One of the inherent challenges in this endeavour is the variability in film titles, often altered when released in different countries. To successfully secure grant funding, the staff at UCLA engages in meticulous research and investigation to gather comprehensive information about the selected films. This diligent approach is crucial in presenting compelling grant proposals that advocate for the restoration of these films and align with the interests of the prospective funders.

UCLA collaborates with major film studios like Warner Bros., 20th Century Fox (now Disney-owned), Paramount Pictures and Universal Pictures primarily in the realm of film preservation, research and academia. This involves restoring and preserving classic films, accessing studio archives for research, fostering academic partnerships for students, conducting film-related research, gaining access to historic film materials, hosting film screenings and events, and more.

The GEM recently undertook a major preservation project for a unique collection of over 1000 films prints from the South East Asian Cinema collection. The collection contains Indian and Pakistani prints which were acquired from various sources. These include donation from the British Film Institute National Archive and salvage from the NAS 8 Theatre, California (North America's first and largest cinema to screen multicultural movies), which was demolished in 2014.²⁸ The films range from 1939 to 2013, cover over 10 languages, and many were directed by major Indian and Pakistani directors.

The project entailed restoration, conservation and collection management of the films such as cleaning, inspecting, re-canning, identifying, cataloguing and digitising the films. This was made possible by a grant from the Institute of Museum and Library Services, which enabled two film specialists to be hired full-time to complete the project. They were met with many challenges such as extreme states of film condition (e.g. mould, dirt, deterioration); language barriers; inconsistencies in film titles and unidentified fragments, which meant much time had to be spent on researching and fact-checking.

28 L. Creech, 'Treasures from the South Asian Cinema Collection: Main Hoon Jadugar', George Eastman Museum, Rochester, 2021 [website] <https://medium.com/george-eastman-museum/treasures-from-the-south-asian-cinema-collection-main-hoon-jadugar-jugal-kishor-india-1965-c95d75e88cd> (accessed: 05 August 2023).

Preserving this collection resulted in preservation of South East Asian film production history and cultural heritage, and the opportunity to bring communities together and continue to share and make South East Asian Cinema accessible. Once catalogued and scanned, the films can be presented at the Dryden Theatre.

5. Personal, Professional and Sectoral Impact

Personal Impact

This Fellowship provided an invaluable opportunity to meet, network and engage with international preservation experts working in some of the world's leading AV institutions. The Fellow's interactions with professionals, combined with hands-on experience impacted on her immensely in the following ways:

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- The Fellow acquired the latest industry best practice standards, knowledge and skills an intensive period, and was exposed to formats, equipment and first-hand knowledge, which she would otherwise not have experienced in her current situation in Australia. She is able to confidently identify, assess, handle and preserve a diverse range of AV formats; and understand and use playback equipment and restoration tools.
- The Fellow has gained confidence in meeting with other professionals on an international level, engaging in discussions and sharing ideas. As a result, she is confident in her abilities to disseminate her knowledge by presenting to, and training, other archivists and being a role-model for the Australian industry.
- As well as professional relationships, the Fellow developed friendships and a sustainable network in which she feels confident to reach out to when in need of advice in the future. Being in the presence of the international AV experts and experiencing their generosity in giving their time and sharing their knowledge was really inspiring. The Fellow hopes to be able to do the same for emerging archivists in the future and add value to the industry.
- More broadly, the Fellow enhanced her archiving/museum practice in general through experiencing curatorial and collection management practices, and project workflows and procedures undertaken in AV archives, which she can implement in her workplace.

Professional Impact

Upon return from her Fellowship travels, the Fellow successfully acquired a new position as the Registrar Team Leader in the Digitisation Team at the Powerhouse. She commenced at a time when a significant three-year large-scale digitisation project was transitioning into a routine part of the organisation's ongoing operations.

Throughout her employment this year, the Fellow has already made a positive contribution and impact on the organisation. She has adeptly applied and demonstrated her acquired knowledge, skills and confidence to developing digitisation projects, workflows and procedures, and coordinating the team of registrars who assist photographers with collection handling and the collection management administration during the digitisation process.

The Fellow's acquired project management knowledge has helped inform her decision-making and planning process to ensure that she is adhering to best-practice standards, working efficiently and producing high-standard results. Her experience enables her to streamline and shape workflows, make practical scoping decisions, and support her staff in their understanding and experience with collection management and digitisation. She has also gained confidence as a Team Leader, with the ability to effectively communicate with her staff, understand their professional needs, train them in registration procedures and object handling, and in turn develop their confidence and best practice.

The Fellow was also able to share her expertise with the Variable Media (VM) team, joining the VM Steering Committee and collaborating with the VM Archivist to develop a cataloguing and rehousing project of the VM collection, which the Digitisation Registrars assisted with. The Fellow disseminated her learnings to her staff and colleagues by exposing them to AV material and providing training in assessing, cleaning, cataloguing and preservation of analogue AV formats. The Fellow aims to contribute to the development of the VM team by advocating for resources and the need for preserving and making AV collections available for research and public interest.

Sectoral Impact

It is the Fellow's ambition use her learnings acquired through the Fellowship to support the AV Archiving community by broadly sharing and maintaining best-practice standards. As a Fellow, she will have the opportunity for greater collaboration across institutions and the sharing of knowledge, working towards the mutual goal of long-term preservation and access of historical material. As a result, a long-term flow-on effect will be established through advocacy and information sharing, as other preservationists continue to pass on the knowledge they gained within their own organisations.

The Fellowship provided the Fellow with a deeper insight into the present state of AV archiving in Australia. Additionally, it equipped the Fellow with the skills to advocate for support and promote further research aimed at monitoring the field's progress and developments.

One way the Fellow is achieving this is through her appointment as a Vice President for the ASRA. This has given her the opportunity to network and engage with the broader AV community in Australia and New Zealand. The Fellow participates in committee meetings and is involved with the board's decision-making and planning. She aims to connect with other AV institutions through her involvement with ASRA and disseminate her Fellowship learnings through presenting at the annual conference, sharing this report with the community, publishing an article in an ASRA journal, and being a contact for other preservationists who require advice or the exchange of

knowledge/ideas. The Fellow is passionate about training and is keen to deliver training sessions to other professionals in need.

The Fellow is also a member of the Australasian Registrars Committee and aims to use this channel to connect beyond the AV archiving community, reaching the broader collection registration sector as a conference speaker and professional contact. This will help build awareness of the need for training, exchanging knowledge and resources and effective preservation of AV collections, promote positive best-practice among organisations who may not have experts in the AV field, and foster deeper connections across organisation in Australasia.

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6. Recommendations and Considerations

Addressing the challenges of limited education opportunities and the risk of losing AV collections to obsolescence and neglect in Australia requires a collaborative and coordinated effort from various stakeholders. To address these critical concerns, the Fellow presents a comprehensive set of recommendations and considerations centred on knowledge sharing, public programming and advocacy. The Fellow does however, recognise the associated financial and time investments required and emphasises that institutions/experts should receive suitable time and compensation:

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- **Collaboration and Knowledge Sharing:** Encourage cross-institutional collaboration between libraries, archives, museums, universities and cultural organisations. This could be achieved through establishing networks or forums where professionals can come together to share resources, expertise and best practices in AV archiving. Partnerships between academic institutions, and cultural heritage organisations and experts in various disciplines will help foster cross-disciplinary learning and research and serves as a powerful mechanism for pooling resources, sharing insights and collectively addressing shared challenges. Stanford Libraries demonstrated the benefits of this by engaging with engineers and piano roll experts to develop the purpose-designed piano roll scanner.
- **Training and Workshops:** Leading AV archives and/or AV experts could consider organising regular training sessions, workshops and seminars on AV archiving and preservation. Training programs could be tailored to cater to both current professionals in the field and students interested in pursuing a career in AV archiving. Incorporating hands-on training and practical experience to prepare individuals for the real challenges in the field would be beneficial. A great example of this is the Audiovisual Archiving workshop recently delivered by the Powerhouse which was “designed for staff and volunteers working in museums or collection organisations with digital and audio-visual material in their collections and are looking for expert guidance on how to archive and maintain it.”¹

The AIATSIS/NFSA joint ‘*Common Problems Shared Solutions Symposium*’ is a good example of archives/archivists banding together to identify, discuss and workshop solutions to industry challenges. The symposium laid a promising foundation for potential ongoing collaboration and the resolution of pertinent issues, however the dialogue needs to be sustained to generate a meaningful impact.

Within an institution, a valuable approach might involve engaging staff from diverse collection management/archiving, conservation or other specialised backgrounds in AV projects. This engagement not only fosters the development of fresh skills but also kindles a potential interest

¹ Powerhouse, ‘Audio Visual Archiving’, Powerhouse, 2023 [website] <https://powerhouse.com.au/program/audio-visual-archiving?fbclid=IwAR0NC5igE2h-XRMA3QNWgjlR8QpxqF06W00g7Fn2n6ikx4k-wuv6lo-Cozl#overview> (accessed: 14 October 2023).

in AV archiving, encouraging further exploration in this area. The Fellow has implemented this in her institution by working with the AV archivist to develop a training program and cataloguing/rehousing project for which other staff who become involved with the project can expand their registration skills, learn new skills and knowledge of basic conservation and be involved with developing the AV collection.

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- **Internship and Mentorship Programs:** Develop internship and mentorship programs, funded by government, to provide students and emerging archivists with practical experience in AV archiving and pair them with experienced experts to facilitate knowledge transfer and skill development. Further, while the online accessibility of the CSU program offers distinct advantages in reaching a wider audience, there is potential for institutions nationwide to collaborate with academic entities of the CSU program itself, thereby extending opportunities for internships integrated into the curriculum so students gain practical experience.
- **Government Support:** It is essential for institutions with AV collections to advocate for increased government funding and support for AV archiving initiatives; highlight the importance of preserving the nation's cultural heritage and the risks associated with neglecting AV collections; and collaborate with policymakers to develop policies that prioritise funding and resources for AV archiving. Enhanced financial support can enable institutions to invest in state-of-the-art equipment, infrastructure and specialised staff to effectively address AV preservation challenges.
- **Digitisation and Access:** Although this is the essence of AV archives, there are many institutions which have AV material in their collections but do not prioritise it due to lack of resources and skilled staff. These could look to incorporating or prioritising digitisation efforts to create digital copies of AV collections, ensuring wider access and reducing the risk of obsolescence; establishing digital repositories and databases to make digitised AV materials easily accessible for research and education; implementing robust metadata standards to facilitate discovery and retrieval of digitised AV content.
- **Public Awareness:** Educate the public about the value of AV collections and the importance of preserving them for future generations. Where feasible, AV archives, universities and experts could engage in outreach activities, public events and educational campaigns such as physical and online exhibitions, film screenings, exclusive talks and annual 'Home Movie Day' events which celebrate amateur films and filmmaking and teaches the community how and why to care for collections.² This will help raise awareness about AV archiving and its significance on a broader level.

2 Center for Home Movies, 'Home Movie Day', Center for Home Movies, 2023 [website] <https://www.centerforhomemovies.org/hmd/> (accessed: 02 September 2023).

- **International Collaboration:** Foster collaborations with international institutions and experts in AV archiving to learn from global best practices and advancements. This can be achieved through participating in international conferences, workshops, Fellowship programs and collaborative projects to stay updated on the latest developments in the field. The Fellow has participated in various international conferences and training programs during & outside the fellowship program over several years which has helped build connections & positive relationships with international experts, raise awareness of Australian archives abroad, and encourage the exchange and sharing of knowledge more broadly across collecting organisations. The Fellow encourages her colleagues in the AV to also establish connections with international experts to stay updated on the latest developments in the field.
- **Continuing Education:** Encourage professionals in the field to engage in continuous learning and professional development opportunities; and stay updated on the latest trends, technologies, and standards in AV archiving through workshops, webinars and industry conferences. Professionals are also encouraged to proactively engage and join membership with associations like ASRA who offer guidance and support to the AV community.

Efforts should also be focussed on harnessing the wealth of knowledge and insights possessed by current and retiring experts, particularly those skilled in the use of obsolete playback equipment. Consider implementing strategies such as conducting oral histories or video interviews to effectively capture and preserve this valuable content for future reference.

Exploring the possibility of establishing exchange programs akin to the collaboration between the NFSA and GEM could prove beneficial across various Australian institutions. This initiative would facilitate the dissemination and exchange of expertise, fostering a broader sharing of knowledge and skills among institutions.

- **Advocacy and Research:** Conduct further research on the current state of AV collections in Australia and present findings to policymakers and stakeholders; advocate for policies that prioritise preservation and access to AV materials, backed by evidence-based research and case studies. Effective advocacy plays a pivotal role in achieving recognition and comprehension, thereby securing funding opportunities for cataloguing, digitisation, preservation and dissemination of AV collections. It serves as a means of acquiring resources for facilitating preservation projects and securing expert staffing.

By implementing these recommendations and considerations, Australia can foster a robust and sustainable AV archiving ecosystem that protects and preserves its valuable cultural heritage for generations to come. The collaborative efforts of various stakeholders, including government agencies, educational institutions, cultural organisations and industry professionals, will play a critical role in overcoming the challenges and ensuring the long-term preservation of AV collections.

7. Conclusion

This Fellowship stood as a pivotal cornerstone in the Fellow's professional journey, proving to be essential for her holistic development. Throughout the duration of the experience, the Fellow not only acquired a wealth of first-hand skills, but also deepened her understanding of international best-practice standards in AV preservation. The knowledge gained during her visits to leading AV archives in the US equipped her with invaluable tools, positioning her as a strong force for positive change within the Australian industry.

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The Fellow's exposure to the global forefront of AV preservation provided her with a nuanced perspective that transcends geographical boundaries. With her international observations, she is now uniquely placed to contribute significantly to the advancement of AV preservation practices in Australia. The Fellowship essentially empowered her with the proficiency and confidence to disseminate her acquired knowledge effectively within the local context, thereby elevating the standards of AV preservation in Australia.

The Fellowship also proved to be a catalyst for fostering cross-cultural collaborations and partnerships. The exchange of ideas and knowledge during the Fellow's interactions with the US AV archives laid the foundation for the establishment of crucial international networks. These connections not only facilitate ongoing dialogue, but also contribute to the creation of a robust and interconnected global community committed to the preservation of AV heritage.

In a broader context, the Fellowship played a strategic role in addressing the challenges faced by the AV preservation industry in Australia. The shortage of skilled professionals and limited educational opportunities has long been a concern and this Fellowship emerged as a proactive response to these challenges. By providing the Fellow with a unique opportunity to enhance her expertise and foster international connections, the Fellowship set in motion a positive trajectory for addressing the skills gap and contributing to the growth of AV preservation practices locally.

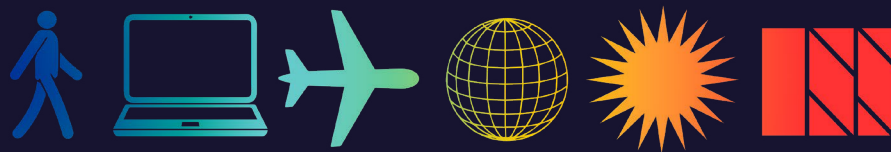
In essence, this Fellowship was instrumental in shaping the Fellow into a leading professional ready to champion the cause of AV preservation. It not only bridged the gap between theory and practice, but also served as a beacon for the broader industry, signalling the importance of global collaboration, continuous learning and the imperative of cultivating skilled professionals for the sustained preservation of audiovisual heritage.

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The International Specialised Skills Institute
1/189 Faraday Street, Carlton VIC 3053
Ph: 03 9347 4583
www.issinstitute.org.au