Snapshot of a Field in Motion

Audiovisual Preservation Report 2020: Four Topics Impacting the Field

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Audiovisual Research Alliance &
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About this Report

Snapshot of a Field in Motion. Audiovisual Preservation Report 2020: Four Topics Impacting the Field is published by the Audiovisual Research Alliance for Archivists & Cultural Heritage Professionals (AVRA) an initiative of the Netherlands Institute for Sound and Vision, and is further supported by the Association of Moving Image Archivists (AMIA) Preservation Committee.

Sound and Vision is the Dutch national institute for media and culture. Through its holdings of over a million hours of material and growing each day, its expertise, and activities, Sound and Vision aims to strengthen an open and free society. Today, it offers its holdings to the broadest variety of end-users, including journalists, students, researchers, heritage organisations, and the general public.

The Audiovisual Research Alliance for Archivists & Cultural Heritage Professionals (AVRA), set up and supported by the Netherlands Institute for Sound and Vision, is a new initiative that seeks to openly engage with and produce research in collaboration with the wider audiovisual archiving and heritage community.

The Audiovisual Research Alliance commissions and publishes research in the field of sound and moving image archiving and heritage, evolving from the former AV Think Tank and taking the idea of a research-generating working group in a new direction. The research of the AVRA thinks forward to consider how the decisions, tools, strategies, and approaches enacted today are currently and can possibly impact the field of AV archiving and heritage. The Alliance does this by actively engaging with and openly inviting practitioners to: share key questions and topics they would like to see explored through research; join a network of interviewees to offer different perspectives and experiences on topics being researched; volunteer as part of diverse peer review teams to support the development and feedback of research; and propose possible researchers within and outside of the audiovisual archiving field to be commissioned for specific reports.

To learn more about the AVRA and how we're working to fully develop the working methods of this new initiative, please visit, www.beeldengeluid.nl/avresearchalliance. Or reach out to: avresearchalliance@beeldengeluid.nl.

The Association of Moving Image Archivists (AMIA) is an international nonprofit association dedicated to the preservation and use of moving image media. The **Preservation Committee** of AMIA works to ensure that preservation issues facing collections, archives and archivists are broadly discussed by AMIA's membership so that traditional and evolving methods and technologies meet the preservation needs of the broadest possible communities. Any AMIA member can participate in the committee's activities.

To learn more about AMIA please visit, https://amianet.org.

About the Author

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Abstract

Audiovisual preservation is a field that is always in motion, whether by way of adapting to the new technologies of the field (or adjacent to the field), implementing systems designed by experienced and amateur preservationists alike, or even by way of the necessity to migrate formats. While archivists and institutions may face policy hurdles or resource realities that hinder steps forward or prevent flexibility, the audiovisual preservation field is compelled to evolve—whether it wants to or not—by evolutions in technology, whether the technology applies to the formats being preserved, the tools created for preservation actions, or even the means by which archivists and preservationists are able to communicate. With this persistent flux in mind, this report offers a snapshot of the field in 2020, looking at four key topics impacting the present and future of audiovisual preservation. These topics include: Providing and Preserving Captions for Digitized and Born-Digital Audiovisual Content; Testing and Implementing RAWcooked on DPX Film Scans; Identifying and Managing Born-Digital Video Collections; and Knowledge Sharing as a Preservation Tool.

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Introduction

What will the field of audiovisual preservation remember when it looks at the impact 2020 has had on this field and its future? It could be the year that archives decided that caption extraction or creation became a standard part of preservation workflows, joining with the sentiment that the COVID-19 pandemic could make the work more accessible.[1] It could be the year that archivists adopted an open-source tool that compressed unwieldy file assets from expensive digitization projects into an open standard.[2] It could be the year when born-digital processing is recognized as an urgent international concern,[3] with smartphone documentation of protests accumulating in the form of evidence as well as irreplaceable cultural heritage documents. It could be the year that knowledge-sharing platforms evolved in a way that brought new preservationists to the field, and provided the infrastructure for current preservationists to continue expanding their skill sets.

With the breadth of these possibilities in mind, this report aims to provide a focused perspective on four topics that might offer current and future archivists a frame of reference for what was impacting the field in 2020.

1 BBC Future, "Why coronavirus may make the world more accessible," accessed September 14, 2020, https://www.bbc.com/future/article/20200513-why-the-coronavirus-can-make-the-world-more-accessible.

2 Stephen McConnachie (@mcnatch), "Speaking just for the archive where I work, I have to express what a powerful change the work you're describing has achieved. I feel like we'll talk when we're old archivists of digital a/v archiving pre-Matroska and post…", July 22, 2020, Tweet, https://twitter.com/mcnatch/status/1286025001544581124.

3 Pamela Vizner Oyarce, "Shaping the future of Digital Preservation in Ibero America," accessed September 14, 2020, https://blog.weareavp.com/shaping-the-future-of-digital-preservation-in-ibero-america-highlights-of-the-first-ripdasa-meeting.

What is this report?

Audiovisual preservation is a field that is always in motion, whether by way of adapting to the new technologies of the field (or adjacent to the field), implementing systems designed by experienced and amateur preservationists alike, or even by way of preservation's necessity to migrate formats. Working in service of the needs of cultural heritage collections worldwide, all with different cultural, administrative, and environmental conditions that inform their processes and resources, and sometimes extending outward into private companies and production environments, the field of audiovisual preservation is also very complex. Where audiovisual materials may be addressed within broader collection development or collection management policies created for galleries, libraries, archives, and museums (known as the GLAM sector), audiovisual materials have more specific complexities and dependencies than paper-based, still image, or other analog and born-digital collections, and thus require their own specific collection and preservation strategies.

The past 100 years of audiovisual technology has seen the introduction of motion picture celluloid film, the standardization of professional and amateur film formats, the development of broadcast magnetic tape-based video, the proliferation of consumer tape-based video formats, the introduction of digital video tape, and the ongoing explosion of file-based digital video in professional and consumer markets at higher and higher resolutions. Each of these formats has its own set of preservation risks, which fall under the paired concerns of degradation and obsolescence.

The past near-100 years of audiovisual archiving and preservation,[4] in turn, have seen a range of strategies developed and implemented to stabilize, migrate, and provide a path toward access for the materials and collections that have been created by institutions and individuals. For perspective: according to the International Federation of Film Archives (FIAF) Technical Commission preservation best practice guide, film preservation is "the duplication, copying, or migration of analogue and digital film to a new support or format, typically in cases where the life expectancy of the original elements is limited or unpredictable."[5] Accepted industry standard supports or formats have changed over the years from duplicate copies on celluloid film (film-to-film preservation) to include digital scans. But the preservation standard's development hasn't unfolded in a single direction: it has shifted between film and digital as film stocks have been discontinued[6] and digital technology has evolved,[7] and

4 International Federation of Film Archives, "The Origins of FIAF, 1936-1938," accessed September 13, 2020, https://www.fiafnet.org/pages/History/Origins-of-FIAF.html.

5 International Federation of Film Archives, FIAF Technical Commission Preservation Best Practice, accessed September 13, 2020, https://www.fiafnet.org/images/tinyUpload/E-Resources/Commission-And-PIP-Resources/TC_resources/Preservation%20Best%20Practice%20v4%201%201.pdf.

6 Kodak Motion Picture, "Chronology of Film," accessed September 13, 2020. https://www.kodak.com/en/motion/page/chronology-of-film.

7 Federal Agencies Digitization Guidelines Initiative, Digitizing Motion Picture Film, accessed September 13, 2020, http://www.digitizationguidelines.gov/guidelines/FilmScan_PWS-SOW_20160418.pdf.

it varies across institutions and international regions, influenced by institutional policies and ethics and available funding and staffing resources.[8] The same is true for the preservation of magnetic videotape and born-digital files: standards have evolved and will continue to do so.

While archivists and institutions may face policy hurdles or resource realities that hinder steps forward or prevent flexibility, the audiovisual preservation field is compelled to evolve—whether it wants to or not—by evolutions in technology, whether the technology applies to the formats being preserved, the tools created for preservation actions, or even the means by which archivists and preservationists are able to communicate. Whether preservation actions are guided by a standard like the Reference Model for an Open Archival Information System (OAIS),[9] driven by a homegrown strategy that could never be replicated again, or making an attempt to be somewhere in between, the work continues to unfold.

With this persistent flux in mind, this report offers a snapshot of the field in 2020, looking at four key topics impacting the present and future of audiovisual preservation, described by way of an emerging professional's observations. These topics were selected by the researcher based on interviews with archivists and preservationists,[10] recently published academic research and blog posts, one-off and series-based webinars, public and private online communities, and 2019–2020 conference contributions, among other sources described in more detail below. The report was commissioned in May 2020 by the Audiovisual Research Alliance (AVRA), an international research initiative supported by the Netherlands Institute for Sound and Vision that evolved from the former AV Think Tank, and is further supported by the Association of Moving Image Archivists (AMIA) Preservation Committee.

The topics are:

1. Providing and Preserving Captions for Digitized and Born-Digital Audiovisual Content
2. Testing and Implementing RAWcooked on DPX Film Scans
3. Identifying and Managing Born-Digital Video Collections
4. Knowledge Sharing as a Preservation Tool

The preservation trends and topics of 2020 are wide-ranging; browsing through the 2019–2020 catalogs of Co-ordinating Council of Audiovisual Archives Associations (CCAAA) conferences

8 MoMA, "Caring for Artists' Films," accessed September 13, 2020, https://www.mediaconservation.io/film.

9 The Consultative Committee for Space Data Systems, Reference Model for an Open Archival Information System (OAIS), June 2012, accessed August 14, 2020, https://public.ccsds.org/Pubs/650×0m2.pdf.

10 Interviewees include the following archivists and preservationists: Michael Angeletti, Steven D. Booth, Reto Kromer, Christopher Julio Magomelo, Morgan Morel, Kieran O'Leary, Judith Opoku-Boateng, Perla Olivia Rodríguez Reséndiz, Dave Rice, Andrew Sargeant, Annie Schweikert, Juana Suarez, Brianna Toth, Lucy Wales, and Joanna White.

provides a window into the vast array of topics that preservationists are researching, along with the implicit suggestion of how many proposed sessions didn't advance past review committees. The topics researched for this report each originated from archivists other than the researcher, and experienced some form of a perceived shift in 2019 or 2020. Topics 1 (Providing and Preserving Captions for Digitized and Born-Digital Audiovisual Content) and 2 (Testing and Implementing RAWcooked on DPX Film Scans) relate to open-source software tools that were released in 2018 and 2019. Topic 3 (Identifying and Managing Born-Digital Video Collections) continues to build in urgency as more born-digital video is created, particularly in relation to documentation of a range of protest movements including the current Black Lives Matter protests against police brutality and systemic racism.[11] Topic 4 (Knowledge Sharing as a Preservation Tool) is evolving with the COVID-19 global pandemic, which has drastically limited in-person gatherings and in turn re-oriented knowledge-sharing platforms to online spaces. While no single topic appeared in research resources across the board, the four selected topics emerged in the reviewed literature and discussions with the most frequency, calling attention to their growing significance in this moving field.

Not all archivists would agree that these four topics are important to the archival preservation field in 2020, nor those most urgent for the years ahead. While archives are united in their mission to pursue the long-term preservation of cultural heritage materials, strategies and values differ across institutions and international regions; what might be important to one archivist might be irrelevant to another. While this may be true, the researcher additionally acknowledges that her perspective as a white, American, LGBTQ+-identifying person with access to an American graduate education has influenced her research process and selection of topics. Her perspective as an archivist in the United States who only speaks English hindered her ability to perform research with a truly global scope. Further, her perspective as a white, able-bodied archivist in the United States shaped her ability to perform research that was inclusive of people of color and people with disabilities. The researcher attempted to account for the biases embedded within her perspective during the research process; if a reader feels that the researcher fell short, the researcher invites the reader to reach out.

Resources and process

Research for this report was divided into two stages. During the first stage, the researcher focused on identifying the four developing topics that would become the focus of this report. The researcher used the following resources to identify the topics:

11 Jen Kirby, "'Black Lives Matter' has become a global rallying cry against racism and police brutality," Vox, June 12, 2020, accessed September 13, 2020, https://www.vox.com/2020/6/12/21285244/black-lives-matter-global-protests-george-floyd-uk-belgium.

- Small-group meetings | The researcher was supported by a small advisory group that met for two check-in meetings during the research process.
- Association of Moving Image Archivists Listserv (AMIA-L) | Before research began in earnest, the researcher generated a list of possible topics based on her own experience in the field, and sent the list to the AMIA listserv as a prompt for potential discussion. The researcher received four responses to the inquiry.
- Informal interviews | Based on recommendations from the AMIA Preservation Committee and responses to the AMIA listserv prompt, the researcher conducted eight informal interviews with archivists to think through potential topics.
- 2019 conference programs | The researcher assessed programs from the 2019 conferences of CCAAA members, including the Southeast Asia-Pacific Audiovisual Archive Association (SEAPAVAA), the International Association of Sound and Audiovisual Archives (IASA), the Association of Moving Image Archivists (AMIA), the Association for Recorded Sound Collections (ARSC), the International Federation of Library Associations and Institutions (IFLA), the International Council on Archives (ICA), the International Federation of Film Archives (FIAF), and Fédération Internationale des Archives de Télévision/ The International Federation of Television Archives (FIAT/IFTA). In addition, she considered the conference programs from the Museum Computer Network (MCN), No Time To Wait (NTTW), and the International Conference on Digital Preservation (iPRES).
- Webinars and other online programming | The researcher attended a range of different online archiving and preservation-oriented programs during the surge in online programming in the months following the COVID-19 lockdown.
- Online interactive communities | Online communities like Twitter, Mastodon's digipres.club, opt-in communities like AV Hackers, Github pull requests and issues, and other CCAAA listservs offered options to observe discussions happening in real time. Preservation blogs were particularly helpful, as they allow practitioners to publicly document and share their testing processes without the formalities associated with academic publication or institutional documentation.
- 2019 academic publications | Academic journals offered peer-reviewed articles regarding archival practice. Academic journals provided a strong anchor to get a sense of how the preservation field and its aims are perceived by the academic community.

Once the topics had been selected, the researcher moved to the next stage: investigating the topics and writing about findings. The preceding sources remained critical components of the research, and an additional six interviews were conducted with practitioners in the field.

Following the submission of the first draft, the researcher received written feedback from a peer review team that included seven

archivists from different global regions. The researcher and the peer review team also met over video conferencing to further flesh out the feedback and give the researcher the opportunity to ask questions. First draft feedback largely addressed where the researcher's biases had limited her scope to a U.S., UK, and European-centric perspective; as a result, an additional three interviews were conducted that informed draft revisions. Following first draft revisions, a second round of feedback was provided by the peer review team to support the finalization of the report.

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Providing and Preserving Captions for Digitized and Born-Digital A/V Content

The rapid shift to online access and collaboration has given archivists a new sense of urgency to find sustainable captioning workflows for audiovisual media.

What is this topic?

Captions are "transcriptions of dialogue and other audio cues that are displayed over the image of an audiovisual program," and their primary use is as a form of access for people who are deaf or who have hearing loss.[12] They are distinct from subtitles in that they go beyond offering transcriptions of dialogue: where subtitles provide text for what a speaker is saying, captions will additionally offer cues like sound effects and speaker identification.[13] While access is captions' primary use, they also provide an opportunity for full-text search and integration with cataloging workflows. Along with screen readers, recorded sign language interpreters, alternative text (or "alt text"), and others, captioning is one tool that organizations use to work toward making digitized and born-digital audiovisual assets accessible for all.

In the United States, federal agencies and contractors are required to provide captions for all prerecorded and live audio content. This is based on an update to Section 508[14] of the Rehabilitation Act of 1973,[15] which prohibits disability-based discrimination in federal agencies, federal contractors, and programs receiving federal funds. Section 508 requires federal agencies to comply with the Web Content Accessibility Guide (WCAG) 2.0[16] Level AA[17] as of January 18, 2018.[18] While the WCAG 2.0 only applies directly to federal agencies and contractors, the Americans with Disabilities Act (ADA) of 1990,[19] which had its 30th anniversary of being signed into law in the United States on July 26, 2020, applies more broadly to content made available on most websites, leading private organizations to lean toward adopting the WCAG 2.0 as their standard for compliance. Because the WCAG is governed by the international organization the World Wide Web Consortium (W3C), it is an internationally-adoptable, interoperable standard, with authorized translations in 14 languages, candidates for authorized translations in 3 languages, and unofficial translations in 5 languages.[20]

12 MediaArea, "No Time To Wait S04E26 Ben Turkus & Annie Schweikert," video 24:11, January 25, 2020, https://youtu.be/4IGiYRMmsz4.

13 The glossary to WCAG 2.0 additionally specifies that in some countries, the terms "caption" and "subtitle" are used interchangeably. For more information, visit the glossary document: https://www.w3.org/TR/2006/WD-WCAG20-20060427/appendixA.html.

14 To learn more about Section 508, please visit the IT Accessibility Laws and Policies website: https://www.section508.gov/manage/laws-and-policies.

15 To learn more about the ADA as it applies to the Rehabilitation Act, please visit the U.S. Department of Justice website: https://www.ada.gov/cguide.htm#anchor65610.

16 To learn more about the WCAG 2.0, please visit the text online: https://www.w3.org/TR/WCAG20/.

17 United States Access Board, "Text of the Standards and Guidelines," accessed August 14, 2020, https://www.access-board.gov/guidelines-and-standards/communications-and-it/about-the-ict-refresh/final-rule/text-of-the-standards-and-guidelines.

18 To learn more about Section 508, please visit the IT Accessibility Laws and Policies website: https://www.section508.gov/manage/laws-and-policies.

19 To learn more about ADA, please visit their website: https://www.ada.gov/ada_intro.htm.

20 W3C Web Accessibility Initiative (WAI), "WCAG 2 Translations," accessed August 14, 2020, https://www.w3.org/WAI/standards-guidelines/wcag/translations/.

From a preservation perspective, the creation, delivery, and preservation of captions is a workflow challenge that shifts based on the size of a collection, the available resources, and the type of content that needs captions, among other criteria. "It's insufficient. This is a huge question that a lot of people want resolved," says Michael Angeletti, Moving Image Digitization Specialist at Stanford Libraries, referring to the state of offering closed captions for Stanford researchers and the public. "But so far, the approaches that we've heard of aren't cost-effective for the scale of the workflows we have in a sustainable way."[21] While it's unlikely that any institution would opt out of a service that provides closed captions for archival content, the technical challenges and costs associated with the creation of closed captions often results in a lack of prioritization for the work required to reach WCAG compliance.

Regardless, as stated in the February 2020 Smithsonian Institution Digitization Program Office report, *Web Content Accessibility for Digital Audiovisual Assets*: "Notions that accessibility responsibilities are burdensome for collections managers are misguided, as accessibility protocol are essential component activities of collections care."[22] In February 2019, the Society of American Archivists' Accessibility and Disability Section; Reference, Access, and Outreach Section; and Task Force to Revise Best Practices on Accessibility published their *Guidelines for Accessible Archives for People with Disabilities*. *Guidelines* provides a broad overview of accessibility practices within archives, and additionally contextualizes the term "accessibility" within archival practice:

> Within the archival profession the term accessibility commonly refers to the general discoverability and ease of use of archival collections. In the context of enabling equal or equivalent access to archival facilities and services for people with disabilities, accessibility refers to minimizing or eliminating barriers. Accessibility should be integral to institutional cultures, workflows, and services.[23]

In the way that preservation provides a path toward access, the steps toward providing closed captions along with audiovisual content begins with decisions made within preservation practice.

How does this topic manifest in a real-world setting?

On a high-level overview, the basic workflow for creating closed captions includes either extracting the captions from an analog

21 Michael Angeletti, interview by author, August 10, 2020.

22 Walter Forsberg, *Web Content Accessibility for Digital Audiovisual Assets*, February 3, 2020, Smithsonian Digitization Program Office, accessed August 14, 2020, https://archive.org/download/smithsoniandpowcagpaperfinal20200204/Smithsonian-DPO_WCAG_Paper_Final_20200204.pdf.

23 SAA Task Force to Revise Best Practices on Accessibility, *Guidelines for Accessible Archives for People with Disabilities*, February 2019, Society for American Archivists, https://www2.archivists.org/sites/all/files/SAA%20Guidelines%20for%20Accessible%20Archives%20for%20People%20with%20Disabilities_2019_0.pdf.

video signal or creating and timing them using machine learning-driven or human-generated captions, performing quality control on those extracted or newly-generated captions, delivering those captions with their corresponding audiovisual content on a media player, and then storing those captions for future use. Within those basic stages, a range of different format choices are possible, interoperability concerns exist, and decisions about technology and labor must be made.

Legacy broadcast video recorded after 1980 in the United States often includes captions in the form of the analog caption data contained in the vertical blanking interval of the video signal. In North America, the analog caption format is called EIA-608 or CEA-608, and is referred to as "line 21," referring to the location in the NTSC video signal where engineers retroactively found space for analog caption data. Today's digitization specialists can visually identify the presence of EIA-608 data in the vertical blanking interval overscan, and they have the option of contracting with vendors offering proprietary solutions to extract and deliver captions.

However, in 2018, the developers Paul B. Mahol and Dave Rice were sponsored by New York Public Library's 2018/19 Innovation Project to create an open-source tool using FFmpeg's readeia608 filter to create closed captions from EIA-608 data. The tool, called sccyou, was released in 2019.[24] Sccyou scans the vertical blanking interval for EIA-608 data, interprets that data, and delivers the captions as an SCC file (where the captions are represented as hex data) or as an SRT file (which is more human-readable).

The development and context for sccyou and closed captions was covered by Annie Schweikert, Digital Archivist at Stanford Libraries, and Ben Turkus, Assistant Manager of Audio and Moving Image Preservation at New York Public Library, in their No Time To Wait 4 presentation, "Opening Closed Captions," on December 6, 2019.[25] Schweikert noted that the reason that captions began appearing after 1980—as closed-captions, which could be turned on or off by a decoder—was because of legislation that was enabled by the efforts of a generation of disability rights activists. These acts included the Television Decoder Circuitry Act of 1990, and the Telecommunications Act of 1996, among a long list of other laws. Says Schweikert:

> Figuring out how to extract closed captions is not just saving us time and duplicated effort, it's also honoring a sustained advocacy that gave us captions. People had to fight for closed captioning at every step of the way, from foundational questions like how to add them to an already-standardized broadcast signal, to passing sweeping legislation in the 90s.

24 To learn more about sccyou, please visit the product Github page at: https://github.com/amiaopensource/sccyou.

25 MediaArea, "No Time To Wait S04E26 Ben Turkus & Annie Schweikert," video 24:11, January 25, 2020, https://youtu.be/4IGiYRMmsz4. The full video of the presentation—with edited captions—and related slide deck is available on the No Time to Wait 4 website: https://mediaarea.net/NoTimeToWait4.

The awareness of honoring a sustained advocacy and the labor built into captioning extends to the way archivists choose to perform the work of captioning today, and build that work into archival captioning workflows. There are many decisions to be made within a born-digital captioning workflow for streaming media or otherwise. Is there an adequate budget for human-generated transcripts? If yes, are the captioners or transcriptionists at a given service performing that work being adequately compensated? Can in-house resources be allocated for in-house transcription work? If not, perhaps AI-generated transcription workflows are a better option. Even still, those AI-generated transcripts will always need human intervention to perform QC, which requires additional in-house resource delegation. Human intervention raises the question: can anyone perform caption QC tasks, or will there be cases where subject specialists are necessary? Beyond QC, decisions will need to be made about which software will be used to sync the transcript to the video timecode, and which export format will make the most sense for the archive's media player, and where the timecode files will be stored in relation to the audiovisual content.

Why is it important in the context of 2019–2020 audiovisual preservation and looking forward?

Captioning workflows frequently arise out of pressured circumstances, whether that's a deadline for WCAG compliance or a specific request for captions for a researcher. Since March 2020, as collections, meetings, conferences, seminars, and academic courses have moved online due to the COVID-19 pandemic, archivists have found a new sense of urgency around captioning audiovisual media in order to make it accessible to colleagues and audiences with hearing loss.

The widespread availability of freely accessible audiovisual content streaming on the web presents an example of content that needs to be captioned. In April 2020, the International Federation of Film Archives (FIAF) released a list of affiliate members whose collections are available via free online streaming services. The affiliates listed relied heavily on YouTube for an access platform, which by default applies AI-generated closed captions to audiovisual content. YouTube's captioning tool offered collections an excellent option for bringing collections online quickly during a moment of international crisis. However, as of July 2020, YouTube has ended its community captions feature, citing spam, abuse, and a lack of use. While the raw AI-generated captions are still available, creators responded with dismay, noting that the community captions allowed for higher-quality captions to reach deaf and hearing-impaired viewers, and additionally that the captions provided a pathway for multilingual translation.[26] Without this tool, collections

26 Kim Lyons, "YouTube is ending its community captions feature and deaf creators aren't happy about it," The Verge, July 31, 2020, accessed August 15, 2020, https://www.theverge.com/2020/7/31/21349401/youtube-community-captions-deaf-creators-accessibility-google.

posted to YouTube will need external captioning assistance: the AI captions are subpar. YouTube is providing eligible creators with a six-month subscription to Amara[27] for third-party subtitling services, which are still supported in the platform.

While using tools like sccyou helps archivists honor the history of advocacy work by extracting closed captions from legacy content, it also sets a precedent for how we may choose to acknowledge or abandon the accessibility work we research and implement today and the incidental benefits (like searchability) that come with it. We don't know the future of closed captioning workflows; it may not be long before new tools are needed to preserve the legacy born-digital captions of today.

27 To learn more about Amara, please visit their website: https://amara.org/.

2 Testing and Implementing RAWcooked on DPX Film Scans

In spite of potential barriers, the RAWcooked project has a network of supporting institutions and individuals dedicated to its continued development.

What is this topic?

The emergence of RAWcooked as a tool in digital film preservation is one that reflects a critical need for film format migration, and the challenge of managing Digital Motion Picture Exchange (known as DPX), a common preservation format used for high quality digital film preservation. The issue of format migration is a fundamental practice of preservation work, and it can be costly and time-consuming. This is the case for born-digital and analog video formats, and it is also the case for celluloid film. While celluloid film is understood to be a reliable preservation format when kept in the correct climate-controlled environment, the reality is that many film collections stored in different climates with varying levels of care show signs of degradation that not only place the original film at risk, but that impede the digitization process.[28]

DPX management is a challenge to film preservation workflows because a single film is represented by many DPX files, and because DPX directories are very large files. A scanned feature film would be represented digitally by a directory, where one DPX file represents one film frame, and the directory is composed of tens of thousands of individual DPX files.[29] Having many files represent one film presents challenges for preservation pipelines that are designed to work with single files (for example, a single QuickTime file) representing a single object (a single feature film), both in terms of the amount of time it might take to process an entire DPX directory, and in the way that the DPX directory is cataloged.[30] This challenge is exacerbated by the size of the DPX directories, which even for a 2K scan of a small-gauge film can be hundreds of gigabytes.[31]

RAWcooked is an open-source software tool developed by MediaArea that facilitates the process of encoding raw digitized film assets—primarily in different flavors of DPX, and TIFF[32] (with OpenEXR[33] in development)—into a lossless video stream.[34] Audiovisual data is encoded into a Matroska (.mkv) container, video is encoded as the FFV1 video codec, and audio is encoded as FLAC.

RAWcooked is known primarily for its file size reductions, noted on its website as ranging between one and two thirds of the original size, with reported size reduction of black and white film

28 Indiana University, "Media Digitization & Preservation Initiative: About," accessed August 15, 2020, https://mdpi.iu.edu/about/index.php.

29 To learn more about DPX, please visit Sustainability of Digital Formats: Planning for Library of Congress Collections: https://www.loc.gov/preservation/digital/formats/fdd/fdd000178.shtml.

30 An excellent overview of the challenges associated with preserving DPX was delivered by MoMA conservators Caroline Gil and Peter Oleksik at No Time To Wait 3, in 2018. A video of their presentation can be viewed here: https://youtu.be/JXPENtl5Imc.

31 MediaArea, "No Time To Wait S03E25 - Peter Oleksik and Caroline Gil - Preservation of DPX. MoMA's Case Study," video 24:20, December 7, 2018, https://youtu.be/JXPENtl5Imc.

32 To learn more about TIFF, please visit Sustainability of Digital Formats: Planning for Library of Congress Collections: https://www.loc.gov/preservation/digital/formats/content/tiff_tags.shtml.

33 To learn more about OpenEXR, please visit its website: https://www.openexr.com/.

34 MediaArea, "RAWcooked," accessed August 15, 2020, https://mediaarea.net/RAWcooked.

scans as high as 83%.[35] As a lossless video stream, the FFV1/MKV compression is reversible, and the Matroska container preserves the RAW data's associated metadata along with any sidecar files, including checksums, LUTs, and captions, as well as the DPX file header, so the compressed FFV1/MKV can be returned to the original DPX bit by bit. Compression to FFV1/MKV also, of course, means that the many DPX files representing one film object are compressed into a single audiovisual file to represent a single film object, allowing for easier integration into a preservation pipeline.

RAWcooked's lossless FFV1/MKV reversible compression has a significant impact on long-term storage costs for the organizations that use it, which is the primary appeal of the tool. Investment in and allocation of storage for archival initiatives in any institution, large or small, is frequently a hard-won battle. Preservation-level storage is a resource that takes significant planning and research to manage, and allocating storage needs wisely is key. The U.S. National Archives and Records Administration reports that a 10-bit 4K DPX scan has a typical file size of 68GB per minute.[36]

Beyond enabling compression, RAWcooked's FFV1/MKV compressed video stream is playable in VLC[37] and MPV[38] media players. Joanna White, Digital Preservation Data Specialist at the British Film Institute (BFI), noted in an interview that because the compressed video stream can be played back, it can be integrated into media asset management infrastructure and viewed alongside videotape preservation assets, providing curatorial staff with an opportunity to access images that could be helpful for their work.[39]

The RAWcooked project is managed and developed by the open-source software company MediaArea, and the addition and development of new features is driven by requests from users and prioritized based on sponsorship from participating institutions. As Jérôme Martinez, CEO and CTO of MediaArea said in his No Time To Wait 4 presentation about the RAWcooked project: "It is thanks to the sponsors that you can have such a tool, for you. It is open-source, and it is made by archivists, for archivists."[40]

How does this topic manifest in a real-world setting?

Prior to the release of RAWcooked, the best option for archives to manage their DPX files was to TAR or ZIP the DPX files. This process

35 Joanna White, email to author, August 3, 2020.

36 U.S. National Archives and Records Administration, "Motion Picture Film Maximum Capture - 4K [MPD-P1]," accessed September 13, 2020, https://www.archives.gov/preservation/products/products/mpd-p1.html.

37 To learn more about VLC media player, please visit their website: https://www.videolan.org/vlc/index.html.

38 To learn more about MPV media player, please visit their website: https://mpv.io/.

39 Joanna White, email to author, August 3, 2020.

40 MediaArea, "No Time To Wait S04E11 Jérôme Martinez," 20:04, video January 25, 2020, https://youtu.be/On0ssUuaVjs.

was time-consuming, and while it offered the ability to maintain the image files and associated metadata, the file size reduction was not nearly as advanced as FFV1/MKV. Duplicating those TARed or ZIPed DPX files to two different storage locations for geographic dispersion meant that a lot of time and storage space were being allocated to the DPX files. In addition, once the files were TARed, they weren't easily viewable. As such, the creation of access copies was also essential, which occupied additional storage space.

RAWcooked had its initial release in October 2018, and a handful of institutions are testing RAWcooked within their DPX ingest and integrity-checking workflows, and sharing their experience through blog posts, social media, conferences, and Github issues, otherwise. Archivists testing and implementing RAWcooked have had successes and struggles with the tool, and while some archivists may be curious enough to want to test, there are additional barriers in their way to doing so. White explains that some institutions may feel nervous about trusting personnel to provide technical implementation and support to RAWcooked, "particularly if they're used to operating in isolation from other institutions or rely on commercial tools and agencies."[41] Cooperation with IT departments is required if a user needs administrative privileges to install software via the command line, and the still-developing support for the archive-specific FFV1 codec could leave decision-makers wary of committing to a codec that isn't a familiar one. Beyond administrative barriers, archivists worry about the long-term sustainability of RAWcooked, and as such are maintaining both the DPX and RAWcooked FFV1/MKV stream and designating them to different tiers of storage. Many archivists also have encountered that their workstations are not well-resourced enough for the processing power that RAWcooked requires in practice.

In spite of potential barriers, the RAWcooked project has a network of sponsoring institutions and supportive archivists that have had success implementing the tool and want to see it continue to develop. When speaking about her experience beginning to test and implement RAWcooked at the Media Archive for Central England (MACE) in 2018, White explained:

> What really kick started testing was having the good fortune of talking with experienced archivists and developers already participating in RAWcooked testing. In particular the documentation, testing, and implementation example set by the Irish Film Institute's Kieran O'Leary became a critical ignition in MACE's testing of RAWcooked.[42]

Archivists setting the tone by testing workflows and creating documentation allowed more archivists to begin their own testing process with a precedent to look to.

41 Joanna White, email to author, August 3, 2020.

42 Joanna White, email to author, August 3, 2020.

White added that when MACE attended No Time To Wait at the BFI in 2018 and networked with other archivists exploring RAWcooked, she didn't need to advocate for testing workflows anymore. Shortly thereafter, once the BFI's Head of Data and Digital Preservation Stephen McConnachie outlined the BFI's intention to move to RAWcooked, MACE was willing to implement the tool. White reiterated: "Institutional uptake, the time saved during file transfer to LTO, and projected financial savings to storage made implementation finally unavoidable! It was a wonderful day when I started the RAWcooked workflow and began writing them to LTO tape."

Some institutions can perform scanning and RAWcooking on site, others outsource their scanning operation to vendors, and still others additionally aim to see if vendors can RAWcook DPX files to compressed FFV1/MKV files prior to delivery. New York Public Library is currently taking this approach, which Media Preservation Coordinator Genevieve Havemeyer-King outlined at No Time to Wait 4 on December 6, 2019. Havemeyer-King explained that NYPL is beginning to perform a mass digitization of its film elements, which is estimated to be about 20,000 elements.[43] As such, the institution is preparing to receive a high volume of files from vendors, and they'd like to create a workflow using RAWcooked. To enable this workflow and make it more trustworthy, NYPL proposed sponsorship for the following features: a DPX implementation checker, integrated losslessness verification, and basic error correction mechanisms. Together, these in-development features will help streamline NYPL's quality control process for RAWCooked digital assets by providing a way to check reversibility without having to "uncook" and store the original DPX packages.

Why is it important in the context of 2019-2020 audiovisual preservation and looking forward?

As the implementation of RAWcooked begins to find traction, the tool offers an open-source software option that assists with film-to-digital format migration and ingest workflows for long-term preservation. One of the ways in which it can continue to grow is if its users invest time or money back into the tool for the benefit of the wider preservation community. As Martinez noted in his presentation, these tools are created for archivists, by archivists, in a field where archivists frequently need to adapt tools made for production and broadcast. The idea here is that tools built for preservation, whether they're open-source or not, enable better preservation work. As White notes: "Supporting open-source projects has immediate financial benefits as the products are mostly free to use and implement—though it is important that archives find a satisfactory means of financing such projects collectively to ensure their continued development."[44] And for those who don't

43 MediaArea, "No Time To Wait S04E25 Genevieve Havemeyer King," video 10:12, January 25, 2020, https://youtu.be/-cJxq7Vr3Nk.

44 Joanna White, email to author, August 3, 2020.

have the means to sponsor features, there is the option of investing time by contributing to documentation and engaging with issues on the RAWcooked Github page.[45] While working with CLI-oriented software and engaging with Github can be a barrier, it is also an opportunity to arrange community training events: for now, online, and hopefully in the future, in person. As White says: "It's a simple but effective way to start things rolling, and technicians get to mingle which can be a rare thing!"[46]

In line with considering the community contributions to this project, Extensible Binary Meta Language (EBML), the binary storage format that is the foundation of the Matroska container, was submitted as an IETF Proposed Standard in July 2020. This milestone in the development of the FFV1/MKV standard was years in the making, and is a big step forward toward generating open standards outside of the Society of Motion Picture and Television Engineers (SMPTE) and the International Organization for Standardization (ISO).

The future of RAWcooked will include more diligent, documented testing and adaptations to the needs of archivists who are working with legacy DPX directories or initiating new film digitization projects on any scale. The role of the archivist, in this regard, becomes critical: archivists can lead the discussion on their needs for tools that enable long-term preservation, and that discussion will help guide RAWcooked to a sustainable future.

45 To learn more about RAWcooked, please visit the product Github page: https://github.com/MediaArea/RAWcooked.

46 Joanna White, email to author, August 3, 2020.

3 Identifying and Managing Born-Digital Video Collections

The more archivists strive toward understanding the specificities of born-digital audiovisual media, the better chance we have of preserving more voices for the future.

What is this topic?

Born-digital video as a concept covers a wide range of video formats, both file and tape-based. Born-digital video works are created by both professionals and amateurs; due to the affordability and ubiquity of many formats, nearly anyone has the capacity to create digital video files on a phone, on a webcam, using a point-and-shoot digital camera, or otherwise. These affordable digital recording options allow more people to tell their stories, while they simultaneously create a flood of camera-original files encoded as formats that are low-quality, complex, unstandardized, and frequently proprietary. These formats can then be edited in accessible non-linear editing software and exported in a range of formats, some of which are open, and many—like ProRes, which is widely preferred by creators—are closed.

This creates an ecosystem of camera originals, transcodes, edited masters, and project files that each represent a number of stakeholders involved in the process of file creation. Beyond stakeholders, each element additionally represents a range of software dependencies that directly impact the way the files can be preserved and accessed in an archival context, or repurposed in a production context. Because of the variables involved in the process of creating digital video, the workflows associated with preserving digital video can never be one-size-fits-all. As Julia Kim, Rebecca Fraimow, and Erika Titkemeyer write in their The *Code4Lib Journal* article "Never Best Practices: Born-Digital Audiovisual Preservation": "'Best practice' is hard enough to determine and follow when you have control over the creation of the media, but even more challenging when accessioning files created by donors, producers, and folklorists that never followed 'better' practices to begin with."[47]

In 2020, the presence of born-digital video and its resulting challenges are not new, but they are becoming more pressing. Out-of-date workflows allow the scale of born-digital video to accumulate, and the risk of obsolescence is high. The video production industry shift from Final Cut Pro to Adobe Premiere enables the creators to work directly from camera-original files transferred from flash storage rather than vetted transcodes, increasing the scale and variety of file formats that arrive in archives. With backlogs increasing and software updates continuing, archives from small-scale community initiatives to large established institutions are assessing their born-digital audiovisual collections and considering how they might enable workflows to process existing collections and new acquisitions that continue to roll in.

47 Julia Kim, Rebecca Fraimow and Erica Titkemeyer, "Never Best Practices: Born-Digital Audiovisual Preservation," Code4Lib Journal 43 (14 Jan. 2019), accessed August 13, 2020, https://journal.code4lib.org/articles/14244.

How does this topic manifest in a real-world setting?

File-based born-digital video collections cannot be visually assessed in the way that tape-based collections can: an archivist cannot walk into a room full of hard drives or optical disks and make a guess at how many hours of material will need to be migrated based on an inventory in the way they could if the room were full of tapes with set recording capacities. This is the first challenge of assessing file-based born-digital archival materials: they require more hands-on intervention to perform an inventory or condition assessment than tape-based video materials. A 1TB hard drive could contain any number of audiovisual materials: for example, it could contain thousands of transcoded MP4 access files, one-half of a 2TB 4K work of video art, or a heterogeneous mix of source materials from different producers shot on different formats, with different iterations of related project files that support an edited master.

Metadata extraction and characterization tools can provide the first layer of file format identification within directories or disk images of hard drives, including DROID,[48] Brunnhilde,[49] Siegfried,[50] and Apache Tika,[51] which provide archivists with the means to understand what is contained on a given hard drive and begin to define assessment priorities and appropriately allocate resources. Beyond identifying what is present within a hard drive, it is often necessary to assess technical metadata within individual files. Even if a file has a visible extension to indicate its wrapper (whether a file is a MOV, MKV, etc.), it is essential to determine the encoding format (ProRes 422, FFV1, etc.) and assess possible embedded metadata like closed captions or copyright information that are not visible without using a tool to extract metadata, like FFprobe,[52] MediaInfo,[53] or Exiftool.[54]

Each of these tools has documentation and is open source, and the UK National Archives has organized research awareness weeks to encourage users to add file formats to the PRONOM technical registry (which powers DROID) and update and expand existing file format documentation.[55] Beyond tools, the OSSArcFlow[56] initiative from Educopia Institute has worked with 10 cultural heritage institutions to model born-digital accessioning and curation workflows using open source software. While these workflows are not specific

48 To learn more about DROID, please visit the product website: https://www.nationalarchives.gov.uk/information-management/manage-information/preserving-digital-records/droid/.

49 To learn more about Brunnhilde, please visit the product Github page: https://github.com/tw4l/brunnhilde.

50 To learn more about Siegfried, please visit the product website: https://www.itforarchivists.com/siegfried.

51 To learn more about Apache Tika, please visit the product website: https://tika.apache.org/.

52 To learn more about FFprobe, please visit the product website: https://ffmpeg.org/ffprobe.html.

53 To learn more about MediaInfo, please visit the product website: https://mediaarea.net/en/MediaInfo.

54 To learn more about Exiftool, please visit the product website: https://exiftool.org/.

55 To learn more about PRONOM research week, please visit the initiative's Github page: https://github.com/digital-preservation/pronom-research-week-2019.

56 To learn more about the OSSArcFlow initiative, please visit the project website: https://educopia.org/ossarcflow/.

to audiovisual collections, they are still useful models to consider in the context of digital preservation.

What might seem like a natural step after file appraisal could be normalization, but audiovisual file formats don't easily yield to the demands of normalization in a way that is true to the needs of archival preservation. Many born-digital files are also born-compressed: lossy information is built into the format, and nothing will recover it. Normalization, for a born-compressed image will always result in an artificial increase in resolution, which can significantly impact the visual appearance of the file and, in some cases, lead to an unexpected file size increase, even during compression.[57] Visually altering the image is, of course, not an option for preserving archival materials, and increasing a file's size in the process is a misstep that unnecessarily crowds space for a future project.

Beyond file-based born-digital formats, there are also tape-based born-digital formats that have their own needs and requirements for long-term preservation. The first digital video format was Sony D1, introduced in 1986, and was followed over the next two decades by formats including D3 (1991), Digital Betacam (1993), miniDV (1995), Betacam SX (1996), DVCam (1996), HDCam (1997), D-VHS (1998), Betacam IMX (2001), HDV (2003), and HDCam SR (2003). At the AMIA 2019 conference in Baltimore, MD, Libby Hopfauf of Moving Image Preservation of Puget Sound (MIPoPS) and Dave Rice of RiceCapades presented on DV Rescue, a collaborative project between MIPoPS and RiceCapades that is working to provide workflows and archivist-created tools for the migration of DV data to more stable file-based preservation formats. Hopfauf and Rice noted that DV tape is "far more susceptible to contamination, damage, decay, and environmental factors than other videotape formats from the same period," increasing the urgency for DV data migration.[58]

As was the case with file-based born-digital video, DV tape's affordability and compact size "enabled many cultural, journalist, and humanities organizations to create unique audiovisual documentation for the first time." This means that a vast array of voices were captured on digital video tape, which as a medium is distinct from analog videotape and file-based digital video. DV Rescue will continue to update their progress over the course of their grant.

Beyond working with tapes, files, and their associated data, there are also decisions to be made regarding what content makes sense to maintain based on a given institution's collections policy or mission statement. A large-scale museum with a digital marketing department may create video documentation of events or exhibitions that will be repurposed for future projects, and as such, it would be logical to maintain camera originals and project files in addition

57 For more information about unexpected file size increases during video preservation, please visit: https://bits.ashleyblewer.com/blog/2019/09/19/ffv1-bigger-than-before/.

58 Libby Hopfauf and Dave Rice, "DV Rescue," Association of Moving Image Archivists annual conference, Baltimore, November 15, 2019.

to edited masters. A large-scale library, on the other hand, that contracts with an outside vendor to document a performance may determine with their vendor that deliverables need only to include digital masters of the performance if no video production is happening on-site.

Why is it important in the context of 2019–2020 audiovisual preservation and looking forward?

On June 19, 2020, the archival activism initiative Documenting the Now[59] hosted an event titled *Archiving Protests, Protecting Activists*, during which representatives from WITNESS,[60] The Blackivists Collective,[61] Texas After Violence Project,[62] and Project STAND[63] all spoke about community-based archival approaches to documenting the Black Lives Matter protests that occurred during the summer of 2020 (and are likely still unfolding) from their respective memory worker perspectives. Tracy Drake, a member of The Blackivists Collective, spoke of the group's work consulting with the Illinois chapter of the Black Panther Party and what that experience could teach other archivists and information professionals. The Blackivists consulted on the creation of an oral history archive, keeping in mind that because the Panthers were targets of pervasive surveillance and state-sanctioned violence, "much of what has dominated the historical record around them is government documents and academic books."[64]

Drake reflected on the way that an oral history archive would attempt to create a counter-narrative for the chapter, which would exist in counterpoint to the one created by the state. She noted that it had taken 40 years to begin to build this counter-narrative, and that archivists don't have to wait to begin preserving materials that will likely help to build a counter-narrative to what is being created by mainstream media to describe today's protests. "In this moment, we have a chance to document the current uprisings responsibly, in a way that protects already marginalized and vulnerable groups, and not wait 40 years later," Drake said, drawing the oral history archive into consideration against the ways in which today's BLM protests are being documented, and the way that documentation is being preserved. "We don't have to wait all that time."

As written above, in "Never Best Practices: Born-Digital Audiovisual Preservation," Kim, Fraimow, and Titkemeyer noted the challenges of accessioning files from donors, producers, and folklorists unfamiliar

59 For more information about Documenting the Now, please visit: https://www.docnow.io/.

60 For more information about WITNESS, please visit: https://www.witness.org/.

61 For more information about The Blackivists Collective, please visit: https://www.theblackivists.com/.

62 For more information about Texas After Violence Project, please visit: https://texasafterviolence.org/.

63 For more information about Project STAND, please visit: https://standarchives.com/.

64 DocNow, "Archiving Protest Content While Protecting Activists," video 1:27:20, June 19, 2020, https://youtu.be/03xciLNQTx0.

with archival best practices. In their AMIA 2019 presentation, the DV Rescue team noted that because of the affordability and compact size of digital videotape, an increasing number of cultural organizations of the 1990s and 2000s were able to create more unique recordings than ever before. Born-digital video collections are frequently documenting voices that are at risk of being lost completely without proper preservation care, and while this care is complex on an institutional level, the tools available provide individuals with the knowledge they need to preserve their own works, too. As Steven D. Booth from The Blackivists Collective explained:

> We really want people to understand the value that their materials have, and to know that they can do the work of preservation; that they don't always have to give it over to some institution. And even if they're not thinking about giving it over to an institution, just getting them to understand: your story's valid to this big picture, too.[65]

The ways in which institutions, organizations, and individuals manage born-digital audiovisual collections has an impact on the long-term access to these fragile, complex, and frequently proprietary formats, and that is primarily felt by communities that have been historically underdocumented, let alone documented with their own voices. The more we strive toward understanding the specificities of born-digital audiovisual media, the better chance we have of preserving more voices for the future.

65 Steven D. Booth, interview by author, August 5, 2020.

4

Knowledge-Sharing as a Preservation Tool

Knowledge sharing has grown in importance this past year as archivists adopt and adapt communication tools while re-examining what knowledge matters.

What is this topic?

Knowledge sharing is a critical tool for audiovisual preservation work, and the ways in which archivists perform the action of sharing knowledge and information can be difficult to quantify. Archivists share knowledge through formal channels like workshops, seminars, mentorship, or graduate degrees, as well as informal channels, like on-the-job learning or other means of learning through experience. In the abstract, knowledge sharing allows archivists to build trust with archivists and organizations that share similar goals within the larger field of cultural heritage, preserve knowledge through progressing generations of audiovisual archivists, and provide methods for more individuals from different socioeconomic and cultural backgrounds and means to gain the necessary tools to pursue careers in the field. It also allows archivists to avoid duplicating work across the field, and to make their work reproducible both within their institution (or organization, or individual practice) and in other institutions within their region or beyond.

In practice, these goals can be difficult to achieve, as audiovisual archivists need not only to communicate with one another, but also with stakeholders that may work in different fields or departments (including production or information technology) that enable the technical nature of audiovisual preservation work, as well as with archivists who live in different global regions who might have different imperatives for their preservation work. Barriers include a lack of time, lack of mutual understanding or trust between institutions or departments, conflicting goals, staff turnover, poor documentation, geographic distance, language barriers, or even a general unwillingness to communicate based on past failures. Today, archivists face a new barrier to sharing knowledge: the COVID-19 pandemic has restricted in-person gatherings and travel, moving the vast majority of our communication online. This restriction significantly hinders the field's ability to provide knowledge-sharing opportunities. Fortunately, the field is aiming to highlight existing tools for knowledge sharing—and to develop new ones—while examining the kinds of knowledge we share in the first place.

How does this topic manifest in a real-world setting?

When discussing how knowledge and information circulate in the field of audiovisual preservation, there are two primary questions that frame the conversation. First: What is the current pathway for gaining the necessary expertise to enter the field, and have the resources to pursue a career? Second: What are the support systems in place that will provide current audiovisual archivists with the resources they need to succeed in their current and future roles?

While these questions require survey research to adequately assess their answers, they are included here as ways of considering the minimum level of knowledge and expertise that the field considers

acceptable for its workers, how that knowledge is gained, in what regions of the world it is possible to pursue education in archival preservation, and how continuing education and collaboration opportunities allow archivists to continue to advance their careers and adapt to the evolving demands of the profession.

In the United States, a master's degree is widely considered to be a requirement for entry-level audiovisual archiving and preservation positions. In the July 2020 *Journal of Archival Organization* article, "Toward a More Equitable Field: Broadening the Landscape with Fellowships in Audiovisual Preservation," the authors provide the approximate cost of the three audiovisual-specialized graduate programs in the United States, and note that although "these programs offer exceptional methods to gain skills and industry contacts in the field of audiovisual preservation, the barriers to entry are high, and few other structured opportunities exist for students to gain a foothold in the profession through internships or mentorships."[66] While there are archivists who have entered the field without a master's degree, that battle to break into the field and succeed is hard-won, and those skilled individuals frequently don't receive the institutional or financial support they need for continued professional development.

Outside of the United States and Europe, few graduate-level programs exist to provide students with the opportunity to work in the field. Some archival education opportunities exist in the form of dedicated coursework within other degree programs. This is the case at Universidade Federal Fluminense in Rio de Janeiro, Brazil, which requires archival coursework as part of its Cinema and Audiovisual BA program, along with support from the connected Laboratório Universitário de Preservação Audiovisual (LUPA), which has been an educational resource while preserving amateur film since 2017.[67] Some institutions, like the Malawi University of Science and Technology, are in the process of establishing new archives-focused graduate programs. This program, which is being developed by the university in consultation with the Malawi National Commission for UNESCO, will focus on records management practices as its bedrock, and will include audiovisual archiving-specific courses to fit within this framework.[68]

Along with finding methods of providing access to educational opportunities, there is an ongoing conversation in the United States about what kinds of knowledge we share, and the values that contemporary archival curricula reinforce alongside technical training. When asked about what a "people-first archival practice" means to him, Steven D. Booth of The Blackivists Collective and

66 Casey Davis Kaufman et al., "Toward a More Equitable Field: Broadening the Landscape with Fellowships in Audiovisual Preservation," Journal of Archival Organization 17 no. 1-2 (2020): 19–37, accessed August 14, 2020, https://doi.org/10.1080/15332748.2020.1769995.

67 Rafael de Luna Friere, *BRICS Audiovisual Preservation Meeting: An Unprecedented Opportunity,* September 2019, BRICS Film Festival.

68 Christopher J. Magomelo, interview by author, September 11, 2020.

audiovisual archivist at the Barack Obama Presidential Library, explained that the practice can be traced back to archival education. "What I've given myself as an assignment is to go back and read some of the people that were taught [...] and see where the gaps are. And if there are gaps, who were the people that tried to close those gaps? And if there were no gaps, then why did we end up creating a field that's so exclusive?"[69] As he continued, he emphasized the importance of community archives, and asked: "What would it look like if we started the semester with community archives? What would it look like if we just had a whole syllabus filled with articles and research papers and webinars from Black Indigenous people of color that are in the field? I think then we would see this huge shift." Outside of academia, professional archive organizations set the tone for how knowledge-sharing and skill-building resources might be organized and implemented. Organizations such as members of the Coordinating Council of Audiovisual Archives Associations (CCAAA) have annual conferences, which are the bedrock of information exchange in the field. While barriers to conference attendance can be significant, these conferences present archivists with the opportunity to connect with colleagues and adapt knowledge for their own archival contexts.

When speaking about her early experiences with audiovisual heritage preservation networks, Judith Opoku-Boateng of the J.H. Kwabena Nketia Archives at the University of Ghana in Accra recalls realizing that the workshops she was attending could be adapted for her archive and her region, and that by extending her international network, she was finding pathways for colleagues to pursue similar mentorship and knowledge-sharing opportunities. In 2013, she participated in the Sound and Image Collections Conservation (SOIMA) workshop in Nairobi, Kenya, followed her 2013 experience with an advanced SOIMA workshop in Brussels in 2015, and took on SOIMA hosting duties in 2017 when the workshop was hosted in Accra, Ghana. Following SOIMA 2017, the Institute of African Studies at the University of Ghana hosted IASA 2018.[70] [71] Opoku-Boateng noted that the workshops and tutorials held at IASA in Western countries were not relatable to the specific challenges faced by local archivists in Ghana, as audiovisual archiving practices were still in their infancy. After consulting with the IASA Training & Education Committee as well as the IASA Program Committee, the workshops were reconfigured to focus on collection assessments, disaster preparedness, and digitization, among other topics.[72] These topics were more accessible and useful to the experiences of local participants.

69 Steven D. Booth, interview by author, August 5, 2020.

70 To learn more about SOIMA, please visit the program website: https://www.iccrom.org/section/people-and-heritage/soima-sound-and-image-collections-conservation.

71 To learn more about IASA 2018 in Ghana, please visit the conference website: http://2018.iasa-web.org/.

72 To learn more about the IASA Training & Education Committee, please visit the committee website: https://www.iasa-web.org/training-education-committee.

Opoku-Boateng's drive to acquire knowledge in the field and impart that knowledge to her colleagues and emerging archivists connected her to a network of international organizations (including Audiovisual Preservation Exchange (APEX), IASA, AMIA, and others). It also provided her with resources to share with other African archive communities. While attending the IASA 2018 conference in Ghana, Christopher J. Magomelo, Senior Assistant Executive Secretary for Culture in the Malawi National Commission for UNESCO, approached Opoku-Boateng and asked if she could present at their upcoming Memory of the World Programme (2019), which was to be held in Malawi. She was tasked to present on the topic "International Networks and Their Benefits to the African Archivist." This topic would contribute to the Programme's overall goal of working toward establishing a pan-African network of audiovisual preservation managers. Opoku-Boateng accepted, and presented at the workshop. Along with her presentation and additional workshops and presentations, the Unesco Commission of Malawi created a draft constitution for the Malawi Society of Audiovisual Managers, which will work to build stronger networks and training opportunities for archivists and preservationists in Malawi with the goal of being a link to other regional and international networks.

International organizations can provide the spaces and gatherings critical to establishing supportive international networks. Strong networks are also built regionally, based on initiatives developed within the regions that need them, and sometimes receive support from CCAAA organizations like IASA via their ability to disseminate regional ideas through their international networks. One example of the importance of international collaboration is illustrated by the foundation of the Fonoteca Nacional de México in 2008. The Fonoteca was founded based on successful local workshops and conferences (which had also been supported by IASA) in the late 1990s and early 2000s.[73] These workshops were initiated by Perla Olivia Rodríguez Reséndiz, who is now the Researcher in Digital Sound Preservation at the Universidad Nacional Autónoma de México. Once the Fonoteca was established, it could provide more workshops on subjects like how to construct appropriate storage vaults, how to clean film elements, and how to perform collection assessments.

The context of the Fonoteca and its workshops provided an opportunity for regional preservationists to gather. The skills shared in those workshops eventually led to the founding of Señal Memoria (initiated by Dora Brausin, Subgerente de Radio RTVC Sistema de Medios Públicos), a state-funded, National Radio Television of Colombia-run program supporting the preservation of public broadcasting materials in Colombia, and the Fonoteca Nacional of Costa Rica (initiated by Olga Rodríguez Chaves, Directora

73 Perla Olivia Rodríguez Reséndiz, interview by author, September 9, 2020.

General, Sistema Nacional de Bibliotecas—SINABI).[74] While Costa Rica, Colombia, and Mexico all face different challenges related to local and national governments and institutional barriers, their shared regional context allowed them to create a sustainable regional network with established regional authorities. While there is still a long way to go, networks like the Red Iberoamericana de Preservación Digital de Archivos Sonoros y Audiovisuales (RIPDASA) provide Spanish-language webinars on topics identified as areas of interest, and additionally provide context for the global network of Spanish-speaking archives via interactive resources like El Observatorio de Archivos Sonoros y Audiovisuales de Iberoamérica.[75] RIPDASA aims to provide archives in Spanish-speaking countries with the same language for describing digital preservation,[76] and while international organizations like IASA and companies like AVP provide invaluable support for initiatives like these, they are not initiatives that began internationally: they originated from the region with the materials organizers aim to preserve.

The need for international support without a U.S. or European-oriented influence is a topic discussed across organizations on both international and regional scopes. In the 2019 report, *BRICS Audiovisual Preservation Meeting: An Unprecedented Opportunity*, Universidade Federal Fluminense film professor Rafael de Luna Freire provides an example when he describes a need for countries from "BRICS"—those being the "emerging economies" of Brazil, Russia, India, China, and South Africa—to develop a mutual understanding that could allow for audiovisual preservation debates outside of the usual U.S. and Europe-led international networks. While BRICS Film Festival is primarily a gathering to showcase films in the spirit of cultural exchange, a significant component of the festival is its Preservation Meeting. In his report, Friere writes:

> As much as the knowledge and experience accumulated in the audiovisual preservation field by the film archive institutions from Europe and the United States were fundamental for the development of the area in the BRICS countries – and they continue to be, by the way –, today it is an indisputable fact that our challenges are different, and they demand that we develop our own solutions. An essential step towards this is that we must get to know each other better. This is where the BRICS Audiovisual Preservation Meeting wishes to start.[77]

74 Perla Olivia Rodríguez Reséndiz, interview by author, September 9, 2020.

75 Universidad Nacional Autónoma de México, "Observatorio Iberoamericano," accessed September 14, 2020, https://www.ripdasa.iibi.unam.mx/geoportal/home.

76 It is worth noting that the Reference Model for an Open Archival Information System (OAIS), one of the touchstones of digital preservation practice, only exists in the English language. While the lack of translations is a barrier to establishing a truly global language for digital preservation, interpretations in languages other than English exist, including Perla Olivia Rodríguez Reséndiz's article, "El OAIS en la preservación digital de archivos sonoros" (2014). The article was published in Investigacion Bibliotecologica, which is published by Universidad Nacional Autónoma de México.

77 Rafael de Luna Freire, *BRICS Audiovisual Preservation Meeting: An Unprecedented Opportunity*, September 2019, BRICS Film Festival.

Why is it important in the context of 2019–2020 audiovisual preservation and looking forward?

While the COVID-19 pandemic presents a barrier to this model by moving all conferences to online-only platforms, professional organizations and individual archivists are finding methods of adapting their knowledge-sharing practices to virtual platforms. While this is a challenge, it could present conference planners with an opportunity to see what works virtually, and adapt it for a future in which we are able to return to in-person conference attendance while still offering virtual programming for colleagues who don't have the resources to attend in person.

One conference-bound audiovisual preservation workshop that has been adapted and implemented online is "Bash for Archivists," taught by Reto Kromer of AV Preservation by reto.ch and Joshua Ng of Archives New Zealand.[78] This workshop, which is a Bash programming workshop for audiovisual archivists, was initially developed for the Southeast Asia-Pacific Audiovisual Archive Association (SEAPAVAA[79]) and adapted as a free online course from June 23, 2020 to July 9, 2020. The course was well-attended by participants from all over the world, in spite of time differences and varying skill levels. Kromer and Ng had previously co-led the "FFmpeg for Audio-visual Archivists" workshop at the IASA/JTS Joint Workshops in Hilversum, the Netherlands in October 2019.[80] While in-person workshops at conferences present an excellent environment for skill-sharing, opening up their workshops to an international pool of archivists for free delivered skills to a new set of archivists who would not otherwise have been able to participate.

Still, online platforms do not solely lend themselves to an expansive audience: there is still space for working in smaller, more focused groups or communities. When speaking about how The Blackivists Collective formed, Booth described the process of lending the memory worker skills that he and his fellow collective members had to the communities they lived and worked in in Chicago: "[S]lowly but surely the projects honestly just started to come to us. We never went out seeking anything and those came to us primarily through the connections we already had in the community." He continued: "Our sole purpose is really just to educate people and to get them to think about their own stories and legacy and how to capture preserved documents." Has that work been impacted by the pandemic? "We have had conversations with maybe one or two organizations during this time, [...] telling them what in the work and the service that we can provide to them has really been beneficial, I think, to us, as we deal personally with this during this time, just trying to figure out life right now. So it really hasn't. I don't think it's shifted that much."

78 To learn more about the Bash for Archivists workshop, please see the workshop website: https://www.reto.ch/training/2020/202006/.

79 To learn more about SEAPAVAA, please visit the organization website: https://seapavaa.net/.

80 To learn more about the IASA/JTS joint workshops, please see the workshop program website: http://jts2019.com/iasa-jts-joint-workshops/.

There are many ways for archivists to connect and share information with one another on global and local levels, whether through formal education, trusted relationships in processional or volunteer settings, or new tools that enable archivists to connect virtually during a global lockdown. While the ways in which we connect take myriad forms, they all function in service of providing support for archivists across institutions and regions, aiming toward a stronger future of shared resources.

Conclusion

What trends and topics will the field of audiovisual preservation remember when it looks back on the impact of 2020 on our work? This report offers four possibilities that link to accessibility, preservation tools, born-digital collection management, and knowledge sharing. These topics may address key concerns in the work of preservation practitioners, and there are still more that influence the path of the field every day. While the audiovisual preservation field may always be in motion, that does not mean it is fast-paced, and sometimes it may feel as though it has come to a standstill. Each of the topics in this report addresses the fact that while "best practices" may guide us, there needs to be room for a "better practices" perspective to accommodate the workflow needs of particular formats as well as the realistic resources of a given archive. Each topic touches on a range of stakeholders, sometimes across different departments, all of them with a need for concrete, actionable plans for communication in the pursuit of mutually beneficial goals. And each topic looks toward the possibility of a more inclusive field, both in terms of the individuals who are able to practice as archivists and preservationists, and in the content we prioritize preserving. As archivists and institutions alike re-assess their working priorities during an unprecedented time in history, it is beneficial to the field to examine our shared goals: what they are, and how we work toward them as a field now and in the future.

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