

UNIVERSITY OF CALIFORNIA

Los Angeles

From Creation to Preservation:

Film Laboratories in the Moving Image Archiving and Preservation Field

A thesis submitted in partial satisfaction of the requirements  
for the degree Master of Library and Information Science

by

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## ABSTRACT OF THE THESIS

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University of California, Los Angeles, 2022

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Moving image archiving and preservation concerned with the stewardship of works on photochemical film often involves the creation of new prints from at-risk original or extant materials. Film archivists and preservationists rely on technicians in sites known as film laboratories to conduct this work, where the images of photochemical film come to visual life through chemical processing and mechanical methods of duplication. Despite this working relationship, a need for a more extensive study of the role of film laboratories as organizations operating within or adjacent to the interests of the moving image archiving and preservation field remains. Structured interviews were conducted with employees, participants, and technicians of six film laboratories: commercial film laboratories Colorlab and Pro8mm; archival film laboratories at the Library of Congress Motion Picture, Broadcasting, and Recorded Sound Division and the Packard Humanities Institute; and artist-run film laboratories L'Abominable

and Nanolab. By advancing the understandings of the film laboratory, outlining their broader institutional logics, and assessing the impacts of their various economic models, organizational structures, and technical practices on the field, this thesis will outline why this institutional divide should be bridged and examine how film laboratories play a significant role in contributing to the lifecycle of film and moving image archiving and preservation.



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*To Black Hole Collective Film Lab and all film laboratory workers past and present  
whose labor, often invisible to the one who gazes upon the medium,  
occupies the margins of the moving image.*

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## **List of Acronyms**

AFI	American Film Institute
AFW	Artist Film Workshop
AMIA	Association of Moving Image Archivists
FIAF	International Federation of Film Archives
FTVA	Film and Television Archive (of UCLA)
IULMIA	Indiana University Libraries Moving Image Archive
LOC	Library of Congress
MBRS	Motion Picture, Broadcasting, and Recorded Sound Division (of the LOC)
LOC MPCC	Motion Picture Conservation Center (of the LOC MBRS)
NAVCC	National Audio-Visual Conservation Center (of the LOC)
NFPF	National Film Preservation Board
NFPF	National Film Preservation Foundation
PHI	Packard Humanities Institute
SMPTE	Society of Motion Picture and Television Engineers
UCLA	University of California, Los Angeles

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## Section I: Introduction

*“This discussion is clear evidence of the great need for a better understanding between the various technical groups who contribute toward the making of motion pictures. The old and sometimes vitrolitic [sic] argument between the cameraman and the laboratory is really cased entirely upon a mutual lack of understanding of the objectives of the other side and the limitations under which they must or do work. This also applies to the several other zones of contact, in particular to that between the motion pictures technicians as a whole and the scientific men who are responsible for all fundamental improvement in the art.”*

— Leigh M. Griffith in a 1928 article, *“The Technical Status of the Film Laboratory”*<sup>1</sup>

Film archivists and preservationists aspire to fulfill a fundamental mission: to preserve works and other content on photochemical media so cultural heritage once captured on this moving image format can be accessible in the present and for the future to come. Every moving image work accessioned and stewarded by an archive was captured at a specific time by a creator—an individual who envisions the work and is responsible for bringing its vision to life. After a creator captures an image on film, the now-exposed film stock must be processed in chemistry and reproduced by mechanical means to enable the viewing of the content recorded on the medium by the creator and others. Moving images on photochemical film come to visual life in no place other than the sites performing this work known as film laboratories. All works on film were once processed within these locations at their earliest points of existence far before a cultural heritage organization or archive acquired the prints or related elements of the work in its later years. Alongside the labor of archivists and preservationists, it is the skill and knowledge of workers within film laboratories shaping the lives and trajectories of moving image works on photochemical film.

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<sup>1</sup> Leigh M. Griffith, “The Technical Status of the Film Laboratory,” *Transactions of the Society of Motion Picture Engineers* 12, no. 33 (1928): 173–94.

Archives and preservation work concerned with the stewardship of photochemical film often dictates that archivists use original or extant materials at risk to create new prints for preservation and access. *Redefining Film Preservation: A National Plan*, published in 1994 from recommendations of the Librarian of Congress in consultation with the National Film Preservation Board (NFPB), mentions the reviewing of film laboratory work and standards as part of the plan to ensure archival copying quality can support the preservation of America's motion picture heritage.<sup>2</sup> After the reauthorization of the NFPB through the National Film Preservation Act of 1996, the U.S. Congress established the National Film Preservation Foundation (NFPF) as a government-independent 501(c)(3) tasked with the distribution of funding to U.S. organizations looking to save American films.<sup>3</sup> An NFPF Basic Preservation Grant application states recipients must use grant funding to pay for "new laboratory work," which includes the creation of "new film preservation elements," "public access copies, one of which must be a film print," and "closed captioning for sound films destined for online or television exhibition."<sup>4</sup> With NFPF Grant awards ranging from \$1,000 to \$75,000 as of writing, they remain a crucial funding source for American organizations operating in the film archiving and preservation landscape and demonstrate the field's reliance on film laboratories and their services in order to continue their mission.

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<sup>2</sup> Annette Melville and Scott Simmon, "Redefining Film Preservation: A National Plan" (Washington, D.C.: National Film Preservation Board of the Library of Congress, August 1994)

<sup>3</sup> "Why the NFPF Was Created," *National Film Preservation Foundation*, accessed November 5, 2021, <https://www.filmpreservation.org/about/why-the-nfpf-was-created>. See also Brian Real, "From Colorization to Orphans: The Evolution of American Public Policy on Film Preservation," *The Moving Image: The Journal of the Association of Moving Image Archivists* 13, no. 1 (2013): 129–50, <https://doi.org/10.5749/movingimage.13.1.0129> and Jan-Christopher Horak, "The Gap Between 1 and 0: Digital Video and the Omissions of Film History." *The Spectator*. Los Angeles, United States: University of Southern California, Division of Critical Studies, Spectator, Spring 2007.

<sup>4</sup> "Basic Preservation Grants," *National Film Preservation Foundation*, accessed November 5, 2021, <https://www.filmpreservation.org/nfpf-grants/basic-preservation-grants>

The knowledge and specialized skills of film laboratories has traditionally existed separate from those of film archiving and preservation institutions, despite their interdependent organizational relationships and avenues for close collaboration often supported by such grants. When the expertise needed to handle and maintain film is split between professional communities with priorities existing in different institutional contexts, knowledge is not equally disseminated and decades-old film collections are more prone to risk and erasure from the cultural record. Workers of the two institutions provide distinct forms of expertise with the medium and often do not generate from the same historical roots and avenues of professional training. Film laboratory technicians and employees, while not often trained the same formal contexts as archivists, understand the archival field's preservation needs as an institution working within the auspices of and for the profession. Reciprocally, it remains to be discussed if and to what extent film archiving and preservation understands the capacities of this constituency essential to its profession's practices. As it stands, without the film laboratory and the maintenance of its knowledge and technologies, the field is left to contend with how film archiving and preservation can sustain itself.

The goal of this study is to help those working within archival organizations bridge institutional divides and help forge a better understanding of the work pursued within film laboratories for the advancement of moving image archiving and preservation efforts, whose labor film archivists must depend upon for the preservation of film collections. This thesis will investigate how film laboratories contribute to the film archiving and preservation profession in a multitude of ways. Those working within film laboratory environments hold specialized abilities and knowledge of working with film honed by their profession's craft, understand the use of film equipment and technologies not available in film archiving and preservation contexts, and are the

sites where original, first-generation materials are processed and access copies of film prints are created. Without film laboratories, moving image heritage on photochemical film would not be able to come into visual existence, and film archiving and preservation would be limited in its ability to perform vital professional responsibilities related to the access of film heritage and the preservation of collections.

Film laboratories operate through distinct economic models, organizational structures, and technical practices that impact the types and goals of the preservation work pursued within them. Commercial film laboratories, forming some of the oldest and earliest organizations in the field, operate as independent businesses on a for-profit basis and were initially developed to serve the needs of the growing commercial film industry. However, they diversified their clientele in later decades and generated a series of technical solutions to serve the needs of both commercial and amateur filmmakers, with select laboratories expanding into digital and other boutique services. Meanwhile, the two largest moving image archives in the United States launched internal film laboratories whose activities are monitored by the parent archives themselves, giving their organizations a stronger ability to focus on the laboratory work needed to preserve their collections. In more recent decades, filmmakers—often working within the traditions of independent media arts and experimental filmmaking—developed artist-run film laboratories for serving the direct needs of the films’ creators and prioritizing creative expression over financial profit within their organizations. While preservation practices pursued within these spaces demonstrate a larger institutional coherence, the differences in organizational contexts are significant, and the impacts on preservation work in film laboratories are elaborated within this study.

To advance understandings of the film laboratory's role in moving image archiving and preservation work and the impacts of various economic models, organizational structures, and technical practices pursued within these spaces on the field, this study explores six commercial, archival, and artist-run film laboratories in North America, Europe, and Australia by conducting interviews with film laboratory founders and technicians. From their earliest roots in the late 1800s to the present, commercial film laboratories have been influenced by numerous changes in media industries and technologies yet carry on with their work in the predominantly digital era of today. Commercial film laboratories continue to offer services for both large-scale studio productions and amateur filmmaking, and in recent decades, expanded to film-to-digital work and a range of other preservation services to help fulfill the needs of cultural heritage organizations. Archival film laboratories develop out of a growing call for film preservation in the post-war period, serve as a rare presence in the broader field, and are established within larger cultural heritage organizations to support their moving image archiving and preservation efforts. Standing as both an antithesis yet direct continuation of commercial film laboratories, the artist-run film laboratory network emerged in Europe in the late 1990s and largely flourished in other Western nations, fostering an alternative form of institutional identity due to their separate agendas and interests.

This study aims to be a starting point for research on film laboratories in moving image archiving and preservation given the current lack of scholarship. Therefore, this work asks:

- What industrial, cultural, and historical influences gave rise to film laboratories as a distinct area of film work, and how have the preservation activities within these spaces shifted as filmmaking and moving image archiving and preservation developed over time?
- How do economic considerations impact the types of clients, film formats, and content preserved within commercial film laboratories? How do the funding models for archival

and artist-run film laboratories converge or diverge from those of commercial film laboratories?

- Where does preservation work take place within commercial, archival, and artist-run film laboratories, and how is this work manifested within the selected organizations? To what extent do organizational structures of the laboratories parallel or diverge from one another, and are these conditions organizationally specific or tied to broader institutional logics?
- What technical practices do commercial, archival, and artist-run film laboratories employ for their work with photochemical film? How do differences in funding sources, training, and cultural commitments impact their technical practices?
- What should archival professionals trained within moving image archiving and library and archival science programs know about the preservation work conducted within film laboratories? How do the institutional spaces of film laboratory workers converge or diverge from those of moving image archivists? How can future scholarship on film laboratories help bridge existing institutional divides, and what core takeaways and practices can help better inform and articulate a more holistic approach to working with photochemical film for archiving and preservation practitioners?

The answers to these questions have several larger implications for moving image archiving and preservation work. First, this work aims to conduct a more extensive study of the role of the film laboratory within film archiving and preservation in order to strengthen the contemporary overall understanding of film as a medium for the various communities who engage with the form. Second, outlining the film laboratory's distinct practices, histories, and priorities can help the film archiving and preservation field foster better communication with and form a greater understanding of this disparately positioned institution. Lastly, highlighting the essential work of film laboratories can help outline what needs to be done within scholarship, academic curricula, and professional training so the moving image archiving and preservation field can better prepare the next generation of film stewards and advocates. This work will discuss that due to their work in maintaining and salvaging film equipment, honing their practice with the medium, and keeping what is often deemed a "declining" industry and tradition alive,



film laboratories play a significant role in shaping the definitions, understandings, and practices of film archiving and preservation.

This section will map the history of film laboratories with primary and secondary sources from inventors who experimented with the earliest moving image technologies, and thus, simultaneously contributed to the establishment of the film laboratory as a site of photochemical motion picture film creation. It then transitions into the role of the film laboratory in the developing commercial motion picture industry to their established stronghold in the creation of motion picture works. The need to preserve a growing volume of films produced by this commercial motion picture industry led to the creation of multinational professional cultural heritage organizations and a greater awareness of film preservation in the post-war era, with film laboratories expanding their clientele to include these film archives driven to cultural preservation and several archives launching their internal film preservation laboratory units. Finally, film laboratories encountered a turning point in the late twentieth century with the establishment of video and digital technologies, resulting in shifting methods and priorities in the moving image archiving and preservation field that created avenues for new organizational forms: cooperatively organized artist-run film laboratories.

### **The Birth and Development of the Film Laboratory**

Understanding the role of film laboratories in moving image archiving and preservation demands situating them within the contexts of commercial filmmaking, the moving image archiving and preservation profession, and media artmaking. The historical genesis and transformations of film laboratories may be charted across three bodies of literature: professional engineering journals, audiovisual archiving publications, and media arts scholarship. To address the initial development of film laboratories in the service of the burgeoning late nineteenth

century and early twentieth century commercial film industry, the section draws on the professional journals of motion picture engineering and related trade publications. It then turns to the publications of international film preservation groups that first emerged during the interwar period in addition to scholarship on moving image archiving and preservation produced during the late twentieth and early twenty-first centuries alongside the development of U.S. graduate programs in audiovisual archiving to discuss the growing importance of film laboratories for preservation work. The 1990s and early 2000s also witnessed the rise of artist-run film laboratories, which have been discussed by media arts scholars operating within media archaeological and art historical traditions as vital efforts for sustaining alternative film practices outside of the influence of commercial and mainstream cinema.

The birth date of the film laboratory may be August 1889, when George Eastman, the founder of the Eastman Kodak Company, sent a supply of motion picture film to William K. L. Dickson, an employee and protégé of inventor Thomas A. Edison.<sup>5</sup> According to the personal accounts of Dickson, who worked with Edison on some of the earliest developments of sound and motion picture technologies, a demonstration of Eastman Kodak cameras influenced his work on the kinetoscope film viewer. Dickson requested a meeting with Eastman, who afterward was willing to support Dickson and Edison's work on the kinetograph camera, and samples of motion picture film strips were tailor-made by the Eastman Company per Dickson's technical requests. It was also during Dickson's work developing the kinetograph that he established the prominent 35mm motion picture film gauge.<sup>6</sup> To support his mechanical tests and endeavors,

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<sup>5</sup> William K. L. Dickson, "A Brief History of the Kinetograph, the Kinetoscope and the Kineto-Phonograph," *Journal of the Society of Motion Picture Engineers* 21, no. 6 (1933): 435–55, <https://doi.org/10.5594/J12965>.

<sup>6</sup> Dickson says, "At the end of the year 1889, I increased the width of the picture from ½ inch to ¾ inch, then, to 1 inch by ¾ inch high. [...] This standardized film size of 1889 has remained, with only minor

Dickson instructed staff to build a dedicated darkroom where employees perforated raw, unprocessed film stock and joined, trimmed, printed, and processed films exposed during their equipment tests in large spiral drums, eventually leading to the creation of the first contact printer for motion pictures, and thus, the first physical site responsible for housing these various mechanisms known today as the film laboratory.<sup>7</sup>

Film laboratories post-Dickson operated in the service of a rapidly expanding commercial film production industry, which was fueled by the introduction of narrative filmmaking and growing public fascination with moving image technology as the twentieth century progressed. By 1900, laboratory work was no longer conducted by a cameraperson and their helpers, and the film laboratory emerged as a separate organization for producing rush and release prints.<sup>8</sup> With the increasing demand for film as a medium and an abundance of exposed film stock requiring development, film laboratories stepped in to fill the growing exigency for film work and chemical processing. To unite this expanding profession, the Society of Motion Picture Engineers, existing in continuous operation today as the Society of Motion Picture and Television Engineers (SMPTE), incorporated in 1916 with the objectives of “the advancement in the theory and practice of motion picture engineering [...], the standardization of the mechanisms and practices employed therein, and the maintenance of a high professional standing among its members.”<sup>9</sup>

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variations, unaltered to date.” See also John Belton, “The Origins of 35mm Film as a Standard,” *SMPTE Journal* 99, no. 8 (1990): 652–61, <https://doi.org/10.5594/J02613>.

<sup>7</sup> Dickson, “A Brief History of the Kinetograph, the Kinetoscope and the Kinetophone,” 455.

<sup>8</sup> John I. Crabtree, “The Motion-Picture Laboratory,” *SMPTE Journal* 1955 64, no. 1 (1955): 13–34, <https://doi.org/10.5594/J18394>.

<sup>9</sup> “Constitution and By-Laws,” *Transactions of the Society of Motion Picture Engineers* 1, no. 2 (1916): 9–11, <https://doi.org/10.5594/J18048XY>.

Charles Francis Jenkins, the Society's first chairman who also later became one of the inventors of television, demonstrated the inception of a professionalized identity for film technicians as the organization began to track the development of the medium and its associated technologies over the decades. In a 1916 address to the Society's membership, he recognized the comprehensive standardization of film as the basis of the motion picture, stating it is the membership's duty as engineers to "wisely direct this standardization, to secure best standards of equipment, quality, performance, [and] nomenclature."<sup>10</sup> Eastman Kodak later opened the doors of filmmaking to a non-professional, amateur sector and pushed film as a medium even further to a market of creators and consumers when they developed the smaller 16mm film gauge a few years later in 1923.<sup>11</sup> While inaccessible to many upon release due to its high costs, 16mm would become one of the most widely used film formats and more financially accessible in later decades, soon influencing Eastman Kodak's development and release of 8mm film in 1932 and cartridge-based Super 8 film in 1965.<sup>12</sup>

As the use of film proliferated and motion picture studios established their cultural stronghold throughout the 1920s and 1930s, film laboratories became increasingly central to the success of this growing industry. Leigh M. Griffith of film production and distribution company Famous Players-Lasky wrote in his 1928 essay about the physical terrain of the film laboratory as a division "within the motion picture production industry [...] concerned with the chemical and mechanical treatment of the exposed negative and the entire treatment of positive prints,"

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<sup>10</sup> "Chairman's Address," *Transactions of the Society of Motion Picture Engineers* 1, no. 2 (1916): 23–23, <https://doi.org/10.5594/J18052>.

<sup>11</sup> Alan Kattelle, "Chapter Four: George Eastman and His Company," in *Home Movies: A History of the American Industry, 1897-1979*, 1st ed (Nashua, NH: Transition Publishing, 2000).

<sup>12</sup> Lenny Lipton, *The Super 8 Book* (New York: Simon and Schuster, 1975), 11.

overall signifying the film laboratory's commercial expansion as a growth parallel to the burgeoning motion picture industry of the time.<sup>13</sup> In 1931, production company Metro-Goldwyn Mayer broke ground on their studio's film laboratory in Culver City, California, giving them the ability to increase production efficiency by processing negatives immediately after shooting, with the laboratory being one of the largest established within the gates of a motion picture studio thus far.<sup>14</sup>

Film laboratories retained their position of prominence in motion picture production and distribution work well into the second half of the twentieth century. Figure 1, taken from the book *Your Film and the Lab* by L. Bernard Happé published in 1974, demonstrates the centralized role of the film laboratory as the link between the creative and technical formation of works on film to their distribution to audiences. However, the media industry supporting its growth would soon face challenges and encounter a change in technology in the latter half of the century. The booming U.S. studio system additionally witnessed a decline with the verdict of the Hollywood Antitrust Case of 1948, which declared film studios' use of vertical integration through direct contracts with actors and directors and its ownership of theaters, film distribution, and companies that processed film a violation of the nation's antitrust law.<sup>15</sup> As business models began to shift in the decades following the collapse of the former studio system, so too did the role and services of film laboratories, which were further impacted by the introduction of video

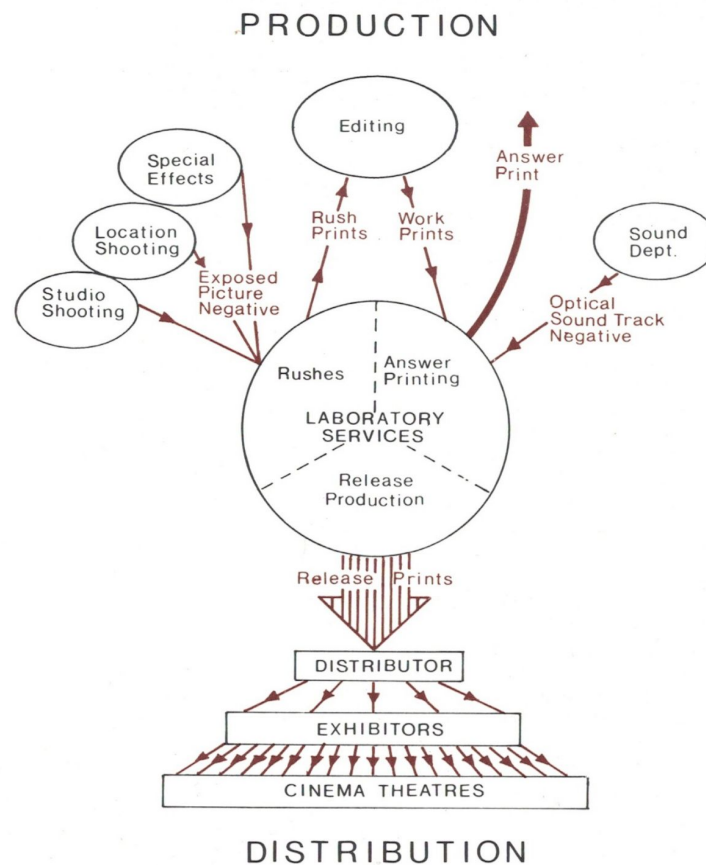
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<sup>13</sup> Griffith, "The Technical Status of the Film Laboratory," 173. See also Luci Marzola, "A Society Apart: The Early Years of the Society of Motion Picture Engineers." *Film History* 28, no. 4 (2016): 1–28. <https://doi.org/10.2979/filmhistory.28.4.01>.

<sup>14</sup> "Great M.G.M. Film Laboratory: New Structure in Culver City Studios," *The Daily Film Renter*, January 7, 1931, 7.

<sup>15</sup> *United States v. Paramount Pictures, Inc.*, 334 U.S. 131 (1948)

technologies in the late 1970s and born-digital formats in the mid-1990s and increasingly embraced preservation work alongside their continued support of commercial film production.



**THE POSITION OF THE LABORATORY** The Laboratory provides the technical services which link all phases of film production and the resultant release prints to be shown in the cinema.

**Figure 1.** A graphic demonstrating the central role of the film laboratory in the production and distribution process of films. Image from Happé, L. Bernard. 1974. *Your Film and the Lab*. Media Manuals. New York: Hastings House. Reproduced with permission of The Licensor through PLSclear.

## From Commercial Production to Archival Preservation

Beyond their growth in the service of commercial film production and distribution, the importance of the film laboratory was further strengthened during the course of the twentieth century by the development of a second profession: film archiving and preservation. The rise of the original “Big Four” film archives in the 1930s, consisting of the Svenska Filmsamfundet established in 1933; Nazi Germany’s Reichsfilmarchiv established in 1934; and the National Film Library of the British Film Institute and the Museum of Modern Art (MoMA) Film Library, both established in 1935; catalyzed the professionalization of film archiving and preservation and its affiliated movement.<sup>16</sup> The MoMA Film Library in New York, continuing today as the MoMA Department of Film, notably launched with a statement by the President of the Museum emphasizing the need not only to study films and make them accessible to researchers and patrons of the arts but also to ensure their ongoing preservation through proper storage and photochemical duplication.<sup>17</sup>

The International Federation of Film Archives (FIAF), a worldwide organization in continuous operation today dedicated to the preservation and access of film heritage founded in 1938 by representatives of the earliest film archives, also played a major part in formulating the principles and identities tied to archiving and preservation efforts. *The Handbook for Film Archives*, first published in 1980, offered a guide based on the experiences of its members across the intervening four decades since FIAF’s initial founding and affirmed many of the organization’s initial commitments not only to the ongoing public exhibition of archival films

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<sup>16</sup> Penelope Houston, *Keepers of the Frame: The Film Archives* (London: British Film Institute, 1994), 17–18, 60–61.

<sup>17</sup> Ibid., 18. For further discussion of the history of the profession during these early years, see Ray Edmondson, “Is Film Archiving a Profession?,” *Film History* 7, no. 3 (1995): 245–55.

but also their active preservation.<sup>18</sup> The handbook demonstrates the necessity of the laboratory for preservation workflows and states that much of the basic work of a film archive is organized around laboratory processes as careful copying of deteriorating film is the only “cost-effective way to preserve and to restore it.”<sup>19</sup> The guide also states that pre-existing machines once built for processing new print stock must be readjusted to accommodate shrunken, delicate films—particularly the kinds maintained by professional film laboratories the archiving and preservation field are likely to work with.<sup>20</sup> The guide demonstrates that film laboratories not only offered vital services for film production contexts but also answered the growing needs of the moving image archiving field as institutions uniquely equipped to conduct the work of film preservation.

According to studies by the Library of Congress (LOC), fewer than 20% of American silent films survive in complete form and half of American films produced before 1950 no longer exist, with these stark statistics fueling mainstream film archiving and preservation in its efforts to prevent what still remains of this history from being further lost.<sup>21</sup> This growth in preservation efforts was in part due to a boost of momentum from cultural organizations such as the American Film Institute (AFI), originally established in 1965 by the National Endowment of the Arts with

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<sup>18</sup> FIAF, taking its acronym for the organization’s French name *Fédération internationale des archives du film*, was founded by representatives of the “Big Four” archives as defined by Houston, except without the participation of the Svenska Filmsamfundet and with the participation of the Cinémathèque Française. See “FIAF Timeline,” *International Federation of Film Archives*, accessed December 21, 2021, <https://www.fiafnet.org/pages/History/FIAF-Timeline.html>.

<sup>19</sup> Eileen Bowser, John Kuiper, and International Federation of Film Archives, eds., *A Handbook for Film Archives*, Garland Reference Library of the Humanities, vol. 1281 (New York, NY: Garland, 1991), 124.

<sup>20</sup> *Ibid.*, 125.

<sup>21</sup> Annette Melville and Scott Simmon, “Film Preservation 1993: A Study of the Current State of American Film Preservation: Report of the Librarian of Congress.” Washington, D.C.: Library of Congress, <https://www.loc.gov/programs/national-film-preservation-board/preservation-research/film-preservation-study/>.



the aim of advocating for film and its industries as a vital component of American heritage.<sup>22</sup>

Tied to a broader cultural call to preserve U.S. film heritage amid the post-war period of the mid-twentieth century, commercial film studios, such as the resulting merger of Sony and Columbia in 1989, also directly contributed to nationwide efforts to preserve American films. Enticed by the rhetoric of preserving an “American identity” the AFI and others advocated for, Sony-Columbia paid for archival staff positions at the LOC film vaults and film preservation laboratories then located at the Wright-Patterson Air Force Base outside of Dayton, Ohio to support government-run efforts to preserve the American studio’s nitrate films.<sup>23</sup> From 1992 to 1993, Annette Melville, who later became the first director of the NFPPF, and scholar Scott Simmon were tasked with gathering information for the LOC’s pioneering 1994 report, *Redefining Film Preservation*, which served as the foundation for the Library’s subsequent National Film Preservation Plan. To support their case, stakeholders of American film preservation ranging from studios to commercial film laboratories servicing the production industry submitted written testimonials on the importance of archiving the country’s motion picture heritage and how their respective organization would support the LOC’s broadly declared mission.<sup>24</sup>

While this commitment from commercial film laboratories lessened the need for other archives to launch internal laboratory spaces, notable cultural heritage organizations such as the

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<sup>22</sup> Horak, “The Gap Between 1 and 0”

<sup>23</sup> Caroline Frick, *Saving Cinema: The Politics of Preservation* (New York: Oxford University Press, 2011), 81–83.

<sup>24</sup> Balázs Nyari of Cineric, Inc. to Steve Leggett of the LOC MBRS, February 3, 1993, in *Written Submissions: Volume 4*, <https://www.loc.gov/static/programs/national-film-preservation-board/documents/fcineric.pdf> and George Zacharia of Hawk Film Laboratories, Inc. to Librarian of Congress James H. Billington, January 21, 1993, in *Written Submissions: Volume 4*, <https://www.loc.gov/static/programs/national-film-preservation-board/documents/fhawk.pdf>.

Library of Congress and the UCLA Film and Television Archive established in-house film laboratories to have direct control over their film archiving and preservation efforts. Both archival film laboratories have been maintained by their respective archives well into the present-day, with the exception of some organizational transitions in the case of the UCLA laboratory. From the deposit of Dickson's paper prints and camera tests to the LOC Copyright Office in 1893 to the development of its film preservation program in the early 1970s through the acquisition of the aforementioned nitrate film collections from major Hollywood studios, the LOC is one of the leading participants of American film preservation equipped with a robust organizational and technical infrastructure for supporting its work.<sup>25</sup> The government organization has overseen a film laboratory dedicated to motion picture preservation from the program's earliest days in Washington, D.C.'s Capitol Hill, its move to the Wright-Patterson Air Force Base in 1981, and its 2007 relocation to the newly opened National Audio-Visual Conservation Center in Culpeper, Virginia, where the laboratory now resides. Meanwhile, smaller cultural heritage organizations worldwide must continue to rely on the efforts of commercial film laboratories for archiving and preservation work, giving these predecessor laboratories a continued position of prominence within the field.

The growing late twentieth-century film preservation movement also spurred the rise of new graduate-level audiovisual preservation programs at universities throughout North America, which audiovisual archivist Ray Edmonson notes facilitated the professionalization of the field and the rapid growth of a corresponding scholarly literature on film preservation.<sup>26</sup> While

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<sup>25</sup> Mike Mashon, "Where It All Began: The Paper Print Collection," 2014. <https://blogs.loc.gov/now-see-hear/2014/05/where-it-all-began-the-paper-print-collection/> and Moving Image Research Center, "Motion Picture Conservation Center (National Audio-Visual Conservation Center - Library of Congress)," accessed March 11, 2022, <https://www.loc.gov/rr/mopic/mpcc.html>.

<sup>26</sup> Ray Edmondson, "Is Film Archiving a Profession Yet?: A Reflection 20 Years On."

attention to film laboratories in this body of literature has been relatively scant, library and information science professor Karen F. Gracy in her 2007 book *Film Preservation: Competing Definitions of Value, Use, and Practice* affirms their importance for continued preservation efforts, noting:

Copying film is another essential part of physical preservation work. Yet most archivists working in either commercial or noncommercial environments do not do their own laboratory work. They rely on the expertise of laboratory technicians, who are well-versed in photochemical processes and are trained to use the apparatus required to reproduce motion picture film (i.e., developers and printers). Laboratory technicians who specialize in preservation and restoration work possess the technical knowledge necessary to reproduce the look of an original element. [...] Because archivists rely on laboratory technicians for this crucial part of the preservation process, they must be able to place their faith in them.<sup>27</sup>

For archivists to take this leap of faith and place complete trust in film laboratories and their technicians to do this work illustrates that film laboratories hold significant roles in the film preservation process due to their specialized knowledge.

Gracy continues her discussion of film laboratories to highlight the challenges they face, notably the decline in the number of skilled technicians performing this work:

Despite the ever-increasing need for specialized knowledge of processing for archival purposes, many archivists fear that the number of individuals with such expertise may be dwindling. Knowledge of photochemical processes may become very rare in the coming years, as the motion picture industry begins to convert its production, distribution, and exhibition to digital processes. Yet, archivists will still be dealing with over a century of film, and will continue to need photochemical copying expertise.<sup>28</sup>

While Gracy's work offers an astute assessment of the importance of film laboratories for film preservation and duly notes some of the challenges they have faced in recent decades, it also

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*Synoptique* 6, no. 1 (2018): 15, 20.

<sup>27</sup> Karen F. Gracy, *Film Preservation: Competing Definitions of Value, Use, and Practice* (Chicago, IL: Society of American Archivists, 2007), 169–201.

<sup>28</sup> *Ibid.*, 182–183.

characterizes these organizations as a homogenous group without regards to the distinctions between commercial, archival, and artist-run film laboratory work that informs the focus of the current study. In addition, written at a moment when most studios were still shooting and distributing works on photochemical film and archives were still largely pursuing photochemical duplication of archival masters to create new preservation copies, her work predates the summit of digital distribution and preservation. The status of film as a medium has also evolved with the rise and development of new technologies throughout the decades, particularly the influence of video formats and the ongoing development of digital technologies and the new forms of access they provide. Digital projection increasingly replaced photochemical film projection in recent decades, and while the latter practice continues as a form of moving image exhibition, it is conducted in far fewer venues across the world. This transition from photochemical film to digital formats sparked renewed interest among film scholars about the role of film laboratories in the preservation of photochemical film whose time, for some, seemed to be short.

While it remains a pronounced consideration for the practices associated with photochemical film, the focus is not whether film will disappear but how digital formats impact film as a medium. Scholar and professor Howard Besser, the founding director of New York University's Moving Image Archiving and Preservation graduate program, wrote in the early 2000s during a crucial era of shifting media technologies about how "archivists need to shift from a paradigm centered around saving a completed work to a new paradigm of saving a wide body of material that contextualizes a work."<sup>29</sup> In doing so, media archival practice must draw attention to the growing significance of an "asset management approach" of preserving the growing number of digital works with no tangible embodiment rather than an artifact-based

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<sup>29</sup> Howard Besser, "Digital Preservation of Moving Image Material?," *The Moving Image: The Journal of the Association of Moving Image Archivists* 1, no. 2 (2001): 44.

approach focused on prints, negatives, and related elements.<sup>30</sup> This was a transformative period for media archiving practice for Besser due to the fact “the concept of saving an original artifact carries little meaning” in the digital world as “it is unlikely there is a single original,” and digital copies, unlike film negatives or video masters, are often “indistinguishable from the digital work that was copied.”<sup>31</sup> With the continuing advancement of these technologies, film laboratories began to offer film digitization services and the use of digital formats in film preservation workflows to keep up with the growing digital landscape and stay relevant to the needs of their clientele.

Scholar and film curator Giovanna Fossati discusses this digital transition as an important and productive one for film archiving and preservation, including film laboratories. To Fossati, one must evaluate film and its related practices *in medias res*—Latin for “in the midst of things”—due to the “chance it brings along to influence the course of events” within the practices associated with photochemical film.<sup>32</sup> She demonstrates this change and the technological stabilization of film laboratories using concepts of *convergence/divergence*, defined within film restoration as “the convergence of technology [and] standards” and “the divergence of analog and hybrid multi-specialized” means.<sup>33</sup> In doing so, preservation and restoration services using contemporary digital technologies and the historical resources of the film laboratory forge a subfield of specialized restoration laboratories.<sup>34</sup> Within these

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<sup>30</sup> Ibid.

<sup>31</sup> Ibid., 50.

<sup>32</sup> Giovanna Fossati, *From Grain to Pixel: The Archival Life of Film in Transition* (Amsterdam: Amsterdam University Press, 2009), 20–21.

<sup>33</sup> Ibid., 134–137, 187.

<sup>34</sup> Ibid., 187–188.

environments, analog and digital methods “are producing highly hybrid restorations,” and “past and future media (from equipment for film formats to trial versions of [...] software still in development) become all equally important in this time of transition where there is no longer (or not yet) one standardized way to do things.”<sup>35</sup>

Within Fossati’s framing, film laboratories can stay afloat in the midst of technological change by claiming their influence as the main users and developers of film technologies within the field. She concludes that new practices for film preservation are shaped in part by the film laboratory operating as an institution working within the reference of the film archive.

Expanding upon this, film laboratories also begin to find ways to break away from points of social and cultural reference and offer the tradition of photochemical image making to both new and long-time communities of creators. With the historical decline in the number of film laboratories as technologies began to shift, the resources and social infrastructures of film laboratories pursued new and expanded avenues for photochemical moving image creation in the rise of artist-run spaces.

### **Media Arts Traditions and New Forms: The Rise of Artist-Run Film Laboratories**

With the declining use of photochemical film in commercial film production by the end of the twentieth century, the rise of the artist-run film laboratory movement in Europe in the 1990s breathed new life into the film laboratory. Drawn to the use of film as a creative medium, these laboratories view the technical processes of film creation and development as integral to their practice, recentering process as an essential component of completed works. As the commercial film industry shifts to digital production and distribution, select commercial film

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<sup>35</sup> Ibid., 186.

laboratories redefined their organization's focus to incorporating more digital technologies and less photochemical work, resulting in the discarding of legacy film equipment and the vast number of commercial film laboratories closing due to an inability to accommodate this shift. To those involved with the artist-run film laboratory community, this transition leaves a surplus of unwanted laboratory equipment facing impending futures in landfills now ready for second lives in artists' hands.<sup>36</sup> The network of artist-run film laboratories has fueled a reclamation of these technologies, yet their agenda extends far beyond artmaking: the movement has also sustained a now-international network and generated a body of publications and discussions about their work transcending the traditional notion of film as a medium.

With roots in the cooperatively-owned models of the New American Cinema Group and the London Filmmakers' Co-op of the 1960s and inspiration from the American avant-garde movement of the 1940s onward, artist-run film laboratories hold a distinct positionality in comparison to their industry-driven predecessors as a collectivist model of artistic control drives the means of filmmaking and production.<sup>37</sup> However, with the use of an alternative organizational approach, some members of this movement also find themselves emulating some of their predecessors' traditions as vendors to help sustain their organizations. While unnecessary to label the works of these communities under blanket terminology, many of these artists also embrace as desirable effects from unorthodox processing methods and intentional damage to the film's emulsion that traditional commercial laboratories might consider "mistakes" and "errors", with these visual and physical products becoming part of the community's shared principles and aesthetics often described as independent, experimental, and avant-garde filmmaking.

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<sup>36</sup> Pip Chodorov, "The Artist-Run Film Labs," *Millennium Film Journal*, no. 60 (2014): 28–36.

<sup>37</sup> *Ibid.*, 29–31. See also P. Adams Sitney, *Visionary Film: The American Avant-Garde, 1943-2000*. (Oxford; New York: Oxford University Press, 2002), xi–xiv.

Scholarship on artist-run film laboratories has focused on discussing their work as a counter-practice positioned in opposition to the apparatuses and techniques of commercial laboratories. Writing about the infrastructure supporting artist-run film laboratory practice, scholars Rossella Catanese and Jussi Parikka claim artists are beginning to see it as their duty to care for photochemical film and articulate the medium's potential beyond the preservation of the past or the extension of the life of film.<sup>38</sup> Placed distinctly from their commercial film laboratory forerunners and the traditions they developed from, Catanese and Parikka identify artist-run film laboratories as grounded in a counter-positionality given their grassroots approaches and opposition to a perceived dominant culture. Forming in response to the closure of commercial laboratories, artist-run film laboratories recoup equipment from the production industry and repurpose the materials and traditions of these environments for their community's gain. As the laboratory itself extends the work of the archive, "artist-run labs provide an experimental site for practices of film preservation," demonstrating the ability of film laboratories to support technological innovation and the continued sustenance of film practice despite the shifts the broader field encounters.<sup>39</sup> This requires their practitioners to equip themselves with specialized technical skills in operating acquired equipment—resources that were once the exclusive province of commercial technicians. With these initiatives, the operations of artist-run laboratories perform an "informal preservation" of the traditions associated with the film laboratory that continue to persist but are prone loss as the field encounters ongoing shifts in formats and technical standards.

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<sup>38</sup> Rossella Catanese and Jussi Parikka, "Handmade Films and Artist-Run Labs: The Chemical Sites of Film's Counterculture," *NECSUS*, 2018, <https://necsus-ejms.org/handmade-films-and-artist-run-labs-the-chemical-sites-of-films-counterculture/>.

<sup>39</sup> Ibid.



Extending the discussion of artist-run film laboratories, scholar and curator Kim Knowles aims to move forward from the disjuncture of “old” versus “new” dialogues for film and the approaches to obsolescence within artist-run film laboratory spaces. She writes that the use of “old” technology “outwardly rejects the forward drive of capitalist progress,” and that in an era of digital filmmaking, working with photochemical film requires the artist to engage with a physical practice “at odds with modern society’s benchmark of speed, efficiency, and instantaneity.”<sup>40</sup> Common art making methods used by artist-run film laboratories include film emulsion scratching, dyeing, bleaching, gluing, to do-it-yourself and self-modified mechanics, with these alternative forms of making embodying a shift away from the “nostalgia” often associated with the widespread discourse on the decline of photochemical film and its laboratories—a narrative often conveyed within the broader media production industry—to a restoration and recentralization of the film laboratory as the site of film creation.<sup>41</sup> Due to the altered approaches conducted within the artist-run context, the film laboratory becomes a site of experimentation rearticulating the meanings of film and preservation within these now transformed spaces of photochemical creation. It is also notable the artist-run film laboratory’s outlook against immediacy stands at odds with the urgency driving the top-down agendas of established cultural heritage organizations in the film archiving and preservation field and its belief that due to the fragility of the medium, film preservation “can’t wait.”<sup>42</sup>

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<sup>40</sup> Kim Knowles, “Slow, Methodical, and Mulled Over: Analog Film Practice in the Age of the Digital,” *Cinema Journal* 55, no. 2 (2016): 146–51, <https://doi.org/10.1353/cj.2016.0005>.

<sup>41</sup> ———, “Self-Skilling & Home-Brewing: Some Reflections on Photochemical Film Culture,” *Millennium Film Journal*, no. 60 (2014): 20–27.

<sup>42</sup> The phrase “nitrate will not wait” was used at a FIAF conference in the 1960s, and film archivist Sam Kula reworded it to “nitrate can’t wait” to emphasize pressing concerns for the preservation of the medium. See Anthony Slide, *Nitrate Won’t Wait: A History of Film Preservation in the United States* (Jefferson, NC; London: McFarland Classics, 2000).

While artist-run laboratories are often discussed as an organizational phenomenon, the second significance of these laboratories are the cultural foundations of their movement, with this outlined by the media arts traditions defining the creation of their works. This introduces particular challenges for the preservation of their films, which have been discussed by film archivist and restorationist Ross Lipman. He writes in FIAF's *Journal of Film Preservation* in 1996 that "the independent artist's film—made, received, and valued in a context outside industry standards—poses a unique challenge to the archivist" as "[archivists] must be aware of any peculiarities in the piece itself" due to "the unusual nature of the art film [presenting] unique considerations which arise from each individual work."<sup>43</sup> For a "formal preservation" standpoint aligned with the efforts of mainstream preservation endeavors, Lipman notes that effective preservation of the films themselves requires a specialized knowledge of their production contexts, which is something trained archivists and commercial laboratory technicians seldom have. His discussion in juxtaposition to dialogues on these laboratories as distinct organizational entities draws attention to the dichotomy between "informal" and "formal" preservation generating from an analysis on artist-run laboratory endeavors.

As these works are created within unique contexts, this makes artists who have the knowledge of their works' creation in addition to the technical resources well-positioned to conduct the preservation of their content. However, traditional preservation has been secondary to production efforts for artist-run film laboratories, with organizations focusing on filmmaking and creation. Despite this, preservation occurs on an improvised, incidental nature as artists begin to digitize their films and their elements, and in some cases, create master prints of their work. Additionally, the practices of artist-run film laboratories can include more traditional

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<sup>43</sup> Ross Lipman, "Problems of Independent Film Preservation." *Journal of Film Preservation* 25, no. 53 (1996): 49–58.

approaches to preservation reformatting, as such laboratories conduct the transfer of content from more obscure and obsolete formats to newer formats that can be more easily played back on existing and readily available equipment. Such activities are performed in the absence of conventional preservation training and not framed as “formal preservation” efforts, but are significant endeavors worth noting in the context of this study.

Operating from the 1990s to the present, artist-run film laboratories emerge as a newer phenomenon in comparison to their commercial and archival laboratory counterparts. From the decline in commercial laboratories to today, the artist-run film laboratory movement continues to expand its cultural purview. FILMLABS.org, a website compiling information on artist-run laboratories and their related work, lists 63 laboratories on their site as of writing and continues to add a number of affiliated organizations across the world.<sup>44</sup> As of writing, a majority of these laboratories are based outside of the United States, with a significant number in Europe. With their notable number of operational laboratories and distinct capabilities, artist-run film laboratories warrant special consideration within this discussion of film laboratories at present.

### **The Current Position of Film Laboratories**

The professional development of film laboratories and their position within various media industries allowed them to not only grow and develop throughout the years, but also provided them an opportunity to shape new forms of film communities, practices, and agendas. As of writing, the Indiana University Libraries Moving Image Archive (IULMIA) claims there

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<sup>44</sup> In December 2021, FILMLABS.org listed 58 active artist-run film laboratories. See “63 ACTIVE LABS,” *FILMLABS.org*, accessed October 28, 2022, <https://www.filmlabs.org/all-labs/>.

are 177 film laboratories in operation around the world.<sup>45</sup> While resources and professional documentation on film handling and storage are abundant and accessible for film archiving and preservation practitioners, publications discussing film laboratories and their relationship to the moving image archiving and preservation field are limited to general overviews that fail to interrogate the practices pursued within these spaces in any depth or acknowledge key differences between competing models and types of laboratories that concern the present study. An improved understanding of film laboratories can help workers within these spaces better grapple with the technical preservation challenges they face and can also be used to the advantage of the overall film archiving and preservation field, helping promote identification of common issues and commitments between the two professions, as well as help outline ways in which their work complements one other.

This thesis traces three prominent types of film laboratories I have identified: commercial, archival, and artist-run. Commercial film laboratories, while operating in fewer numbers compared to the post-war period, continue today as a hybrid site of commercial media technology innovation, as a vendor for filmmakers who continue to work on film, and as a provider for cultural heritage organizations and their preservation needs. While a rare presence in the broader landscape, archival film laboratories illustrate the film laboratory's vital link to cultural heritage efforts and offer an explicit example of how film laboratories are essential to moving image archiving and preservation work. Lastly, artist-run film laboratories have made

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<sup>45</sup> IULMIA claims their "Photochemical Lab List" is "accurate to the best of [their] knowledge" as of January 15, 2021. Their list also includes some artist-run film laboratories; however, a number of smaller, lesser-known artist-run laboratories in operation as of writing are not accounted for. See "Photochemical Lab List," *Indiana University Libraries Moving Image Archive*, accessed November 30, 2021, <https://collections.libraries.indiana.edu/IULMIA/exhibits/show/film-lab-list> and "List of All Photochemical Film Labs Operating in the World Today," *International Federation of Film Archives*, accessed November 30, 2021, <https://www.fiafnet.org/pages/E-Resources/Film-labs-list.html>.

significant efforts to discuss how their work allows the film laboratory to move away from the supposed decline of the medium and its laboratories to instead becoming one expanding and making more publicly accessible the practices associated with photochemical film. The contemporary discussion of film laboratories in moving archiving and preservation warrants more focus on these points of discussion, including the film laboratory's essential role and technical contributions to the field.

This present study conducts interviews with employees, participants, and technicians of each film laboratory organization to trace three main axes of analysis: economic models, organizational structures, and technical practices. Economic analysis evaluates how film laboratories stay afloat in the contemporary field on a financial and resource-driven basis, notably discussing who sustains their organizations and how they continue within a networked world requiring transactional exchanges of capital and human interactions to keep their regular operations going. An analysis of organizational structures explores how film laboratories are organized, where within their structure preservation work occurs, and what its relationship is with other roles and functions within the given organization. And lastly, an exploration of their technical practices points out specific sets of expertise the included film laboratories have honed and what skills their employees, participants, or technicians conduct to help situate their organization as a notable contributor within the moving image archiving and film practice fields at large.

## Section II: Research Methodology

This study examines a group operating within a wider field: film laboratories as they exist within the professional practices of film archiving and preservation, a medium-specific subset of the moving image archiving and preservation field. *Film archiving and preservation* is defined within this work as the practices, ethics, and professional and academic literature affiliated with the work of archiving and preserving photochemical moving image media. The media film archiving and preservation works on—often on 35mm, 16mm, Super 8, 8mm, and other less standard gauges—is otherwise known as *film*. The film archiving and preservation field encompasses *cultural heritage* and *cultural heritage organizations* working with film collections, archives, film laboratories, and other affiliated individuals within this study. This study also acknowledges that the work necessary to perform the specific skills particular to *archiving* and *preservation* varies and includes concrete professional responsibilities and forms of training. They are grouped within this conjunctive field and categorized under the umbrella of cultural heritage for the purposes of this research.

Within *film laboratories* are the technicians and related employees versed in the technical skills of developing chemistry to process films, proficient in maintaining and utilizing industrial and computer-based machines in which film is processed, and equipped with a detailed eye for color timing prints, among many other skills existing within the laboratory workplace. To structure the analysis of film laboratories and their contributions to film archiving and preservation, the remainder of this work is divided into sections focusing on three significant subfields of film laboratories: commercial, archival, and artist-run. These labels are utilized as categories to help group laboratories with those of similar forms of self-identification and positionality. However, as this research will point out, these categories are not rigid subject

terminologies, as some laboratories may fall within a spectrum of typologies and definitions based on how they exhibit their approaches to economics, organizational structures, and technical practices.

My prior experiences in moving image archiving and preservation and film laboratories informs my approach to this work. I was drawn to this research due to my work over several years with the artist-run Black Hole Collective Film Laboratory in Oakland, California before entering UCLA's Master of Library and Information Science program with a specialization in Media Archival Studies. In addition, I also worked in a contract position where I processed amateur footage and home movie collections on 16mm, 8mm, and Super 8 film as part of a production team for a PBS documentary. Over the years, in experiences with archivists and filmmakers of the laboratory world, I observed a division between the creation and preservation of film. Film laboratory work and the use of film technologies were not often situated as a branch of archival practice, and I found that the contributions of these workers and sites were not often discussed by those in the archives and preservation world. To build my own understanding of this neglect region of film preservation, I began following the activities of a number of film laboratory founders and technicians online and struck up acquaintances with them at conferences and other professional events, with these prior acquaintances proving a significant aid in efforts to recruit participants for the interviews that form the main source materials for the remainder of this study.

Section III on commercial film laboratories looks into Colorlab in Rockville, Maryland and Pro8mm in Burbank, California. I conducted interviews with Andrew Tamburrino, a film preservation technician at Colorlab, and Rhonda Vigeant, a co-owner of Pro8mm. Tamburrino represents one of today's most esteemed commercial film laboratories that is now also known for

working with archival clients. Colorlab offers their clients both film production and preservation services, a specialization that allowed the laboratory to stay afloat within the changing landscapes over the decades. His position also works closely with NFPF grantees partnering with Colorlab for preservation projects and acts as a central figure between cultural heritage organizations and other laboratory technicians. Vigeant operates a film laboratory in the heart of the world's commercial film industry and has also made it a personal mission to advocate for film preservation such as through her service on the board of directors for the Al Larvick Conservation Fund, a non-profit organization and funding body specializing in film and video home movies. To further support her advocacy and interests in preservation, Vigeant also published a book on the importance of amateur film preservation in 2013 called *Get "Reel" About Your Home Movie Legacy... Before It's Too Late*.

Section IV on archival film laboratories discusses laboratories operating as part of or in tangent with the two largest moving image archives in the U.S.: the Library of Congress Motion Picture, Broadcasting, and Recorded Sound (MBRS) Division located at the Library's National Audio-Visual Conservation Center in Culpeper, Virginia and the Packard Humanities Institute Film Laboratory in Santa Clarita, California, which also houses the UCLA Film and Television Archive. I conducted the interview for the Library of Congress with Ken Weissman, the former head of the Motion Picture Conservation Center operating as part of the MBRS at the Library of Congress. Weissman is an integral figure in the establishment of the Library's film laboratory that exists solely for the cultural heritage organization's film preservation efforts, has worked for the Library for over 36 years before his retirement in 2017, and was awarded the Association of Moving Image Archivists' (AMIA) Silver Light Award for outstanding career achievement in moving image archiving in 2018. For the Packard Humanities Institute Film Laboratory, I



interviewed Joseph Olivier, the film laboratory manager. Olivier started his career as a laboratory technician specializing in film preservation through his work at the laboratory that would later become Cinema Arts, Inc., a film laboratory specializing in archival and preservation work in Pennsylvania still in operation today. Olivier has also held roles in several notable commercial and archival film laboratories throughout his entire career, including with FotoKem Budapest and the now-defunct Cinetech in Valencia, California.

Section V on artist-run film laboratories explores two film laboratories that are part of the global artist-run film laboratory network. L'Abominable, based in the outskirts of Paris, France, offers its members the ability to work in Super 8, 16mm, and 35mm, with its technical capabilities largely emulating the capacity of a commercial film laboratory. To gain more insight into L'Abominable, I conducted an interview with core member Nicolas Rey who has been a member of the laboratory since the earliest days of the organization and continues to work on sharing knowledge about film, including through participation in film projection workshops. The second artist-run film laboratory discussed in this section is Nanolab, an artist-run film laboratory balancing the broad technical abilities of a commercial film laboratory with artist-run innovation in the Melbourne, Australia region. The laboratory was founded by filmmakers Richard Tuohy and Dianna Barrie in response to the closing of commercial film laboratories and the need to continue offering filmmakers a resource for producing work on photochemical film. To gain more insight into Nanolab, I conducted an interview with Tuohy. Tuohy and Barrie are active members of the artist-run film laboratory network and are known for traveling to other artist-run film laboratories worldwide to help educate their members about laboratory processes and equipment use.

This section will discuss the use of recorded interviews as the primary data collection method, limitations of this study, and the use of institutional analysis to bring to light the specific functions of how commercial, archival, and artist-run film laboratories as organizations utilize various courses of action to contribute to the field of moving image archiving and preservation. The use of institutional theory allows for the exploration of group-based functions in a field driven by limitations and constraints on a collective and individual basis. *Organizations* differ based on where they derive their capital and material resources, how the capital and resources are allocated within the respective organization, and the ways in which tasks are executed using specific sets of knowledge and expertise, including professional training or background. *Institutions*, by contrast, are governed by logics that shape the organizational structures, practices, and actions and are displayed across the different types of organizations that represent them. Imperatives and tensions introduced by institutions can also lead to organizations responding in various ways, which can be drawn out an analysis of different organizations within a field.

Within this study at present, the relationship between institutions and organizations is illustrated as the “film laboratory” as institution and “film laboratories” as different organizations who can be identified within the three-part typology this thesis outlines: commercial, archival, and artist-run. One of the goals of this study is to determine how institutional logics and contradictions of the film laboratory shape actions pursued within these laboratories as organizations, what these courses of action are, and what strategies each type of film laboratory pursues when responding. A second set of institutional logics is also relevant, which are those of the field of film archiving and preservation, whose increasing concern with the preservation of film within archival practice has aligned agents within the archiving field with those operating in

film laboratories and brought the two fields into conjunction. For archival film laboratories, the two institutional contexts join together within a single cultural heritage organization, while for commercial film laboratories they remain separate organizations but interdependent upon one another. A similar but slightly different convergence between institutional logics occurs with the intersection of media art making and the film laboratory environment through the rise of artist-run cooperatives, a forming third set of institutional logics.

### **Data Collection Methods**

This study utilizes qualitative methodology and evidence to explore the role of the film laboratory as a relevant group of the moving image archiving and preservation field. The primary data collection method for this study uses structured interviews to collect information from those working in and involved with film laboratories in a real-time setting. Structured interviews also allow this research to gather data not currently available in a documented or published format and offer an opportunity to compile information from subjects that expands on the primary and secondary sources used within this work. A UCLA webIRB application for the research interviews was filed with the university's Office of the Human Research Protection Program during the Fall 2021 quarter and was granted certification of exemption from IRB review in November of the same year.

Purposive sampling was used to gather interview participants due to my prior connections and familiarity with several commercial, archival, and artist-run film laboratories before the start of the research. In this method of sampling, members of the research sample are chosen by the researcher based on criteria relevant to the research questions rather than the randomness of

selection from the population.<sup>46</sup> This method ensured that the research incorporated varying sizes and subtypes of commercial, archival, and artist-run laboratories and individuals with different titles, backgrounds, and professional experiences into the subject pool. Purposive sampling also allowed the research to gather a small but sizeable sample of candidates with strong and relevant film laboratory experience during the length of the research period.

Emails of subjects were gathered through the principal investigator's professional and personal contacts or prior contact with the subjects and were invited to participate in the study via email. Those who agreed to participate were then emailed a participant information sheet about their privacy and rights as research subjects. All participants were offered no financial or other forms of compensation for their participation in the research. Interviews were conducted through Zoom video conferencing on UCLA's institutional account and recorded using the application's interface. These interviews were conducted between December 2021 and April 2022. The principal investigator led each participant through a verbal informed consent process, recited the information from the participant information sheet, and gave participants the right to remove their names and provided information from the work during the period of the study before the start of the interview. The audio file of each interview was then transcribed using the web-based transcription tool Otter.ai and generated transcriptions were manually reviewed on the application for speech accuracy. Responses were then organized and discussed by themes, similarities, and differences based on the three axes of analysis. Follow-up interviews were conducted with two participants to elaborate on key points that arose during the review of the initial interview, with the same transcription and processing procedures applied to the secondary interviews.

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<sup>46</sup> Lynn Silipigni Connaway and Ronald R. Powell, *Basic Research Methods for Librarians* (Santa Barbara, Calif.: Libraries Unlimited, 2010), 215–216.

The structured interview questions were written based on the goal of highlighting the given film laboratory's economics, organizational structures, and technical practices. The questions began by discussing the subject's background, which provided a necessary insight into the work and history of their respective organization, and then transitioned into a discussion of the specific film laboratory per the three axes of analysis. Questions discussing economics inquired about support and funding for the organization and the other stakeholders who utilized the laboratory and its resources, often in exchange for capital or other services. Organizational structures were determined through questions based on the laboratory's mission and about employees, members, founders or other participants and what they were responsible for within the daily operations of the laboratory. Technical practices were uncovered through a discussion of the laboratory's specific equipment, how it was acquired, and what competencies or skills were currently in demand at the organization. With the increasing use of digital services in the broader moving image archiving and preservation field, subjects were also asked about scanning, digital restoration, and other related digital and computer-based capabilities at the organization to help illustrate how laboratories were tackling these technological circumstances. A complete list of questions can be found in the Appendix.

## **Limitations**

A significant limitation of this study includes the exploratory nature of this work due to the lack of pre-existing scholarship on film laboratories in the moving image archiving and preservation field. This study aims to pave the way for research and work on this topic while acknowledging this study is preliminary and cannot be an all-encompassing discussion of film laboratories in moving image archiving and preservation. Data collection limitations include a small sample size and bias in subject recruitment. I held prior knowledge of and had earlier

points of contact with many of these individuals before the start of the research, making participant recruitment a subjective choice. This positionality was in other ways also an asset, as my prior connections with the interviewees allowed me to gain a privileged level of access to these subjects, witness a level of candor in their responses, and have a more thorough understanding of their work and backgrounds that would help inform our conversations and my analysis.

Through my attendance at an Association of Moving Image Archivists (AMIA) annual conference, I was aware of Andrew Tamburrino's archival and preservation work at Colorlab after attending a panel he presented on with a colleague at the 2019 conference. I also had prior contact with Ken Weissman of the Library of Congress after attending his lecture on photochemical film preservation at the Biennial Audiovisual Archival Summer School hosted by FIAF and IULMIA at Indiana University Bloomington earlier the same year. Lastly, my affiliations with the artist-run film laboratory movement allowed me to become familiar with the work of Nicolas Rey and L'Abominable prior to the start of this research, whom many of my fellow collaborators at Black Hole Collective Film Laboratory in Oakland, California already knew or had collaborated with prior. Similarly, I first made contact with Richard Tuohy of Nanolab when he visited our laboratory for a workshop he led for us in early 2019.

While the majority of the 177 film laboratories in operation throughout the world today are located in Western nations, a focus on Western institutions also limits this research's findings and conclusions as commercial, archival, and artist-run film laboratories exist worldwide, including in the region often known as the Global South. Despite it being a difficult choice but necessary boundary due to my prior contact with the subjects and their work, future research on film laboratories should incorporate more non-Western and non-Anglophone perspectives. The

selected subjects also reflect limited gender and racial diversity, a preexisting condition of the population the study draws from. According to the 2020 AMIA Salary and Demographics Survey of the Field that gathered data from 447 respondents working in moving image archiving and preservation, 81.6% of respondents identified as white and 33.8% identified as male.<sup>47</sup> All six interview subjects in my own research identified as white and one identified as a woman, making this a skewed sample but also representative of a bias in the field at large. Lastly, the archiving and preservation of film is but one medium within the broader field of moving image archiving and preservation, which also includes born-digital media, video, and sound recordings also processed in places described as laboratories. This study excludes discussion of these other formats and focuses on the activities of film preservation.

### **An Institutional Analysis of Film Laboratories**

The interviews and the film laboratories analyzed for this study utilize the inquiry of institutional capacity known as new institutionalism and institutional theory. Drawing from the Oxford English Dictionary definition, an institution is described within the boundaries of this work as any social grouping of individuals organized for a common purpose, with goals of forming fixtures of social life and engagement.<sup>48</sup> Anthropologist Mary Douglas expands upon

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<sup>47</sup> 61.6% of respondents identified as female in response to gender identity, which follows the general trend that female gender identities are better represented in cultural heritage fields such as libraries, archives, and museums in comparison to males, according to the authors. The gender identities of those working in technical or production-oriented media fields such as film laboratories remains to be discussed and can perhaps be captured through a survey of professional organizations laboratory technicians have been historically more involved with, such as SMPTE. See Brian Real and Teague Schneider, "2020 AMIA Salary and Demographics Survey of the Field: Findings and Future Directions." Association of Moving Image Archivists, November 11, 2021. <https://amianet.org/committees/advocacy-committee-of-the-board/salary-demographic-survey/>.

<sup>48</sup> "institution, n.". OED Online. September 2022. Oxford University Press. <https://www.oed.com/view/Entry/97110?redirectedFrom=institution> (accessed November 5, 2022).

this and states that an institution operates according to routines of both thought and action, with conventionalized practices that are “institutionalized” within a social group requiring a “parallel cognitive convention” in order to shape group members’ values and worldviews.<sup>49</sup> Institutions are often discussed in conjunction with organizations, which are defined in this work as an assembled group of individuals with a formal structure and arrangement. Within this network, these organizations and their actors can have predictable interactions and outcomes based on institutionalized conventions of thoughts and actions. The institutionalized practices of the film laboratory and its corresponding values and meanings carry over into the routines of laboratory workers and cut across different types of film laboratories as organizations as I discuss in this study. However, these institutionalized practices and meanings may also be inflected differently depending on the particular type of film laboratory to which the individual belongs, and whether their background and training occurred within the commercial sector, the archiving and preservation field, or as a laboratory practitioner focused on artmaking traditions.

Older and traditional modes of institutional analysis drew on a study of individualistic aims that focused on behavior and rational choice, with assumptions that “individuals act autonomously as individuals, based on either socio-psychological characteristics or on rational calculation of their personal utility.”<sup>50</sup> In doing so, old institutionalism concluded that individuals “were not constrained by either formal or informal institutions” and would have the capacity “to make their own choices.”<sup>51</sup> New institutionalism builds on the understanding of the old but

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<sup>49</sup> Mary Douglas, *How Institutions Think*, 1st Edition, The Frank W. Abrams Lectures (Syracuse, NY: Syracuse University Press, 1986), 46.

<sup>50</sup> B. Guy Peters, *Institutional Theory in Political Science: The New Institutionalism* (London; New York: Pinter, 1999), 1.

<sup>51</sup> Ibid.



advances it to new directions that aim to identify rules, norms, and relationships shaping and influencing behavior in everyday affairs and decision making. Its ideas seek to “locate collective action at the center of the analysis,” with an understanding that the “relationship between political collectivities and their socio-economic environment should be reciprocal.”<sup>52</sup> For new institutionalism, institutions tend to have a “‘logic of appropriateness’ that influences behavior more than a ‘logic of consequentiality’ that [may also] shape individual action.”<sup>53</sup> In summary, individuals have the capacity to make conscious choices, but their choices will remain within the parameters established by dominant values. Influenced by new institutional theory, my goal in interviewing my subjects has been not to merely understand their individual choices and actions as members of the different types of film laboratories, but also to grasp the larger meanings and values they ascribe to film laboratory work and the ways their thoughts and actions are shaped by the different professional fields in which these subjects are positioned.

Institutional theory claims collections of routines are essential to the formation of institutions, and institutions develop and employ these routines as a means of observing and responding to changes within their environments.<sup>54</sup> An institutional analysis not only offers a method for locating the notable discussion points of an established institution’s position, but also becomes a way of highlighting how communities of practice develop and continue through the formation of organizations. This work ascribes the pursuit of a professionalized terrain where one is engaged in a particular activity, such as the profession of “archivist” and “film laboratory

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<sup>52</sup> Ibid., 17.

<sup>53</sup> Ibid., 29.

<sup>54</sup> James G. March and Johan P. Olsen, *Rediscovering Institutions: The Organizational Basis of Politics* (New York, NY: Free Press, 1989), 26ff. quoted in B. Guy Peters, *Institutional Theory in Political Science: The New Institutionalism* (London; New York: Pinter, 1999), 32.

technician,” to the definitions outlined within institutional theory. Using the organizational types of commercial, archival, and artist-run laboratories, the main sections of this thesis will examine how ideas come to fruition and shape the everyday actions of the organization, thus also influencing the film laboratory as institution. This work will overall analyze through the lens of institutional analysis how individuals contribute social interactions to shape the role of their organizations, yet at the same time become limited by the broader institutional constraints in which they operate. Additional points of discussion include particular values that become privileged and established as “common sense” actions across the selected organizations and professions.

The analysis of this work aims to uncover how film laboratories fit into the aforementioned definitions and models by using the three major axes of analysis to draw out these distinctions. This work traces three different variables shaping how film laboratories function, which this work identifies as economics, organizational structures, and technical practices. Within new institutionalism, external influences are not always known by agents operating within an organization, and different organizations exist and form as a response for dealing with larger institutional pressures. Evaluating the variables influencing individual behavior per new institutionalism, highlighting economics points out what external groups the organizations are indebted to on a transactional basis and how the featured laboratories respond to this in order to carve out their identities within the broader field or type of film laboratory they belong to. Organizational structures exemplify the systems the selected organizations develop within their respective laboratory and how this structure represents ways for laboratories to respond to institutional pressures. And finally, technical practices are conceived as responses to these pressures with the aim of crafting products, workflows, and concentrations of worker

expertise in line with their goals. Through routinization, these practices are ingrained, thus operating as a way for those working within the confines of the organization to justify their actions.

The film laboratory as an institution has placed in motion modes of practice and norms that can have larger implications within the moving image archiving and preservation profession. To identify these points for discussion, it is important to note that film laboratories as organizations fall into various categories, with different economic models and organizational structures that can move their technical practices in directions that deviate from or alter the trajectory of institutional norms. Such insight provides this research the opportunity to further explain the significance film laboratories have for moving image archiving and preservation and its associated practices. As the later discussions of the various film laboratories will outline, their economics, organizational structures, and technical practices are shaped by the specific clientele they serve or the communities they must cater to, resulting in different responses to the institutional pressures film laboratories must act in acknowledgment of.

Regardless of the various organizational trajectories, notable convergences and similarities across the three film laboratories in their choices of actions in response to their circumstances suggest the persistence of broader institutional norms playing out across the different organizational contexts. Exploring commercial film laboratories offers a baseline for an investigation of the film laboratory as institution, serving as the original type of film laboratory that can therefore be understood as a paragon of institutional norms and the point of departure for succeeding laboratory organizations as they developed in later years. Archival film laboratories arose historically within the context of the parallel growing profession of the archiving and preservation field. Despite these differences in organizational contexts, their technical practices

have been largely modeled after those of their commercial film laboratory predecessors. Artist-run film laboratories, emerging within the separate context of the media arts field, display the greatest deviations from institutional norms. Similar to archival film laboratories, artist-run film laboratories serve the needs of a specialized population of constituents with their own aims, thus encouraging the pursuit of different funding models and organizational structures that give way for the emergence of more specialized technical practices tailored to the needs of the artmaking communities they provide creative solace to.

When a level of regard is given to institutional constraints, influences, and limits, implications for moving image archiving and preservation can be outlined, giving the field the ability to draw attention to gaps to be filled and areas for further development. The conclusion of this thesis will discuss how the importance of film laboratories across varying organizational and institutional contexts attests to the need for a more concerted work in the study of film laboratories, and for those working in the moving image archiving and preservation field, a need to understand different models and technical practices within these organizations to strengthen their work. Over a century of fluctuating but continuous practice with film has outlined that film laboratories will remain essential for the preservation and ongoing work associated with the medium, and it is only through a study of the field's interrelated yet currently disparate networks moving image archiving and preservation can strengthen its relationship with and broaden its understanding of the full lifecycle of photochemical film—from its creation to its preservation.

### Section III: Commercial Film Laboratories

*“My thanks to Sam Bush, of Western Cine, who collaborated with me on this, much as if I were a composer who handed him a painted score, so to speak, and a few instructions—a medieval manuscript, one might say—and he were the musician who played it.”*

*— Stan Brakhage in reference to Samuel C. Bush, an optical printing technician at the now-defunct Denver, Colorado commercial film laboratory Western Cine, in the synopsis of his film Chartres Series (1994)<sup>55</sup>*

Commercial film laboratories contribute to the broader efforts of the film archiving and preservation field and are known for their numerous innovations in film practice and technologies. They are established first and foremost for the means of commerce and aim to conduct their work both for and within the realm of a larger industry in exchange for profit. Commercial laboratories increasingly began to offer preservation services over the decades, resulting in these laboratories shifting from a mass production-focused operation generating out of a growing motion picture industry to ones focusing on methods of specialized craftsmanship. As the motion picture industry develops new demands to support shifting priorities, machinery, chemistry, skilled technicians, space to expand, and institutional resources are needed to conduct laboratory work in this broader media field effectively. Because of this, these spaces with separate operations from production contexts and cultural heritage organizations must remain ready to provide their services to external parties.

This section focuses on Colorlab and Pro8mm, two commercial film laboratories initially serving commercial film production contexts that extended their operations to supporting archiving and preservation efforts in later and recent decades. While the two laboratories branched out to different commercial trajectories and areas of focus since their respective dates

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<sup>55</sup> “Chartres Series - Stan Brakhage - The Film-makers’ Cooperative,” *The Film-makers’ Coop*, accessed November 8, 2021, <https://film-makerscoop.com/catalogue/stan-brakhage-chartres-series>

of inception, Colorlab continues to work with commercial productions but has also broadened its clientele and specialization to include film archiving and preservation work. On the other end, Pro8mm attracted a constituency of independent and commercial filmmakers due to their focus on the smaller film gauge of Super 8 many of these filmmakers relied on during the format's earliest days and begin to focus on offering related new technologies to their stakeholders. The two laboratories in this section are products of the changing landscape commercial film laboratories must operate within, and their work illustrates that these organizations respond by confronting shared sets of institutional pressures within their field. At the same time, these laboratories must also manage to find their own paths of innovation based on their respective organizational histories and identify the commercial niche that each has carved out for itself within their broader industry.

By identifying the economics, organizational structures, and technical practices of commercial film laboratories, this section will outline the stakeholders who seek the services of these laboratories and keep their businesses going, illustrate how work is distributed across these organizations, and highlight the contributions commercial film laboratories make to the field of moving image archiving and preservation at large. Founded in Rockville, Maryland in 1972 as a 16mm film laboratory for commercial productions in the Washington, D.C. area, Colorlab now also offers Super 8, 16mm, and 35mm processing and digitization work in addition to its preservation-related services. Pro8mm, the second commercial film laboratory this section discusses, was founded in 1971 in Cambridge, Massachusetts under the name Super8Sound. With a boom in business, Super8Sound expanded to Southern California in 1987 and renamed their company to Pro8mm in 1998. These two commercial film laboratories demonstrate a commitment to fulfilling continued demand for film preservation services, and their

specialization allows for greater efficiency across film archiving and preservation practices, reinforcing the role of the commercial film laboratory as a service provider.

## **Colorlab**

Colorlab was founded in 1972 by business partners Russ Suniewick and Ernest Aschenbach as a 16mm film laboratory determined to serve the Washington, D.C. motion picture community. The organization today is run by Tommy Aschenbach, the son of co-founder Ernest Aschenbach. Colorlab's expansion to preservation work in recent decades has made the organization one of the most notable commercial film laboratories catering to film archiving and preservation efforts today. According to Suniewick, the idea of starting a film laboratory originated during his and Aschenbach's time working at local television station WMAL after seeing documentary filmmaker Charles Guggenheim sneaking into the station's film laboratory at night to process film dailies for George McGovern's 1972 U.S. presidential campaign.<sup>56</sup> Colorlab continues to serve a commercial clientele today, now processing and digitizing film for commercial productions in addition to artist-made works and student films across North America and beyond. To gain more insight into Colorlab, a Zoom interview was conducted in December 2021 with Andrew Tamburrino, a film preservation technician who began working for Colorlab in late 2017.

The economics of Colorlab are shaped by the organization's physical locale and its response to the media field's call for laboratories to service film preservation work. Skewing slightly away from a direct studio to archive workflow, the preservation work of the organization

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<sup>56</sup> Dave Nuttycombe, "Rockville's Colorlab finds future in film preservation as firms switch to digital," *The Washington Post*, September 4, 2012, [https://www.washingtonpost.com/lifestyle/style/rockvilles-colorlab-finds-future-in-film-preservation-as-firms-switch-to-digital/2012/09/04/f84c5318-f6a2-11e1-8398-0327ab83ab91\\_story.html](https://www.washingtonpost.com/lifestyle/style/rockvilles-colorlab-finds-future-in-film-preservation-as-firms-switch-to-digital/2012/09/04/f84c5318-f6a2-11e1-8398-0327ab83ab91_story.html).

takes on a hybrid form. Tamburrino states that contracts during his tenure with the organization are “[evenly] split between” production and preservation work, as the organization is “doing archival work and scans to then be used in new productions,” demonstrating a number of clients contracting with them for both types of services.<sup>57</sup> Notably, Colorlab’s physical location in the D.C. region, a hub for U.S. government-funded or founded cultural heritage organizations, acts as a critical turning point for the organization being able to embed itself into archival work.

Tamburrino expands on the impact of Colorlab’s work with government organizations and states:

We had one [contract] for the Nixon Library, where you sign a five to ten-year contract. And it’s just evergreen, so the work keeps coming in. I think that the Nixon contract was five years and wound up being seven because you literally couldn’t do it in five years. You could be running full-time and still not have it all done. [...] Archival work started to bleed in, after the new work was done, realizing that we could do both and everyone will be happy.<sup>58</sup>

He cites these partnerships as a potential catalyst for the organization’s expansion to preservation, as this prior success allowed Colorlab to continue into preservation as client needs branched out into these areas. Colorlab is also known today for being the vendor for numerous NFPF grantees who seek out laboratory vendors for preservation projects due to the organization’s ability to cater to preservation-specific needs despite no formal partnership with the non-profit organization.

Colorlab utilizes the needs of its clients to build the foundation of its organizational structure. Tamburrino’s position is now responsible for being a point of contact for cultural heritage organizations that have been awarded NFPF funding for film preservation projects because of the organization’s high volume of clients who have received project funding through their grants, displaying a high organizational priority of archiving and preservation efforts.

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<sup>57</sup> Andrew Tamburrino, interview by author, December 30, 2021.

<sup>58</sup> Ibid.



Additionally, Tamburrino's title as "film preservation technician" demonstrates Colorlab's strong contemporary focus on preservation despite its origins as a production laboratory. Mirroring the organization's development, Tamburrino, who started at Colorlab with a background in film festivals and no prior film handling and archival experience states he started as a dailies technician where he was able to "get the basics down" through film handling, with a mastering of this skill allowing him to shift into more advanced preservation work that entailed "hand cleaning, fixing splices [and] tears" and "putting [film] through the different processes" that bring them to a shape "where they can be scanned or printed."<sup>59</sup> He now oversees work with archival and preservation clients, film preparation and handling, and film timers and printers in order to lead projects through their completion during their time at the laboratory.

Tamburrino's position as a central figure between the divisions of the organization and external stakeholders requires him to understand every aspect of the film laboratory and its processes to bridge communication with clients and the specific technical steps materials must undergo. To this end, the organization currently employs approximately 25 staff members and bases the organization's structure on present needs. All employees are divided into various operations, including a customer service division, film technicians responsible for machine operations such as color timing, and prep technicians who prepare materials for laboratory work, including film scanning, developing, and printing. The organization is also split into two buildings: one housing employees specializing in film, which includes technicians working in both dry and wet laboratory operations, such as film handling, developing, and printing; another dedicated to approximately ten employees responsible for the organization's digital operations,

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<sup>59</sup> Ibid.

including scanning, the creation of digital intermediate film outs, and the recording of new film elements.

Colorlab's technical practices are shaped by organizational interests in innovation and being a contributor and provider to contemporary archiving and preservation laboratory work. Colorlab and Aschenbach are known for supporting research in and conducting film replasticization, a film preservation method commonly only performed within film laboratories.<sup>60</sup> Colorlab's replasticization method uses a chemical solution of acetone, glycerine, and water to inject moisture into brittle film base to make film flexible enough to run through a film scanner. Once the damaged film is scanned, digital intermediates of the work can be created and used to generate other access formats, such as Digital Cinema Packages (DCPs) or new prints. Regardless of its many advantages, the preservation method comes with high risk. Mold can develop on the film due to the reintroduction of moisture and laboratories must safely navigate replasticization work to prevent further damage to items that may be originals, remain the only copies in existence, or already pose high levels of risk. As Colorlab continues to contribute to the field's development of film replasticization and offer clients this specialized service, the laboratory demonstrates an ability to not only serve the needs of a cultural heritage clientele but introduce new methods to archival and preservation practice and establish itself as an exclusive organization in which a specific archiving and preservation method must be conducted.

Colorlab's technical practices are additionally shaped by the prominence of digital processes and formats in the present day. Tamburrino mentions there is now a digital component to every film preservation project the organization works on, whether it be digital deliverables as

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<sup>60</sup> Greg Wilsbacher, Tommy Aschenbach, Reto Kromer, and Diana Little, "Physical Conservation Treatments of Digitizing Film: Re-Plasticization," presentation at the 2019 Association of Moving Image Archivists Conference, Baltimore, MD, November 2019.

part of an NFPF grant, the use of a scan and digital intermediate to make a print, among other methods. An exclusively photochemical film-to-film preservation and duplication method is in low demand among Colorlab's clients, and Tamburrino mentions how an Oxberry optical printer that can be used for a photochemical film-to-film preservation method is available at the organization yet is seeing less use in recent years due to changing client priorities. He discusses the Oxberry at Colorlab and states that the organization has "people that know how to use it and run it" but "[has] so few jobs that would ever be used and run on it that that knowledge has kind of dwindled, both on [their] side, but also, people often don't know that [they] have it."<sup>61</sup>

Whether shaped in part by a lack of awareness of film laboratory equipment on clients' ends or other reasons, this decreased demand in photochemical duplication work demonstrates an organizational response to the broader trends in the field such as the digital turn, particularly how the laboratory now increases its focus on digital technologies for preservation efforts.

To cater to production clients more familiar with digital work but interested in film as an access format, Colorlab has made use of a Cinevator, a film recorder developed in the early 2000s that makes projectable film prints from digital files regardless of the absence of camera original film elements, and claims the organization is one of a few film laboratories with the machine. Tamburrino expands upon the extended use of the Cinevator for additional archiving and preservation needs, stating that some clients are bypassing the creation of negatives and other preservation elements and going straight to a print, which is then treated as a preservation copy. Despite not being the organization's preferred preservation method, Tamburrino finds that Colorlab, "good or bad," is starting to "branch into using [the Cinevator] for this purpose."<sup>62</sup>

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<sup>61</sup> Tamburrino, interview.

<sup>62</sup> Ibid.

Notably, using the Cinevator to eliminate the creation of some preservation elements benefits clients financially as it reduces the costs of already high-priced film preservation projects for budget-tight or grant-limited cultural heritage organizations looking to maximize their funding and project abilities. Additionally, with Colorlab's unique use case for the Cinevator, the concepts of archival "best practices" shift as the film laboratory transforms preservation methods and approaches and its reliance on original elements.

Colorlab demonstrates both an ability and testament to not only face and endure shifting sands but also benefit from and establish unique strengths within an age of media driven by constant changes and developments. In late 2020, Kodak's decision to discontinue 16mm and 35mm color internegative stocks 3273 and 2273 caused alarm in the field and posed a particular challenge for preservation projects working with color reversal materials.<sup>63</sup> Tamburrino mentions how Aschenbach led the organization through this issue and found workarounds in their archival and preservation workflows despite the sudden shift from a film stock supplier the organization must rely on to conduct key operations. He concludes by stating laboratory work is "is always a step behind trying to catch up" and that the ability to work in such an organization "[is not] a position that can be filled or a knowledge base [one] can have" but will be defined by "the drive to keep things going."<sup>64</sup> Colorlab's efforts pay homage to the film laboratory's historical roots as a site of commercial innovation and expand upon this work in impactful ways, illustrating the commercial film laboratory's contributions to the broader moving image archiving and preservation landscape.

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<sup>63</sup> Jon Dieringer, "Avant-garde film preservation: how a change to Kodak's product line puts experimental film at risk," *Screen Slate*, May 26, 2021, <https://www.screenslate.com/articles/avant-garde-film-preservation-how-change-kodaks-product-line-puts-experimental-film-risk>.

<sup>64</sup> Tamburrino, interview.

## **Pro8mm**

Pro8mm, originally named Super8Sound, was founded in Cambridge, Massachusetts in 1972 by Harvard University astronomy professor Bob Doyle. Following Doyle's resignation from his position as CEO in 1978, the organization encountered a tumultuous period of bankruptcy and unsuccessful leadership in the late 1970s. Present-day co-owner and president Philip Vigeant, then an accounting student at a local business school, began working part-time at Super8Sound to assist with the organization's books around the same period. He led the organization through the bankruptcy following Doyle's departure and purchased the company in 1982. With the new leadership of Vigeant, Super8Sound continued its mission to expand Super 8 offerings by opening a successful second location in Hollywood, California in 1987. The organization, renamed Pro8mm in 1998, is now led by Philip and his wife Rhonda Vigeant, who was also brought into the organization during its earliest years, and currently operates out of Burbank, California. To gain more insight into the operations of Pro8mm, a Zoom interview was conducted with Rhonda Vigeant, who is responsible for marketing the organization's offerings in addition to co-leading and owning the organization, in January 2022.

The economics of Pro8mm are defined by a unique strength of understanding the specific commercial market their organization caters to and being able to identify avenues to adhere to within this niche. Founded on the belief smaller, cartridge-based Super 8 film had larger potential not just as an amateur format but also as a production medium, Doyle and a group of investors designed a line of sync-sound full-coat audiotape with sprocket holes, editing benches, sync modifications to Super 8 cameras, in addition to other production equipment during his tenure. Their products soon became popular within university film programs due to the reduced

costs of shooting productions on Super 8 in comparison to 35mm and 16mm gauges.<sup>65</sup> Despite the strenuous periods the organization faced in its earliest years, Philip Vigeant and others continued the organization's foundational belief that Super 8 had more significant potential as a production medium and that a market of eager filmmakers was waiting to be served.

Rhonda Vigeant discusses Pro8mm's established connections to educational film production settings in its earliest periods and the organization's transition to commercial contexts as a significant reason for the organization's economic growth. As students of film production programs in the 1970s and 1980s learned how to use Super 8 and its related equipment, Vigeant discusses how students brought the format they were familiar with to their first professional careers in the production industry. She states:

These students who came up through film school in the '70s and '80s and learned to shoot on these beautiful film cameras took those into their first professional careers with them. [...] We were working with all the major production companies who learned how to shoot film in film school; they did not learn how to shoot digital in film school. They were the main media makers entering the commercial market at that time and they took with them the equipment and the film stocks they knew and loved. And, it was so interesting to me that people have said, 'Oh, you must have had a lot of ebbs and tides.' No, we've always been busy.<sup>66</sup>

Pro8mm also utilizes this historical trajectory of film and its constituency as momentum to carry them into the future as they begin pursuing vertical integration methods of film production equipment and technology to strengthen their organization. With the vast closure of commercial film laboratories as video formats came to prominence in the 1980s, Super8Sound purchased Film Service Lab, a film laboratory located across town in Boston. Now equipped with a film laboratory, Pro8mm consolidated another crucial step of film production, and Vigeant cites the

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<sup>65</sup> "The Pro8mm Story," *Pro8mm*, accessed February 4, 2022, <https://www.pro8mm.com/pages/the-pro8mm-story>.

<sup>66</sup> Rhonda Vigeant, interview with the author, January 4, 2022.

ability to have more “quality control over what [they] were offering people” and an all-in-one approach as valuable organizational assets.<sup>67</sup>

The organizational structure of Pro8mm is crafted in response to the vertical integration methods Pro8mm begins to pursue. Today, Pro8mm is an all-in-one film business, incorporating film laboratory services, equipment rental, camera repair, and a store under a single roof. The laboratory now also works with cultural heritage organizations, families and individuals preserving home movies, amateur filmmakers, to commercial productions shot on small gauge formats to digitize film, with Vigeant listing several notable cultural heritage organizations working with them to digitize small gauge collections during the interview. Pro8mm’s organizational structure is also shaped by its decades of experience and sustained growth following a difficult period, and Vigeant states the organization has “always been a small company” but is “at [its] largest with 12 employees.”<sup>68</sup> Two individuals are responsible for scanning film and two camera technicians repair film cameras. Three full-time workers conduct laboratory operations, including spooling film out of incoming Super 8 cartridges ready for processing, preparing the film for laboratory work, maintaining chemistry for film developing, and repackaging film stock they purchase from Kodak and resell under their company name. In addition to continuing work with Super 8 film and its related technologies, Pro8mm has also expanded its offerings to include Super 16mm and 16mm processing.

Pro8mm continues its roots as an organization focusing on Super 8 technologies and utilizes this background to shape the organization’s technical practices. A unique attribute of the organization is its ability to drive innovation by expanding pre-existing technologies, equipment,

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<sup>67</sup> Ibid.

<sup>68</sup> Ibid.

and offerings of larger corporations film laboratories are beholden to, such as film stock and equipment manufacturers. A practice allowing Pro8mm to continue its roots in technical innovation started in the 1980s as the organization purchased 35mm short ends from film brokers who resold leftover, unexposed film from commercial shoots to filmmakers in need of smaller amounts of film for projects. Experimentation with film stocks began when Pro8mm converted their slitting and perforating Super 8 magnetic soundtrack equipment from the 1970s to handle the film of a different gauge. Vigeant goes on to discuss how this experimentation led to Pro8mm debuting their Pro-8 color negative stocks in 1993 despite the fact Kodak representatives told them color negative Super 8 “couldn’t be done,” going so far as to reach out to a patent attorney to discuss their new line of products.<sup>69</sup> She describes their work with film stocks as “extremely successful,” and as they continued releasing more film stocks, Vigeant states that the “industry seemed to be eating it up.”<sup>70</sup> According to Vigeant, Kodak had “no interest in [Super 8] color negative film” as she believed Kodak thought Super 8 “was cutting into [their] 16mm market,” giving the organization the ability to carve out a distinct niche in the face of market competition with the legacy corporation.<sup>71</sup>

To Pro8mm, this was yet another opportunity for technical innovation that a larger corporation in the field with more governing power over film technologies seemed to have ignored. Not only did the expanded Super 8 stock offerings appease the organization’s stakeholder demand, it also navigated a period of shifting technologies by bridging newer and

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<sup>69</sup> Ibid. Super 8 film is most commonly developed through a reversal process which eliminates the need for prints requiring negatives as positive images can be created by camera originals, making the format more accessible to non-professional and amateur users.

<sup>70</sup> Ibid.

<sup>71</sup> Ibid.



preexisting media as it was designed for filmmakers who wanted to shoot on film, go direct to telecine, then complete their productions in video formats or as digital media.<sup>72</sup> Clients who wanted more professional abilities with Super 8 and expanded Super 8 film stock options could now also apply more film editing processes they were familiar with using the cheaper format often marketed as an amateur medium. Because of their technical ability to slit film stocks made by external corporations, Pro8mm can make Super 8 prints, making them one of the very few commercial film laboratories of North America today capable of this highly specialized service. Despite the more prominent practice of enlarging Super 8 and 8mm films to 16mm for preservation and new distribution copies, this remains an important offering for archival projects looking to create new prints on the original small gauge format.

Another Pro8mm innovation illustrating Pro8mm's strength in technical practices is the company's million dollar investment and invention of Max 8 in 2002, which transforms the 4:3 aspect ratio of Super 8 film to 16:9 widescreen, a more common aspect ratio in use today, by utilizing the unexposed area between Super 8's perforations.<sup>73</sup> Pro8mm created the format in response to filmmaker demand, highlighting pre-existing structures and cultural context of filmmaking carrying into institutional practice as a crucial method of sustaining and motivating Pro8mm as an organization.<sup>74</sup> To support this endeavor, Pro8mm had a custom scanner made and began modifying Super 8 cameras in-house to accommodate the newer aspect ratio in the early 2000s. Pro8mm continues to offer rentals of their custom-modified Max 8 Beaulieu film cameras

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<sup>72</sup> David E. Williams, "Transforming Super 8," *American Cinematographer*, November 1996, 28–32.

<sup>73</sup> Pro8mm, "Max 8 Widescreen Modification for Beaulieu Super 8 Cameras," August 19, 2010, <https://www.youtube.com/watch?v=jzt4nWuEGw>.

<sup>74</sup> Philip Vigeant, "Why and What Is Max 8...The Super 8 Widescreen Format," *Pro8mm's Blog on The Power of Super 8 Film* (blog), March 12, 2008, <https://pro8mm-burbank.blogspot.com/2008/03/why-and-what-is-max-8the-super-8.html>.

along with other Max 8 services today, establishing themselves as the organization to work with for Max 8 productions. As Max 8 film and production elements from the past two decades begin to be acquired by archives and other cultural heritage stewards, Pro8mm's technical knowledge and documentation of their format will become essential information needed to guide and provide context to the format's preservation.

From the idea of a Harvard professor, organizational distress in the 1970s, to a continued maturation over the decades, Pro8mm's trajectory tells the story of a family-owned business claiming its stake in film technology innovation while also following the trajectory of film within the larger field they serve. When asked about her and Philip Vigeant's background in media and related industries before joining Super8Sound, Rhonda Vigeant discusses how all means to explore and innovate were honed over time within the organization as she and Philip Vigeant had no prior experience in the organization's line of work and wanted to "[continue] to push [themselves] to the maximum potential to continue offering products and services clients want"—drawing attention to the film laboratory as a site of distinctive film work despite its position in the margins of a larger field.<sup>75</sup> Pro8mm's method of utilizing both vertical integration and pre-existing, established structures in film production to guide its path forward become the means through which the laboratory makes decisions that not only sustain, but support the main interests of the organization.

## **Conclusion**

By focusing on commercial markets, commercial film laboratories have occupied a beneficial dual positionality as service providers and as stakeholders in archival and preservation

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<sup>75</sup> Vigeant, interview.

work. To respond to the changes in their external environments, both Colorlab and Pro8mm make significant strides in utilizing preexisting institutional knowledge and governing logics to propel their organizations forward and shape archiving and preservation practices. For Colorlab, a background in production contexts allows them to transform production technologies for preservation work and simultaneously expand on new preservation methods commercial film laboratories can now claim ownership of and be the designated sites for certain practices within the field. A response to change at Pro8mm means utilizing a vertical integration approach to its organizational structure that allows them to become acquainted with all aspects of film and its processes—from film stock, equipment, processing, digitization, and access formats. In doing so, the organization becomes well-grounded in all required steps of film production, and thus, becomes uniquely positioned for serving archiving and preservation efforts as this demand develops in the broader landscape.

Colorlab and Pro8mm's respective approaches to film archiving and preservation methods foster comprehension of archival and preservation work honed by the legitimized, top-down socially encoded information of the field's established operations yet also break away from this mold. Reflecting on Fossati's claims on film laboratories, an ability to foster agency in the field through technologies allows them to effectively adapt to a shifting terrain.<sup>76</sup> In this case, both commercial film laboratories utilize established techniques and logics of film laboratory practice from the broader field they originate from but diverge from these methods to form their respective new ones. Governing logics vetted by the test of time influence the trajectory an organization takes, but can also be used to craft a response resulting in a rearticulation of logics through new forms of action. Colorlab's unique use of the Cinevator utilizes a pre-existing

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<sup>76</sup> Giovanna Fossati, *From Grain to Pixel: The Archival Life of Film in Transition* (Amsterdam: Amsterdam University Press, 2009), 134–137.

device for the production field's exhibition on film to reorient the archival and preservation concepts of established "best practices" of the film archiving and preservation field, indicating the film laboratory's capacity to shift the field's understandings and instigate new approaches to its work through technical practices.

Commercial film laboratories additionally converge the various methods of the film production and laboratory fields throughout the decades to become an all-in-one, encompassing site of nearly every step of film's associated economy. Colorlab's historical trajectory follows the film laboratory as it generates from the demands of the commercial film industry—from production, distribution, and to the growing need to utilize its technical skills to preserve works once completed on film. For Pro8mm, an early history as a site dedicated to innovation in film technology is utilized as its core mission and foundation when working to redefine what a film laboratory is and can offer. By starting as a business focusing on Super 8 equipment and catering to production environments, the laboratory implements a vertical integration approach to give the organization the ability to have full control of its offerings and capture a broader share of photochemical film's associated market and constituency. The implementation of these methods in addition to the laboratory's creation of new film technologies defines the laboratory's response to broader governing rationales, with their economic reasonings trickling down into the structure and technical practices of the organization.

While the courses of action implemented by commercial film laboratories demonstrate their connection to production environments and their utilization of institutional logics, other laboratories forming alongside commercial laboratories or in later years generate directly from the wider field's interests in archival and preservation work. Section IV will explore archival film laboratories, a type of laboratory operating in far smaller numbers working under the

auspices of preservation efforts to serve the needs of the field's most established cultural heritage organizations.

## Section IV: Archival Film Laboratories

*“We spent a lot of time trying to figure out the processes of preservation. After looking at the process of sending film to commercial laboratories and doing the sort of struggling that Bob Harris described this morning of getting the film back from the laboratory and saying, ‘good heavens, what is this?’ and sending it back and forth and back and forth several times, John Kuiper said the only thing to do is to start our own laboratory. [...] In the process, we made a lot of mistakes because we did not have the kinds of standards that we really needed to do the work. But we learned it.”*

— Paul C. Spehr, Former Assistant Chief of the Motion Picture, Broadcasting and Recorded Sound Division at the Library of Congress, in a 1993 public hearing<sup>77</sup>

As film preservation gained increasing attention from the mid-twentieth century onward, most cultural heritage organizations managing film collections relied on commercial film laboratories to meet their preservation goals. Several, however, have opted to forming film laboratories within their organizations to have more control over their archiving and preservation endeavors. While few in number, the direct institutional relationships and the embeddedness of archival film laboratories within larger film archiving and preservation organizations allows them to stand as notable presences within the broader field worthy of discussion and analysis. As the development of archival film laboratories demonstrate, the institutional logics of film archiving and preservation and that of the film laboratory are brought into conjunction within a single organization. Through this positionality, their role as organizations working within the economic purview of cultural heritage and its interests impacts their preservation priorities. Additionally, their organizational structures and technical practices emulate those of commercial film laboratories, pointing to larger institutional logics of the film laboratory at work despite the outlined differences between the archival and commercial laboratory contexts.

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<sup>77</sup> *Volume 3: Hearing Before the Panel of the National Film Preservation Board*. 1993. Washington, D.C.: Library of Congress. <https://www.loc.gov/programs/national-film-preservation-board/preservation-research/film-preservation-study/washington-dc-public-hearing/>.

This section explores archival film laboratories operating part of the two largest moving image archives in the United States: the film laboratory of the Library of Congress (LOC) Motion Picture, Broadcasting, and Recorded Sound (MBRS) Division located today in the LOC's Packard Campus in Culpeper, Virginia and the Packard Humanities Institute (PHI) Film Laboratory in Santa Clarita, California overseen by its parent organization, the PHI, in cooperation with the UCLA Film and Television Archive (FTVA), the second largest moving image archive in the country. These two archival film laboratories are financially sustained by philanthropic funding originating from David Packard, the co-founder of Silicon Valley technology corporation Hewlett-Packard, and his immediate family. Key organizations funding archival endeavors include the David and Lucile Packard Foundation, established by him and his wife, and the PHI, established and led today by their son, David Woodley Packard.

Archival film laboratories both follow the trajectory of and play a vital role in the wider media industry's shift from industry to preservation work, and to this day, build on many of its relationships with the commercial production industries film laboratories originate from. Unlike that of their commercial laboratory predecessors, archival film laboratories are beholden to an exclusive client: the archive which they operate within or under. This organizational structure impacts preservation priorities for archival film laboratories, as the profit motivations driving commercial film laboratories factor in differently for an archival film laboratory's decision making processes. Located an hour and a half away from Washington, D.C. in the Packard Campus National Audio-Visual Conservation Center (NAVCC) of the LOC, the operations of the LOC MBRS's film laboratory stem from the organization's efforts to preserve America's motion picture heritage and have benefited from the Packard family's various forms of philanthropy. While the LOC has received significant one-time financial support from the

Packard family's efforts, the PHI Film Laboratory today operates as an administrative part of the PHI responsible for continuing the Institute's larger mission, and thus, holds the namesake of its parent foundation. Although a rare presence within the larger field of film laboratory work, the continued operations of these organizations illustrate how film laboratories are essential to the efforts of film archiving and preservation.

### **The Library of Congress Motion Picture, Broadcasting, and Recorded Sound Division Film Laboratory**

The film laboratory of the Library of Congress' (LOC) Motion Picture, Broadcasting, and Recorded Sound Division (MBRS) has a storied history as the sole film laboratory operating within the auspices of the Library, the oldest federal cultural institution in the United States and the de facto national library of the country created to serve the U.S. Congress. Operating within the LOC, the MBRS is the arm of the Library responsible for the acquisition, cataloging, and preservation of the Library's motion picture and television collections. The LOC began collecting motion pictures as early as 1893 when inventor William K. L. Dickson deposited the paper prints of their company's films shot on their recently invented kinetoscope for copyright. As larger interest in film preservation developed in the early-to-mid twentieth century, the LOC MBRS film laboratory was founded as part of national efforts to steward American motion pictures. Government efforts started as early as the 1920s, with California Senator James D. Phelan's failed 1921 congressional bill for the creation of an American film collection that would preserve noteworthy motion pictures.<sup>78</sup>

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<sup>78</sup> Frick, *Saving Cinema*, 27–34, 40–47.



A national film laboratory was finally established in the Wright-Patterson Air Force Base outside of Dayton, Ohio in 1976, with facilities moving to the newly opened National Audio-Visual Conservation Center (NAVCC) in Culpeper, Virginia upon completion of its construction in 2007. To learn more about the operations of the LOC MBRS film laboratory and the work this division does in support of the LOC's film preservation efforts, two Zoom interviews were conducted in December 2021 and March 2022 with Ken Weissman, the retired head of the Motion Picture Conservation Center (MPCC) operating as part of the Library's MBRS division. Weissman first joined the LOC film laboratory in 1981 upon the end of his service in the U.S. Air Force, where he started his film laboratory career in the late 1970s. Before retiring in 2017, Weissman was responsible for managing the film vaults of the MPCC and overseeing the operations of a government film laboratory he was part of for almost 40 years.

The NAVCC, also interchangeably known as the Packard Campus, is named after the Packard family of Hewlett-Packard fame, whose significant amounts of funding contributed to the establishment of the 45-acre campus based on a former U.S. Federal Reserve Board high-security facility. In 1997, the David and Lucile Packard Foundation purchased the property from the Federal Reserve Bank of Richmond with the approval of the U.S. Congress through a \$5.5 million grant. The LOC soon planned the building of a new facility, and the PHI, the other Packard family operated entity, contributed \$150 million on top of the U.S. Congress' \$82.1 million to build the NAVCC on the acquired property. Upon the completion of the NAVCC in 2007, a single site where millions of audiovisual items from the LOC's collection could be stored was established for the first time in the Library's history.

As a government entity, the LOC MBRS film laboratory's economics are determined by its role as a legislative branch of the United States government supported by government

funding, taxpayer dollars, and donations—notably from philanthropic figures such as the Packard family. The involvement of David Woodley Packard—a former Hewlett-Packard board member and classics professor—in the LOC’s film preservation affairs began in the early 1990s when he reached out to inquire about 1920s and 1930s Warner Brothers and Paramount titles he developed a personal interest in. The relationship between Packard and the LOC strengthened over time, and according to Weissman, Packard “agreed to pay for six staffing positions” that Weissman oversaw, soon leading to Packard’s eventual financial and administrative involvement in the creation of the Packard Campus in Culpeper.<sup>79</sup> Upon the completion of the campus in 2007, Packard donated the buildings back to the LOC in July of the same year, and per a 2014 article from *The Los Angeles Times*, the transaction was “the largest private gift to the U.S. legislative branch and one of the largest ever to the federal government.”<sup>80</sup> Following the return of the campus to the government, Weissman describes Packard’s level of influence at the MBRS and the film laboratory as a minimal source of influence yet still a central figure who kept in contact with him and the chief of the MBRS given his continued interests in supporting the LOC’s film preservation work.

With financial support from both Packard and the federal government, the organizational structure of the LOC MBRS film laboratory is shaped by the organization’s position within a larger federal government institution whose mandates the laboratory must support and respond to. The Motion Picture Conservation Center is a smaller section within the MBRS tasked with the conservation, preservation, and restoration of U.S. motion picture heritage held in the

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<sup>79</sup> Ken Weissman, interview with the author, March 9, 2022.

<sup>80</sup> Randy Lewis, “Library of Congress builds the record collection of the century,” *The Los Angeles Times*, March 15, 2014, <https://www.latimes.com/entertainment/la-ca-library-congress-packard-20110508-story.html>.

collections of the LOC's moving image division.<sup>81</sup> A majority of titles the laboratory works on are black and white nitrate films from the LOC's acquisition of studio collections in the early 1970s, which were catalyzed by the separate establishment of the American Film Institute in 1965 that brought into the LOC's hands collections from Sony, United Artists, Paramount, and others, in addition to some government-produced films.<sup>82</sup> At the laboratory's peak, Weissman discusses that he managed sixteen laboratory technicians, with employee responsibilities ranging from "printing for [color] timing" to three to four responsible for "film to digital [work]."<sup>83</sup> Due to the vast amount of nitrate studio film collections at the Library, nitrate film preservation is a high priority for the organization. He notes that "[employees] that worked in digital could go work in film," with the job descriptions for the film to digital employees requiring that they have the ability "go into [film work] if [the laboratory] needed them to."<sup>84</sup>

On a larger organizational scale, all specific projects for laboratory work are dictated by a curator and curatorial section at the MBRs, who are responsible for "[deciding] which films were being preserved within the library's collection."<sup>85</sup> The quality control specialist, a position operating as part of the laboratory and the MPCC, plays a mediating role between the work of

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<sup>81</sup> "Motion Picture Conservation Center (National Audio-Visual Conservation Center - Library of Congress)," <https://www.loc.gov/rr/mopic/mpcc.html>.

<sup>82</sup> According to Weissman, all government records on moving image formats and government-produced films are sent to the National Archives and Records Administration. For more information on the LOC's moving image collections acquisition history, see Frick, *Saving Cinema*, 53–83. Nitrate film is a synonymous term for motion picture film using a nitrocellulose film base, also referred to as "cellulose nitrate." The material is prone to fire danger as it is highly flammable due to its ability to generate its own oxygen source in the event of ignition and prone to rapid decomposition if not stored in climate-controlled environments, making works on this film base a priority and duplication to non-nitrate film bases an urgent goal for preservation work.

<sup>83</sup> Weissman, interview, March 9, 2022.

<sup>84</sup> Ibid.

<sup>85</sup> Ken Weissman, interview with the author, December 17, 2021.

the laboratory and the curator. Upon the creation of new film elements at the laboratory, the specialist evaluates the work and decides whether or not to approve the work as final. Weissman describes the relationship between all parties involved in the process as collaborative, noting the amount of skill developed over years of experience many had within the MBRS environment to ensure almost near-agreement between curator, laboratory, and quality control technician, and that disagreements, when they arose, “generally weren’t serious” and could often be resolved by management of the respective ends “[discussing] it and [making] it a decision.”<sup>86</sup> He states:

The film lab supervisor obviously had supervisory control of the film lab. But we had a lot of very experienced people. And we worked very closely with the QC people. [...] And it was not unusual at all for someone to come across a problem that they felt might veto the entire project. [...] And if necessary, [they’d] get back with their territorial supervisors in Washington and say, ‘Hey, this project’s too problematic, it’s going to take too long; let’s take it out of the mix and do something else.’ [...] And we kind of continued that model once we were in Culpeper. [...] But, for the most part, we had very experienced people. And they had come from the industry, you know, commercial film laboratories, where you did your best to get something done.<sup>87</sup>

While the professional collaboration between laboratory technicians, quality control specialists, and non-laboratory roles such as curators performs a system of checks and balances for film preservation at the Library, Weissman’s statement also highlights the archival film laboratory emulating the organizational structure of commercial film laboratories and the structuring of its employees to further organizational interests and support levels of organizational productivity.

The technical practices of LOC MBRS employees are dictated in part by its organizational history and the specialized nature of the nitrate film materials with which they work. Despite the division of titles and roles across laboratory operations and the presence of the quality control specialist as a means of institutional balance, Weissman’s quote highlights

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<sup>86</sup> Weissman, interview, March 9, 2022.

<sup>87</sup> Ibid.

preservation operations of the MPCC and the curator as a collaborative across the various institutional stakeholders involved. Because the LOC's moving image collections policies and foci were outlined by the early leadership of the division and shaped by the Library's historic role in acquiring collections from American studios, much of its collections are on black and white nitrate film stock—a prominent film stock used before the demise of the studio system in the late 1940s. Throughout the history of the LOC and its acquisition of American motion picture collections, collections policies have determined what the laboratory is capable of doing and what is needed to conduct the work to preserve the organization's current film collections. All nitrate preservation projects are duplicated onto safety film bases, with minimal digitization work and need of digital intermediates regardless of the availability of a film scanner within the MBRS. The specific steps film elements must go through at the laboratory are additionally determined by the laboratory technicians themselves, demonstrating a level of autonomy for the laboratory and the ability of its technicians to play a more active role in the preservation process. While the NAVCC laboratory is equipped to do so in part due to Packard's funding, the film laboratory does very few color film preservation projects.

Following the decline of the studio system in the late 1950s to the restructuring of Hollywood, the LOC picked up where America's commercial studios left off after the landmark U.S. antitrust case in 1948 by acquiring their materials for preservation in the following decades. With the acquisition of these collections, the stewardship of such work entails the implementation of an archival practice to drive the activities of the LOC MBRS laboratory. Additionally, the Library's mission to preserve the studio nitrate collections it now stewards helps drive the professionalization of film preservation. From the deposit of Dickson's paper prints to the LOC Copyright Office in 1893 to the acquisition of studio titles in the mid-to-late

twentieth century, the LOC has played an active part in the preservation of film history since the birth of the moving image, culminating in landmark efforts such as the publication of “Redefining Film Preservation” by Melville and Simmon for the LOC in 1994. While the organization’s work displays a level of autonomy and self-determination that demonstrates the laboratory’s ability to shape the tasks associated with film preservation, the work of figures such as Weissman and others in the MPCC are still dictated by the top-down logics shaped by avenues of finance and its interests in the cultural heritage realm. The amalgamation of archival and economic logics coalesce into a film laboratory organizational formation necessary for the Library’s ongoing interests in defining a national moving image heritage.

### **The Packard Humanities Institute Film Laboratory**

The Packard Humanities Institute (PHI) Film Laboratory was founded in 1998 from what was then first named and established as the Stanford Theatre Film Laboratory, an archival film laboratory part of the UCLA FTVA and operated by FTVA staff at its former location in Hollywood, California. Throughout its history, the PHI Film Laboratory as an organizational entity has been positioned between the PHI and the UCLA FTVA. Founded in 1965 by the joint efforts of the Academy of Television Arts and Sciences and UCLA’s Theater Arts Department—now joined with other departments as part of what is known as the UCLA School of Theater, Film, and Television today—the UCLA FTVA first collected television collections upon its establishment and branched out to motion picture films in 1977 with the donation of the Paramount Pictures Nitrate Print Library, a collection that included almost all of the sound films the studio had produced between 1930 and 1950. A year after, the Archive launched its film

preservation program by restoring notable studio titles such as Paramount's *Double Indemnity* (1944) and Warner Brothers' *The Big Sleep* (1946).<sup>88</sup>

The PHI Film Laboratory remains a lesser-known organization and archival film laboratory in comparison to its North American counterpart at the LOC MBRS with little to no published information available, and the current study at present is one of the sole efforts to date to document its history. The PHI, the parent foundation of the film laboratory, is led today by David Woodley Packard, the son of Hewlett-Packard's co-founder, who founded the PHI in 1987 and now serves as the Institute's president. According to its minimal website, the Institute is "a non-profit foundation dedicated to archaeology, music, film preservation, and historical archives."<sup>89</sup> Their website also states they are not associated with any Hewlett-Packard foundations, and despite Packard receiving a significant endowment from his parents' David and Lucile Packard Foundation in 1998, the PHI operates independently of the organization and all other Hewlett-Packard entities.<sup>90</sup> To gain more insight on the PHI Film Laboratory, two Zoom interviews were conducted in February and March 2022 with Joseph Olivier, the PHI Film Laboratory manager who started his career in film laboratory preservation work in the early 1980s. Olivier was first hired in 2014 as an assistant to the then-manager and as an employee of the UCLA FTVA's then-named Stanford Theatre Film Laboratory.

The wealth and influence of the Packard family have played a large part in both the preservation and exhibition of moving image works across North America. With David Woodley Packard's convincing to his parents, the David and Lucile Packard Foundation and other

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<sup>88</sup> "Our History," accessed April 5, 2022, <https://www.cinema.ucla.edu/our-history>.

<sup>89</sup> "Packard Humanities Institute," accessed February 15, 2022, <https://packhum.org/>. See also Turan, "Reels of classic films tend to melt into goo"

<sup>90</sup> Ibid.

philanthropic entities stemming from Packard family efforts oversaw the purchase and ownership of the nitrate film-certified Stanford Theatre in Palo Alto, California in 1987, a repertory venue, around the same time the PHI was established.<sup>91</sup> When the Stanford Theatre Film Laboratory was established in Hollywood, California as a part of the UCLA FTVA in 1998, David Woodley Packard was also funding FTVA efforts through proceeds generated by the theatre up north in Palo Alto.<sup>92</sup> The pockets of funding from Packard led to the naming of the FTVA's film laboratory upon its establishment in recognition of their repertory theater in Palo Alto, with some restorations conducted by the laboratory and FTVA being exhibited in the Bay Area venue, a relationship it continues to this day.<sup>93</sup> Upon the laboratory's inception, Olivier discusses that the laboratory "did a lot more UCLA work than it did PHI work," demonstrating the film laboratory's initial commitment to UCLA's film preservation efforts despite its PHI ownership today.<sup>94</sup>

After establishing the Stanford Theatre Film Laboratory in Hollywood, the David and Lucile Packard Foundation separately funded the establishment of the LOC's National Audio-Visual Conservation Center on the opposite coast and wanted to continue aiding efforts in film

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<sup>91</sup> The Six Fifty Staff, "Behind the curtain of Palo Alto's 90-year-old cinematic treasure—The Stanford Theatre," *The Six Fifty*, February 22, 2018, accessed 11 March 2022, <https://www.thesixfifty.com/behind-the-curtain-of-palo-altos-90-year-old-cinematic-treasure-the-stanford-theatre-4453/>.

<sup>92</sup> The Stanford Theatre in Palo Alto, California is a separate organization from the Stanford Theatre Film Laboratory based in the Southern California region, despite sharing a similar name. See also Nancy R. Day, "Not the Biggest, Only the Best." *The American Heritage Society's Americana*, April 1990.

<sup>93</sup> "Film Preservation," The Stanford Theatre, accessed October 2, 2022, <https://stanfordtheatre.org/aboutArchives.html>.

<sup>94</sup> Joseph Olivier, interview with the author, February 2, 2022.



preservation upon completion of the Culpeper campus in 2007.<sup>95</sup> They set their sights this time on the second-largest film archive in the country after the LOC: the UCLA FTVA. The PHI purchased a 65-acre property in Santa Clarita, California to support this endeavor and began building the PHI Stoa on the acquired land to make a new home for the FTVA and its collections, with the Institute, UCLA FTVA, and laboratory all moving into the new facility in 2014.<sup>96</sup> In 2018, the PHI acquired the Stanford Theatre Film Laboratory from UCLA ownership, renamed it to the PHI Film Laboratory, and became responsible for its full operations—a moment that paved the way for the laboratory’s future. A year later in 2019, the UCLA FTVA became part of UCLA Library, making the film laboratory the only one in the U.S. operating within the immediate network of an academic library system.<sup>97</sup>

The UCLA FTVA’s organizational oversight of the Stanford Theatre Film Laboratory began to shift as Packard’s funding to the FTVA decreased in the 2010s, thus affecting the laboratory’s economics. According to Olivier, Packard was providing pockets of financial support to FTVA and the then-named Stanford Theatre Film Laboratory throughout the decade, with his funding intending to support the organization until it relocated to the planned Santa

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<sup>95</sup> Richard von Busack, “Cinema Saver: David Packard of Stanford Theatre Gives Millions to National Film-Preservation Effort,” *Metro Silicon Valley*, September 5, 2007, <https://www.metrosiliconvalley.com/metro/09.05.07/film-restoration-0736.html>.

<sup>96</sup> A stoa in Greek architecture is a freestanding colonnade or covered walkway with a roof supported by columns. It was often used as architectural framing device to create safe, protective atmospheres combining the use of inside and outside space. The PHI Stoa’s design draws large influences from ancient Greek architecture and can be discussed as a reflection of Packard’s background as a classics scholar and a symbol for the “protection” of cultural heritage.

<sup>97</sup> Storage facilities and collections management operations of the UCLA FTVA are based out of the PHI Stoa. The Archive Research and Study Center of UCLA FTVA, the public-facing division of the Archive, is located in Powell Library of the UCLA main campus. In late 2019, the FTVA became part of the UCLA Library. See also Rose Miranda, “UCLA Film & Television Archive Joins UCLA Library,” *UCLA Library News & Events*, December 19, 2019, accessed 2 March 2022, <https://www.library.ucla.edu/news/ucla-film-television-archive-joins-ucla-library%C2%A0>.

Clarita Stoa. Economic circumstances reached a peak in 2017 as Packard began to wean the organization off the PHI's financial support. As a result, UCLA FTVA leadership discussed how the organization could no longer afford to maintain the film laboratory, yet it was felt across the organization "that the laboratory should not go away" and remain part of the Archive.<sup>98</sup> Soon after, Packard "agreed to bring [the laboratory] over to the PHI side" and all laboratory employee salaries and organizational costs were absorbed by the foundation, with the laboratory's official renaming to the PHI Film Laboratory at the beginning of 2018.<sup>99</sup>

The PHI Film Laboratory has varied its laboratory output since Olivier's tenure, often emulating the level of administrative oversight the two organizations the laboratory is positioned between. In 2015, the laboratory's first full fiscal year upon Olivier's tenure and the laboratory's relocation to the Stoa in 2014, projects at the laboratory shifted from UCLA FTVA work to PHI projects. That year, 17% of laboratory output by film footage were for PHI projects with 83% belonging to FTVA.<sup>100</sup> Over the years, the PHI Film Laboratory output increased and simultaneously skewed toward PHI endeavors. FTVA output at the laboratory decreased by a third each year until it reached a low of 4% in 2019, the last full year before in-person operations were affected by the COVID-19 pandemic.<sup>101</sup> Although the FTVA and the PHI Film Laboratory operate adjacent to one another in the Santa Clarita Stoa and have opportunities for its staff to communicate and collaborate with one another should the need arise, the FTVA is not administratively tied to doing laboratory work with the PHI laboratory, and Olivier attributes the

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<sup>98</sup> Olivier, interview.

<sup>99</sup> Ibid.

<sup>100</sup> Ibid.

<sup>101</sup> Ibid.

decline of film output for FTVA at the laboratory being “directly related to David [Woodley] Packard cutting off the annual funding that [PHI] gave to them.”<sup>102</sup>

From its roots at UCLA to its ownership under a private foundation, the PHI Film Laboratory’s long history in the hands of multiple stakeholders has shaped the laboratory’s organizational structure. According to Olivier, after the completion of the LOC’s Culpeper campus, “[David Woodley] Packard wanted to do the same thing for the FTVA,” with “the largest collection [of moving image work] on the East Coast” and “the second largest, [the] FTVA, [having] its facility on the West Coast.”<sup>103</sup> Additionally, the Packard family’s financial contributions to UCLA FTVA throughout the years was integral to their involvement with the FTVA’s preservation efforts. The PHI Film Laboratory, from its inception in 1989 as part of UCLA to the present, has performed a dual role as an institution serving the needs of FTVA’s preservation of legacy studio collections in addition to the collections the archive branches out to in later decades and conducting film laboratory operations for Packard’s interests in cultural heritage preservation and access. Construction of the PHI Stoa wrapped up in 2014, and the UCLA FTVA departments overseeing collections moved in, the same year Olivier was first hired as a UCLA FTVA employee of the then-named Stanford Theatre Film Laboratory and was tasked with helping with the laboratory move to the new Santa Clarita Stoa. Working as the film laboratory manager today, Olivier oversees all laboratory operations and four of its employees: one responsible for film preparation, one color timer, one optical printer operator, and another technician for contact printing and film cleaning.

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<sup>102</sup> Ibid.

<sup>103</sup> Ibid.

All film processing work at the PHI Film Laboratory is divided between the UCLA FTVA and PHI-specific operations. The laboratory does not bill the FTVA for labor on its projects; however, the FTVA is solely responsible for purchasing raw film stock from Kodak for the laboratory to use, which must be processed by FTVA staff through UCLA's procurement system. On the PHI side of operations, a large project for the foundation includes the creation of new preservation elements of Packard's film collections, which UCLA FTVA film preservationists oversee in addition to their UCLA-specific tasks. Upon the completion of any preservation work funded by Packard, all elements are accessioned into UCLA FTVA's holdings and stored with the rest of their collections at the Stoa. Other PHI-specific work includes the digitization of Packard's Hearst Metrotone News Collection preserved as part of UCLA FTVA's holdings, one of the largest newsreel collections in the world at 27 million feet, which the organization hopes to make fully accessible online. To conduct this project, the PHI hired a technician responsible for digital restoration work in late 2019.

The technical practices of the PHI Film Laboratory are governed by the laboratory's current technological capabilities and the external parties overseeing the laboratory's work and relying on its functions. Regardless of the clear lines of responsibilities and split operations between its two parent organizations over the years, all steps preservation projects must go through at the laboratory are dictated by UCLA FTVA's film preservationists who are responsible for communicating with the PHI Film Laboratory technicians about the specific printing processes each element of a larger project will go through, such as whether film elements be printed using a contact or optical printer for best results. The PHI Film Laboratory is an exclusively photochemical site conducting film-to-film preservation work and "dry" laboratory operations such as film printing, cleaning, and preparation, with no onsite film

processing or other “wet” laboratory operations pursued due to the special environmental permitting required for such work. Despite the organization’s limited technical abilities in comparison to other laboratories, the Stoa was first envisioned as both a film processing and developing laboratory. Olivier mentions that the LOC’s Packard Campus encountered local environmental regulations making it difficult for the organization to function as a wet laboratory, a laboratory with film developing and processing abilities, with the planning of the Stoa potentially finding similar and more difficult hurdles with the City of Santa Clarita the PHI decided not to tackle.

Today, the PHI Film Laboratory is equipped to do 35mm dry and liquid gate printing, continuous contact printing, 35mm and 16mm optical dry and liquid gate printing, and now has legal permits for perchloroethylene film cleaning as of 2016.<sup>104</sup> According to Olivier, most projects the laboratory handles and outputs are 35mm, with select 16mm titles passing through the laboratory being blown up to 35mm on an optical printer. After elements are run through the PHI Film Laboratory’s printing machines, all film to be developed is sent to FotoKem, a commercial film laboratory and post-production house in the Los Angeles region. While the PHI has owned a film scanner since the beginning of Olivier’s tenure in 2014, the laboratory also does not use any digital intermediates in any of its preservation work. On its own end, the FTVA oversees its Digital Media Laboratory managed by an FTVA employee, giving the organization the ability to digitize its collections and do digital restorations of their projects independent of the PHI.

As a film laboratory focusing on photochemical preservation methods within a larger organization, the PHI Film Laboratory must seek a way to define itself within a region housing a

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<sup>104</sup> Perchloroethylene, also known as “perc,” is a film cleaning solvent requiring vapor containment and legal permits for use as it poses significant health and environmental risks.

broad range of moving image technical services. While it could not be confirmed during the interviews how many FTVA film preservation projects were fully conducted with external film laboratories, Olivier also discusses for reasons unconfirmed on his end, the FTVA being able to “take money from an external funder” and “go to [another laboratory]” due to the wide availability of other laboratories in the Los Angeles area, thus reflecting the PHI Film Laboratory’s FTVA output over the years.<sup>105</sup> In addition, the UCLA FTVA may also rely on external grants, other private individuals, foundations, and university funding as a division of the UCLA Library, with these circumstances requiring them to potentially work on projects that need laboratory work the PHI Film Laboratory is not capable of doing. For example, PHI is not capable of audio restoration work, and Olivier discusses that if the PHI is working on a preservation project with sound elements, “audio work goes out of house to another third party vendor.”<sup>106</sup> Depending on project circumstances, the FTVA may end up seeking to work with film laboratories with a wider range of technical capabilities to help support the completion of projects under one organizational roof rather than splintering tasks and communicating between multiple parties.

The PHI Film Laboratory occupies an advantageous position due to its funding and support from an external party, but being beholden to an external funder has also created several challenges and restrictions for its operations over the years. The laboratory serves as an in-house entity and an integral component of both the UCLA FTVA and PHI’s operations helping foster multi-organization collaboration in one physical location, allowing all of those involved in archival preservation work to have more direct control over the creation of new elements and an

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<sup>105</sup> Joseph Olivier, interview with the author, March 2, 2022.

<sup>106</sup> Olivier, interview, February 2, 2022.

understanding of each other's practices. However, external circumstances resulting from the laboratory's physical location in Santa Clarita contribute to the restricted abilities of the organization, such as the fact essential laboratory services such as film processing must take place with vendors, illustrating the laboratory and its parent organizations' reliance on commercial film laboratories to oversee the full cycle of preservation work. Operating between two organizational entities since its inception, only future administrative decisions can determine whether the laboratory's positionality between UCLA and a private foundation over the years has benefitted the laboratory or held the organization back its abilities to commit itself to film preservation. While positioned within the peripheries of its two parent establishments, the organization remains notable due to its ability to conduct film preservation via ties with private philanthropy and a stakeholder role in the operations of one of the most notable moving image archives of North America.

## **Conclusion**

As the call for film preservation extended its reach to North America's most renowned cultural heritage organizations specializing in moving image media, archival film laboratories developed alongside existing commercial film laboratories to fill urgent needs for preservation work. The two laboratories discussed in this section demonstrate the moving image archiving field's interests in preserving the work of the American industry's most established motion picture studios. With archives operating as the institutions shaping public engagement with moving image materials, the film laboratories they establish become sites responsible for the photochemical preservation of the films these organizations steward. While operating within a different organizational context than commercial laboratories, archival film laboratories have in

practice historically blended institutional logics of the commercial film laboratory with those of the archiving and preservation field.

Impacted by the authority of the commercial industry, archival film laboratories are staffed by members of commercial laboratory and production backgrounds, and in some instances, must stay relevant in comparison to these laboratories whose technical practices they increasingly rely on to fill gaps in organizational abilities. Additionally, operating as organizations generating out of a historical interest in the preservation the works of commercial industry and production, the institutional motivations of archival film laboratories act in accordance with the logics driving commercial film laboratories. Despite the unique economic freedoms archival film laboratories operate under in comparison to their commercial counterparts, archival film laboratories find their organizational structures and technical practices converging with those of their commercial film laboratory forebears. Similar to these commercial laboratory predecessors, the operational tasks of archival film laboratories must be completed in response to externally driven, top-down demands, with archival history, avenues of funding from philanthropists such as Packard, and curatorial interests defining the works preserved at such laboratories. Yet, these conditions also pave the way for archival film laboratories to have more command over the means of preservation, giving archives an expanded degree of autonomy and direct control over preservation activities.

On the other end, the persistent technical gaps and economic challenges that remain for archival film laboratories result in portions of their work being outsourced to other external laboratories operating as vendors. This occurs in the case of the PHI Film Laboratory, demonstrating the double-edged sword of reliance on philanthropic funding, which reduces the UCLA FTVA's reliance on external grants and commercial revenue, but creates challenges of



coordinating competing administrative interests with its Packard Humanities Institute funders. Being positioned within film archives permits archival film laboratories to develop more specialized technical practices tailored to the needs of their internal collections, with technicians at both the LOC MBRS and UCLA FTVA holding distinctly rich expertise for work with nitrate film collections that constitute a prominent part of both organizations' holdings. However, to locate needed skills and ensure efficient operations, both organizations have also recruited many of their technicians from commercial film laboratories and adopted workflows similar to those pursued by their commercial counterparts.

As archival film laboratories follow the governing logics of the larger fields and agendas they are beholden to, other laboratories developing in later years seek to reinterpret traditional logics and intersect new interests in the shaping of their organizational structures. Section V will explore two artist-run film laboratories in France and Australia operating within a broader network of artist-run film laboratories established in the late 1990s onward working to sustain their practices within a transitioning media landscape.

## Section V: Artist-run Film Laboratories

*“While professional film production facilities close their doors, artist-run labs open theirs, recuperating and rebuilding discarded machinery such as cameras, projectors, editing tables, optical and contact printers, developing tanks, and rostrum cameras, often with the help of other labs. Suddenly, artists have direct access to the means of production—those stages of the filmmaking process that have traditionally been controlled by professionals who work to strict industry standards and conventions.”*

— Kim Knowles in a 2014 article, *“Self-Skilling & Home-Brewing: Some Reflections on Photochemical Film Culture”*<sup>107</sup>

As the broader media production industry followed exponentially growing shifts into video and digital technologies in the late 1970s onward, groups of creatives and filmmakers were left to contend with questions about how the medium they knew and were familiar with would continue into the future. Other organizations affected by this transition, such as production facilities and educational centers, began to replace their media making resources with video production suites, leaving equipment for photochemical filmmaking to be abandoned in studios and production centers, destroyed for scrap in waste facilities, or sold to a market of constituents still willing to use it. Pushback against these technological changes in moving image creation from a number of creative communities has helped fuel the artist-run film laboratory movement, whose members have salvaged or purchased discarded equipment to sustain their own specialized production activities in cooperatively run laboratory spaces directly controlled by the artists themselves.

According to the accounts of filmmaker and artist-run film laboratory participant Nicolas Rey, in 1990, three students from the Arnhem School of Art in the Netherlands, now known as ArtEZ University of the Arts, refused to accept their organization’s replacement of film with

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<sup>107</sup> Kim Knowles, “Self-Skilling & Home-Brewing: Some Reflections on Photochemical Film Culture.” *Millennium Film Journal*, no. 60 (2014): 20–27.

video production equipment. Instead, students decided to rescue photochemical film machines from a recently shuttered local film laboratory and established a film laboratory they named Studio Een, with other sectors of these small student-run film laboratories later popping up across Europe.<sup>108</sup> Parallel to these student events, members of the artist group Metamkine in Grenoble, France began doing visual and sound performances with film projectors and set up a film laboratory to produce elements for their performances. Members of Metamkine later crossed paths with Studio Een, which prompted members of Metamkine to welcome other artists working with photochemical film who wanted to use their equipment to their film laboratory and workshop known as Atelier MTK. Over the years, filmmakers from various countries in Europe visited their laboratory to share knowledge, experiment, and help continue photochemical ways of artistic creation.

To Rey, this period was a point of departure for photochemical filmmaking in Europe that led to a formal 1997 meeting in Geneva, Switzerland of these then-called independent film laboratories.<sup>109</sup> Nearly all laboratories participating in the forum adopted operations similar to Atelier MTK, in which the maker of a work was responsible for seeing the execution and creation of it from exposure, processing, editing, to exhibition. For these organizations, the laboratory did not exist as a site of services but was a place where those interested in working on projects had to acquire the skills to do the photochemical laboratory work themselves. With the sense of community they established amidst a format-driven crisis, it was notably also a pretense of precarity and the idea that a medium would soon vanish that catalyzed the unification of these organizations. Today, the artist-run film laboratory network aims to conduct annual

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<sup>108</sup> Nicolas Rey, “Artist-Run Film Labs, an Historical Perspective,” April 2009. <https://www.filmlabs.org/dissemination/writings/artist-run-film-labs/>.

<sup>109</sup> Ibid.

congressional meetings and now includes film laboratories spanning five continents, with a non-exclusive list of artist-run film laboratories documented on the website FILMLABS.org. As of writing, the website lists 63 film laboratories, however, many other artist-run film laboratories not listed on the site have also been established across the world.<sup>110</sup>

This section focuses on two artist-run film laboratories that are active participants of this network. Topics discussed during the interviews included particular avenues for expansion, the reclamation of commercial laboratory technologies, and reasons that led to their laboratory's founding. Established as one of the earliest members of what became known as the artist-run film laboratory network following the 1997 meeting in Geneva, L'Abominable is based in the outskirts of Paris, France, and offers filmmakers the ability to work in Super 8, 16mm, and 35mm and nearly every traditional film laboratory method of production—from film developing, enlarging, optical printer effects, to even sound on film. Much of the films created within L'Abominable by its trained members are distributed by notable film cooperatives Light Cone and Collectif Jeune Cinéma, organizations also based in the Paris area involved in the distribution and access of experimental moving image art and works on photochemical film.

Nanolab, the second laboratory this section explores, is an artist-run film laboratory based outside of Melbourne in Daylesford, Australia offering abilities to process Super 8 and 16mm with select 35mm capabilities. Established and overseen by experimental film artists Richard Tuohy and Dianna Barrie, Nanolab also operates their more public-facing workshops and film exhibition programs through the Artist Film Workshop, an affiliated organization and venue in Melbourne. Nanolab offers basic film processing services as a means of economically sustaining the organization but conducts such work through a distinctive approach, as the two filmmakers

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<sup>110</sup> “63 Active Labs,” FILMLABS.org, accessed October 28, 2022, <https://www.filmlabs.org/all-labs/>.

see the laboratory's main priority as assisting other filmmakers also interested in the technical practices of photochemical film. Tuohy and Barrie are known for their many travels to other artist-run film laboratories worldwide, often training members of respective laboratories on processing techniques and how to use and restore acquired film laboratory equipment.

As these artist-run film laboratories utilize their strong understanding of technical practices to repurpose equipment from a different era of film production, they begin to introduce alternative economic models and organizational structures to the definition of the film laboratory. In comparison to their commercial and archival predecessors, the artist-run film laboratories demonstrate a form of economic hybridity in which they can generate financial means for their organization by operating as vendors, relying on external grants and funding, or by collecting dues from its body of members. These artist-run film laboratories thus shape an organizational structure that pays tribute to cooperative enterprise, working to decentralize decision-making that in turn gives them the opportunity to focus on egalitarian principles when distributing knowledge about technical practices amongst their members. Through this work, artist-run film laboratories distinguish themselves in the field by forging an alternative form of organizational structures and technical practices different than those of commercial and archival film laboratories.

Seeing themselves as members of a practitioner community distinct from commercial film production and positioning the organizational identities of their laboratories often in opposition to established commercial laboratories, their cooperative structure has led to more horizontal distributions of expertise and encouraged development of more specialized knowledge and practices tailored to their communities' specific traditions of media artmaking. However, many of the skills and workflows needed to sustain artist-run laboratory operations also closely

parallel those embraced in commercial and archival-run laboratory spaces, suggesting the persistence of broader institutional logics across these different organizational contexts. Similar to the early history of commercial film laboratories, most activities in artist-run laboratories to date have been primarily focused on sustaining production practices, with preservation work being of secondary concern. However, as an outgrowth of artists' ongoing production and distribution needs, members of both L'Abominable and Nanolab have begun to engage in emergent preservation work, whose place within the still evolving organizational models and functions for artist-run film laboratories has yet to be fully outlined.

### **L'Abominable**

Founded in 1995, L'Abominable exists as one of the artist-run film laboratory network's earliest and most established organizations. During the laboratory's earliest years, L'Abominable provided film workshops for schools in the French commune of Asnières, their earliest location in the outskirts of Paris, which thus helped the laboratory attract interest among the broader community. Around this time, the core members of the organization began to reflect on the organization's structure and how the established space could better support its members' creative practices and interests in experimentation. As their work continued, L'Abominable garnered more interest across Paris and Europe, established broader connections with the simultaneously growing artist-run film laboratory network in the late 1990s and early 2000s, and received its first government grant from the National Center for Cinema and the Moving Image (CNC), an agency of the French Ministry of Culture, in 2003.<sup>111</sup> To conduct laboratory work, L'Abominable sources equipment from the closure of commercial film laboratories, scrap piles,

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<sup>111</sup> "From the basement to the kitchen," L'Abominable, accessed May 1, 2022, [https://www.l-abominable.org/en/history/a-traduire-en-en\\_us-de-la-cave-aux-cuisines/](https://www.l-abominable.org/en/history/a-traduire-en-en_us-de-la-cave-aux-cuisines/).

donations, French production studios, or individual sellers, with maintenance and repair primarily conducted by a member trained in electronics and mechanics outside of the context of the laboratory.

Documenting the history of L'Abominable from 2007 to 2012 on the laboratory's website, member Nicolas Rey discusses how the matter of formal "institutionalization" for the organization has "naturally been a matter for debate on several occasions."<sup>112</sup> In Rey's words, "[a] small cultural institution, even when correctly financed, can stumble under the sheer weight of its own existence and way of functioning," using this to demonstrate the laboratory's ongoing struggle to balance formalized ways of maintaining an organization and adhering to its mission given societal and logical constraints. The laboratory began offering film projection services for art galleries in 2007, earning the group the near same amount of their annual funding from the CNC in the span of a few months. Nonetheless, the desire to make films foregrounded this paid work, and it remained a question of how the laboratory would balance financial sustenance while aligning itself with its fundamental goal: providing its members the time and ability to produce their creative work. To gain more insight into L'Abominable, a Zoom interview was conducted in April 2022 with Rey, a filmmaker who has been core member of the film laboratory since the organization's earliest days.

Economics are no simple topic of discussion for L'Abominable as these early discussions on the "institutionalization" of the laboratory demonstrate. As group interests drive where the organization will seek out money and resources, the means of income and financial sustenance they acquire begin to shape how the laboratory is organized and run. During the organization's earliest days, Rey mentions how the laboratory earned an income "by [setting] up workshops

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<sup>112</sup> Ibid.

with kids, which was a way to earn money for the people [...] running the lab”—events done in partnership with the educational system in the Paris region.<sup>113</sup> Aside from these early workshops, the laboratory generates a significant amount of its funding by charging its members for the use of the space and its equipment, with filmmakers who receive production funding from external parties or requiring more training to create their films often paying the most in comparison to other members. In the decade before the COVID-19 pandemic, L’Abominable welcomed approximately ten new members to the laboratory a year on average and offered them a day to undergo training with a core member, an individual more familiar with the use of the laboratory’s equipment. Rey discusses that as the years progressed, typically 40 to 50 people renewed their membership each year, with each paying approximately €50, or about \$50, for renewal. According to Rey’s estimates during the interview, L’Abominable supports about 80% of its overall operations through these fee-based member structures with the remaining 20% of its financial budget sourced from government grants, such as the one from the CNC.

Confronted with the need to balance the pressures of operational demands with its central mission, L’Abominable finds its organizational structure shaped by a consensus-driven decision making process and a cooperative structure. Following a period of eviction from an early location in Asnières and the placement of laboratory equipment into storage around 2011, the laboratory relocated to an old school kitchen owned by the city government in La Courneuve, another commune in the outskirts of Paris. As questions relating to the balance between the maintenance of the laboratory and creative work continued, it was decided that the core members of the laboratory would receive funding for conducting basic operations and training incoming members on how to use the laboratory’s equipment. Funding the core members of L’Abominable

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<sup>113</sup> Nicolas Rey, interview with the author, April 6, 2022.



became a key topic of discussion at group meetings, with the amount given to these members often decided by a group consensus at the end of the year by evaluating who dedicated a larger portion of their time to maintaining the laboratory.

Questions about the balance between creative drive and group maintenance resulted in the laboratory implementing their distinctive organizational structure and formation. Currently, there are about ten core members who make up the foundation of running and overseeing L'Abominable, which includes those paid for their part-time roles of overseeing the laboratory, and another half who are paid on a needed basis. L'Abominable is also governed by a board of members chosen by the wider body of the laboratory's membership to represent the organization. According to Rey, the group of ten are "chosen by the general assembly [the laboratory organizes] every year," with the group "making decisions in a non-hierarchical way."<sup>114</sup> Despite the organization's distinction between members, core members, and the board, Rey reverts to highlighting work of the organization as one working to move away from the established "hierarchy" that takes place within traditional film productions by giving creators autonomy and full access to the means of production required to complete a work.<sup>115</sup>

Shaped by its mission to operate a laboratory where the filmmaker must be responsible for overseeing the creation of their work from vision to exhibition, L'Abominable's technical practices are defined by their long-term goal to maximize organizational abilities and offer non-commercial productions and creators access to everything a film laboratory can be capable of doing. Rey elaborates on L'Abominable's transition from early roots to expansion in order to fill gaps in technical abilities and states:

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<sup>114</sup> Ibid.

<sup>115</sup> "Film in the digital age?," L'Abominable, accessed May 1, 2022, [https://www.l-abominable.org/en/history/a-traduire-en-en\\_us-largentique-a-lheure-du-numerique/](https://www.l-abominable.org/en/history/a-traduire-en-en_us-largentique-a-lheure-du-numerique/).

We opened the lab on a DIY basis thinking, it's not going to be just our tools, but we'll share it with others. [...] Of course we couldn't go all the way to the final print. [...] People would go up to the workprint stage and they would bring the negatives to a commercial lab if they wanted to finish on film, which at the time was the norm [...] But going from there, we picked up more equipment. We emptied the other rooms of the basement [...] and started to expand. And at the end of those 15 years we stayed there [...] we had a full processor for color, for black and white prints, and then a contact printer for 16mm and 35mm and a sound camera to make sound negatives.<sup>116</sup>

Unlike commercial film laboratories, L'Abominable offers the wider creative public a rare opportunity and ability to have more direct and full control over the photochemical filmmaking process. The laboratory's recent expansion of its technical capabilities means that members can now process a larger footage of film stock using industrial-scale machines, enlarge prints on optical printers, and create optical sound prints themselves, among a volume of other abilities not commonly available to a general practicing population. For L'Abominable, independence from the reliance on commercial film laboratories means an internal replication of their predecessor's technical practices, but through an implementation of alternative funding and organizational models. Doing such allows the laboratory to ultimately specify their work as solution to the dearth of photochemical equipment and support a creative filmmaking practice honed within the organization and its members. Currently, the focus of the laboratory is on facilitating production and distribution of its members' films. However, members have the ability to make copies of film elements when conducting their work, and similar to commercial laboratory workflows, masters are often kept separate from other copies and carefully guarded by the creators of the work, who recognize their importance for sustaining the work's longer-term viability.

Reflecting on the growth and capabilities of the laboratory, member Frédérique Devaux writes in 2013 that those “who produce their work at L'Abominable discover, create and develop their own means of expression, way of editing and (r)evolution in style or in the use of [the]

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<sup>116</sup> Rey, interview.

medium,” overall pointing to the method of laboratory work giving rise to new forms of creative reflection and meaning for the film laboratory as an organization. As commercial film laboratories may evaluate their work as a means to a profitable end, L’Abominable’s role as an artist-run film laboratory reemphasizes photochemical making as an artform itself by focusing not only on the reclamation of the film laboratory’s physical artifacts. The skills and competencies once sealed off behind commercial and industry doors by laboratory forebears become highlighted through increased public accessibility to the methods of photochemical creation. Works generated in the laboratory may follow the traditional laboratory methods of original elements, master workprint, to distribution copies, or may be unique, one-of-a-kind prints and elements per artist intention. L’Abominable performs an informal and reconstructed method of preservation through its conservation of film laboratory traditions, an intangible heritage prone to loss amid change, and expands this efforts by providing resources to both a generation who once lost access to photochemical resources in addition to a new one looking for alternatives to today’s predominant modes of creation.

The organization’s work of acquiring commercial laboratory equipment highlights the laboratory’s ability to rearticulate an organizational structure fostered by laboratory predecessors by offering these services to creators working outside of the commercial context. However, this aspect of L’Abominable also simultaneously points to the organization’s decisive emulation of technical practices once siloed within the commercial realm. As the work of the laboratory continues, the organization is left to face the challenge of balancing its growing number of members with the questions of “institutionalization” a wider reach would bring them. Contrary to this self-reflection, L’Abominable’s efforts demonstrate that the laboratory finds its organizational definition by carving distinctive rationales for laboratory work counter to that of

the institutional logics shaped by the industry. As of writing, L'Abominable is fundraising for the development of Le Navire Argo, a site combining a film exhibition space open to the public with the resources of its artist-run film laboratory. The laboratory's current aspirations demonstrate that L'Abominable is able to see a future for their valued mission and practice, yet must balance questions regarding its organizational identity as they develop these plans, broaden their public reach, and rely on government funding. Such conflicts point to the challenges faced by artist-run film laboratories: establishing a mode of practice that allows alternative, non-commercial works to flourish while successfully staying afloat in a profit-driven world.

## **Nanolab**

Founded in 2005 in response to the discontinuation of Kodak's Kodachrome color reversal film stock, Nanolab was established to fill a gap in development services many filmmakers still interested in working with Kodak film stocks could no longer acquire. With a background as filmmakers participating in the Melbourne Super 8 Film Group of the 1980s, an informal group of experimental filmmakers in the Melbourne, Australia-area, artists and film laboratory founders Richard Tuohy and Dianna Barrie were equipped with a community to cater to upon the organization's inception. Tuohy and Barrie run the laboratory in Daylesford, Australia today as a hybrid site where Super 8 films can be processed as a service and as a place for other film laboratory experimentations, including in 16mm and Super 8, with select 35mm capabilities also available to filmmakers in non-commercial capacities. To gain more insight into Nanolab, a Zoom interview was conducted with Tuohy in April 2022. Tuohy first gained interest in filmmaking and laboratory techniques as a philosophy student exposed to technical courses on film and photography at his university, later joining the Melbourne Film Group. Today, Tuohy and Barrie are active members of the artist-run film laboratory network and are widely known

for sharing knowledge about various filmmaking and laboratory techniques through their visits to other artist-run film laboratories around the world.

Nanolab's economics are driven by the need to fill a wide gap of film processing offerings in the Australia region and support its independent filmmaking community. Nanolab offers commercial processing services to independent filmmakers, but to Tuohy, offering their services in exchange for economic profit was never the larger goal and focus of the organization, as the idea to provide film processing services came about while working to reach his own goals and increase his technical capacities as a filmmaker. Instead, foundational motivations have been trying to expand his and Barrie's possibilities of creating with film, realizing that because they had acquired the ability to process color reversal film stocks, they could "[start] offering the service of processing Super 8 films on color reversal" by also operating as a vendor for filmmakers interested in the tradition of small gauge moving image making.<sup>117</sup> Tuohy discusses how it dawned on him that the shuttering of commercial film laboratories he once relied on left open the possibility that materials from these laboratories could be acquired and used for his own photochemical filmmaking work. For this reason, public and commercial offerings have focused on film processing exclusively, with the laboratory at the time of this writing offering no formal preservation services for independent filmmakers. Offering film services has merely been a way to help maintain the infrastructure that allows Tuohy and Barrie to support a larger community of artists and filmmakers working in photochemical moving image techniques, with the emphasis, like L'Abominable, placed primarily on supporting film production needs. For Nanolab, striving to increase business offerings are less important than the ability to continue laboratory work to help support a wider community of those interested in photochemical filmmaking.

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<sup>117</sup> Richard Tuohy, interview with the author, April 21, 2022.

Driven to support a wider photochemical filmmaking community, Nanolab's organizational structure is impacted by their dual role as a commercial and community site, with the latter being the core driver of their efforts. To support their broader interests in experimental filmmaking and the sharing of artist-made works, the collective Artist Film Workshop (AFW) was established and operates today in Melbourne. For Tuohy and Barrie's work, AFW provides the sense of community essential to creating a photochemical filmmaking network, and films shared and envisioned within this network are completed within the technical purview of Nanolab. Elaborating on the establishment of Memory Lab, a partner organization of Nanolab generating out of the AFW network, and its founding as part of an organizational structure working to support photochemical film, Tuohy states:

[Memory Lab] has his own scanning business. [...] [Nanolab] tried to adopt early on, being a collective right up here, but we're in the country [...] So we started [Artist Film Workshop in Melbourne]. And we provided it with many of the services that it needs. [...] Callum, who runs [Memory Lab] in Melbourne emerged out of that. He is still a member of the Artist Film Workshop here in Melbourne. And he started off with a [telecine], then got a better machine, and now he's got a ScanStation. So, [...] his business sort of emerged out of Nanolab via Artist Film Workshop in Melbourne.<sup>118</sup>

The community generated at AFW has also provided an opportunity to support others also interested in providing film-related services to creators working with photochemical media. Film scanning at Nanolab is conducted by Memory Lab, which is operated by a filmmaker who established their commercial film scanning operation to support the digitization needs of fellow creators also working with photochemical film and, as described, is part of Tuohy and Barrie's immediate network. In addition to Tuohy and Barrie overseeing the larger direction of Nanolab, the laboratory currently employs two part-time employees in their Daylesford location to support film processing orders, maintaining laboratory processing chemistry, preparing film for

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<sup>118</sup> Ibid.

developing, and overseeing incoming and outgoing orders. The laboratory's work counters larger institutional logics that film laboratories must formulate responses to the external pressures of stakeholders, and does this by fostering its own network of related collaborators who generate from their immediate community to support the lifecycle of photochemical film. Importantly, digitization capabilities opened up important avenues for the digital reformatting of artists' works for preservation purposes, although such activities are at present conducted on an ad hoc basis for individual artists and not identified by the laboratory as a central part of their organization's mission.

As the laboratory continues gathering equipment and generating its affiliated network, Nanolab's technical practices are shaped by the laboratory's core mission of picking up where commercial film laboratories have left off. Operating in an era where film laboratory equipment is often no longer created, Tuohy and Barrie must pick up the pieces and understand the ins and outs of laboratory machines and their maintenance to revive the infrastructure needed to continue photochemical filmmaking and processing work in Australia, often finding they must teach themselves certain things or seek out avenues for further learning. After operating Nanolab as a vendor for film processing for several years, Tuohy conducted more research on the technical practices of commercial film laboratories, established more connections with others in the industry, and soon realized they could branch out into film printing. The acquisition of their first contact printer around 2008, a larger piece of laboratory equipment, helped Nanolab envision a trajectory toward expanding the organization's abilities. Tuohy states, that the "most significant thing that happened for Nanolab" was acquiring the contact printer, adding that "it was the first

piece of equipment [they] needed to build a room for,” and if he “hadn’t gotten to that point, maybe [they’d] be in a different place right now.”<sup>119</sup>

Issues arise due to Nanolab’s smaller scale of output compared to commercial film laboratories and the use of the industry’s large-scale equipment requiring excessive resources for Nanolab to maintain. Given the historic decline in the number of commercial film laboratories, Tuohy discusses how the laboratory is “in the position of having to cobble things together” from this bygone, flourishing era of commercial laboratories.<sup>120</sup> He mentions that upon the vast closure of these laboratories, the discarded legacy photochemical film equipment “had a lot of [...] electrical units that had to be brought along with the machine,” with it often being the case that “the person who was disposing of it saw the larger unit as the [main component] that was to be disposed of” and didn’t account for other related parts, leading to the piecing together Tuohy and many other artist-run film laboratories working in similar fashions must now conduct to make the resources they acquire operate according to their needs.<sup>121</sup> Functioning as a hurdle to their larger group aims and technical practices, such challenges also became important opportunities for Nanolab’s members to develop levels of expertise and technical knowledge that they might otherwise have not possessed.

In conducting such work, artist-run film laboratories such as Nanolab shape an alternative form of preservation within the film laboratory, in which a laboratory expands the archival role of safeguarding not just completed works and their affiliated elements, but sustains the technologies needed to initially engage with photochemical film—preserving, in other words, not

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<sup>119</sup> Ibid.

<sup>120</sup> Ibid.

<sup>121</sup> Ibid.



just the films themselves but also the hardware needed to create them and produce duplicate prints or elements as existing copies deteriorate with age and use. Driven to acquire more laboratory capabilities despite hurdles, one workaround Nanolab has overseen includes creating optical sound from 16mm magnetic full coat audiotape, in a practice that archivists may refer to as preservation reformatting that moves an obsolete format for which playback equipment is no longer readily available to a new format that can be used on current equipment. The laboratory had acquired the necessary components to create optical sound prints, however, was missing the part necessary for syncing with an optical sound recorder. The necessary parts Nanolab obtained operated with a different voltage and had to be changed to Australian standards with additional software to communicate between the optical sound recorder and the various machine components needing to be programmed. Additionally, Tuohy mentions that select laboratory equipment, while no longer easy to find replacement parts for, is fortunately often made from more modular, mechanical parts that are maintainable for the organization. However, machinery with more complex electronics and circuit boards become the main source of maintenance issues Nanolab must understand how to fix and navigate for its continued operations. While an alternative form of preservation occurs for Nanolab, their efforts in the reclamation of technologies focus on the means of creation over traditional modes of preservation as understood within the commercial and archival context.

The cobbling together of the past Nanolab performs provides the laboratory a platform for branching out and expanding its work in preserving laboratory technologies. Driven by needs to implement ad hoc solutions, the artist-run laboratory has made strides in developing its own technologies from scratch, giving filmmakers the ability to utilize both digital and analog formats in their work. In AFW's self-published journal, Tuohy discusses his and colleague Carl Looper's

creation of the “carl-o-sync digital sync sound bracket,” Nanolab’s version of a rotary encoder that allows a 16mm film projector to play sync stereo sound from a digital source.<sup>122</sup> While these encoders can be purchased, they remain inaccessible to many due to their high associated costs. Tuohy and Looper’s creation further reduces the reliance on additional resources and bypasses the need for additional sound printing work such as the creation of a magnetic track or an optical negative. Through this approach to film technology, the work of Nanolab demonstrates Fossati’s *convergence/divergence* approach to film laboratories by repurposing film laboratory apparatuses of a previous era and blending them with newer, digital technologies.<sup>123</sup> Locating this equipment is an ongoing challenge for these artist-run laboratories, but also serves as an important means for expanding their own skills and knowledge and adding to the value they bring to their organizations. This practice of transferring content from one format to another to maintain viable access to and use to materials is also a core aspect of what professional archivists would define as “preservation work.” However, artists themselves do not necessarily recognize or label it as such, seeing it instead as merely a means of facilitating the immediate production tasks at hand.

Similar to many artist-run film laboratories in the broader network, Nanolab has established its foundational presence by continuing photochemical filmmaking traditions that were on the decline yet much needed to continue a valuable practice for them and their work. During the interview, Tuohy discussed additional projects Nanolab was developing for future laboratory expansion, which included the incorporation of color soundtrack abilities in order to

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<sup>122</sup> This method bypasses the need to utilize the traditional mono output of an optical track on a 16mm print. See Richard Tuohy, “Digital Sync Sound on 16mm... and Other Wonders of the Modern Age.” *Film Is: Journal of Artist Film Workshop*, no. 1 (May 2017): 68–70.

<sup>123</sup> Giovanna Fossati, *From Grain to Pixel: The Archival Life of Film in Transition* (Amsterdam: Amsterdam University Press, 2009), 134–137.

fully replicate the quality of soundtrack production of a commercial film laboratory and the use of film-out digital intermediates. When discussing the financial aspects of the laboratory, he notes that commercial offerings are less of a key highlight for the laboratory as a focus should be given to “when [they] do things that are outside of the commercial services” and “find [a filmmaker] who wants to do something interesting” with their laboratory’s resources.<sup>124</sup> Instead, an income helps sustain organizational activities that members position as different from those of their commercial counterparts and support technical practices that tailor to alternative modes of production. For an artist-run film laboratory such as Nanolab, an artist-run laboratory practice can blend traditional modes of experimentation of the artists’ photochemical world while building a unique environ where the laboratory can transform the operational modes of their commercial predecessors.

## **Conclusion**

Despite an active resistance to an institutionalized identity, artist-run film laboratories such as L’Abominable and Nanolab are organizations that retain similar institutionalized practices as other film laboratories and are shaped by many of the same larger institutional pressures. Like other laboratories, they work with highly specialized and increasingly scarce equipment whose maintenance and operation requires advanced knowledge, skill, and financial capital, and despite the more specialized artistic practices they support, many of the basic workflows involved in photoduplication are the same as those followed by technicians based in commercial and archival spaces. However, artist-run laboratories also foster distinctive identities and shared group values among their members that are different from those of other film

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<sup>124</sup> Tuohy, interview.

laboratories. They acquire a sense of legitimacy through the establishment of a what Douglas calls “cognitive conventions”—understanding their own practice in relation to a perceived a decline of the commercial laboratory industry and seeing their own acts of artistic creation and laboratory activities as standing in sharp distinction to those that support commercial film production.<sup>125</sup>

To Douglas, a form of naturalization occurs when institutions survive the state of being “fragile conventions” and achieve a more stable, enduring presence within the larger order when they remain “ready to stand the grounds of argument.”<sup>126</sup> While artist-run film laboratories do not have as long a history as commercial and archival counterparts, they have developed distinctive economic models, organizational structures, and technical practices rooted in media arts traditions, which may move beyond the level of organizational differences to further suggest qualitative institutional differences. While Nanolab offers limited commercial services for artists, these efforts support operations that its members see as distinct from those of a commercial production industry members choose to actively disengage from. L’Abominable, for its part, can be described as more vocally oppositional in its stance toward the commercial sector or any overly settled method of operation, as reflected in its inward reflection about its growing “institutionalization.” Both organizations favor cooperative organizational structures over the hierarchical models employed by other laboratories and support specialized, often experimental filmmaking practices and uses of equipment beyond the scope or knowledge of most commercial and archival film laboratory technicians. At the same time, they have had to learn many of the

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<sup>125</sup> Mary Douglas, *How Institutions Think*, 1st Edition, The Frank W. Abrams Lectures (Syracuse, NY: Syracuse University Press, 1986), 46.

<sup>126</sup> Ibid.

same skills and processes as their counterparts in other film laboratories, while grappling with the same financial pressures to obtain needed supplies and keep their equipment operational.

The nature of artist-run film laboratories demonstrates a competitive merging of the two institutional logics of the commercial film laboratory and that of media arts traditions. Artist-run film laboratories are exposed to the same economic pressures all other types of laboratories are beholden to, culminating in the adaptation of hybrid organizational models accommodating commercial operations in the case of some laboratories, as illustrated with the organizational structure of Nanolab. When their technical practices are juxtaposed with that of their commercial film laboratory counterparts, numerous similarities are shared; however, artist-run film laboratories exist as rich sites of technical experimentation working to foster increased access to laboratory practices for those interested in the means of photochemical moving image art. With media arts traditions forming the foundation these laboratories, preservation becomes embodied in an alternative context oriented toward artistic production of new works, with the formalities of film preservation less of a priority and preservation-related activities seldom pursued explicitly or even labeled or recognized as such. While the future of formal preservation within these spaces remains as of yet uncertain, artist-run film laboratories have cultivated an important niche within the larger field of film laboratory work and mapped out a distinct set of practices and cultural identities.

## **Section VI: Conclusions**

This thesis traces three prominent types of film laboratories identified by outlining the history of film laboratories in an assortment of literature: commercial, archival, and artist-run. Commercial film laboratories, while operating in fewer numbers compared to the post-war period, continue today as a hybrid site of legacy technologies and media innovations, as a vendor for filmmakers who continue to work on film, and as a provider for cultural heritage organizations and their preservation needs. While a rare presence in the broader landscape, archival film laboratories illustrate the film laboratory's vital link to archiving and preservation efforts due to their embeddedness within North America's most established moving image cultural heritage organizations and offer an explicit example of how film laboratories are essential to moving image archiving and preservation work. Lastly, artist-run film laboratories have made significant efforts for the accessibility of laboratory equipment for a wider range of practitioners and have worked to sustain alternative modes of filmmaking practices, with formal preservation activities within these spaces to date remaining as a secondary concern and pursued on a less organized, ad hoc basis.

Due to constraints in research design that were informed by the preliminary focus of this study, the scope of the project was narrowed to specific avenues of emphasis, resulting in areas where conclusions could not be drawn and additional information was required. A significant limitation discussed earlier in this study included the exploratory nature of this work due to the lack of pre-existing scholarship on film laboratories in the moving image archiving and preservation field. This study aimed to pave the way for research on this topic and acknowledged this study was preliminary, therefore leaving room for further expansion of the study of film laboratories and their contributions to archiving and preservation. Data collection limitations

included a small sample size based on laboratory technicians and participants I knew were conducting work relevant to my research goals and foci. While film laboratories are mainly concentrated in the West and Global North, my own positionality as an individual working within these regions also informed my focus on organizations based in North America, Europe, and Australia. Future research on film laboratories in other regions of the world may reveal additional findings that complicate or even contradict my own, and more comprehensive study of the full range of laboratories throughout the world should be encouraged.

This work's central tone of advocating for film laboratories as a mainspring of moving image archiving and preservation has also left little room for a discussion of when film laboratories have proved to be challenges to preservation efforts, such as through the commercial film laboratory's notable malpractice of discarding original film elements and workprints needed to create best copies, whether it be conducted due to staff blunder, client-motivated errors, laboratory foreclosures driven by economic circumstances, or other reasons.<sup>127</sup> Additional ambiguities remain in the analysis of artist-run film laboratories, given their nascent development in comparison to their commercial and archival counterparts. The artist-run film laboratories part of the sample for this study reflected two of the most established laboratories of their type in operation today. Therefore, this study is not able to incorporate a broader reflection of the assortment of economics, organizational structures, and technical practices associated with artist-run film laboratories operating at smaller scales and organizational capacities, which may vary considerably from the two larger, well-resourced organizations I have focused on for my

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<sup>127</sup> Clients often deposited their original elements and workprints with commercial film laboratories, as the laboratory's easy access to these materials allowed them to easily strike new prints with shorter turnaround times. As of writing, this research has no knowledge of or access to formal deposit agreements between clients and film laboratories and what preservation efforts clients undertook for their work and its elements outside of the given film laboratory, if any.

case studies. The operations of these smaller laboratories in the research sample can help outline a more comprehensive reflection of the artist-run film laboratory population as its movement carries on and the scope of artist-run film laboratories continues to grow.

As a final point for future exploration, subsequent studies should also expand their focus to the industries that both film laboratories and their external stakeholder groups in archiving and filmmaking rely on to provide them with the core essentials to conduct their work: the manufacturers of film stocks. The Eastman Kodak Company, the only manufacturer of color motion picture film stocks in continuous operation as of time of writing, operates three motion picture film laboratories in New York, London, and Atlanta that this study was not able to incorporate.<sup>128</sup> While laboratories owned and operated by film manufacturers may not currently perform much active preservation work, they remain an important part of the larger film laboratory landscape. Future research can explore what economic models, organizational structures, and technical practices are implemented and conducted in these spaces and assess the extent to which those align or diverge from the three types of film laboratories addressed in the present study. It is possible that these manufacturer-run film laboratories could play an increased role in preservation efforts alongside traditional commercial laboratories such as Colorlab and Pro8mm, or their focus may instead remain on areas beyond the cultural heritage sector.

One of the goals of this study was to determine how institutional logics and contradictions of the film laboratory shape actions pursued within these laboratories as organizations and what strategies each type of film laboratory pursues when responding to larger institutional pressures. Operating as an initial set of institutional logics, the historical trajectory of the film laboratory as one stemming from the demands of a commercial industry continued in

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<sup>128</sup> “KODAK Film Labs,” Kodak Motion Picture, accessed September 27, 2022, <https://www.kodak.com/en/motion/page/kodak-film-labs>.



a varying form or prevailed within the three laboratory typologies discussed in this work. A second set of institutional logics this work identified were those stemming from the professional traditions of film archiving and preservation, whose increasing concern with the preservation of film within archival practice has aligned agents within the archival field with those operating in film laboratories and brought the two fields into conjunction. A third set of institutional logics are those of the media arts traditions that have given rise to artist-run film laboratories. Stemming from creative drive and the need to stay afloat in the midst of technological change, artist-run film laboratories prioritize the means of creation for the photochemical medium, distinguishing their film laboratories as organizations possessing thorough understandings of the fabrication of the moving image and the preservation of its associated traditions. Each of these three types of laboratories forges its own ways of engaging with photochemical film and shaping its future, and each takes up and positions of preservation practice differently within its respective organizations.

All film laboratory typologies responded in according to broader institutional rationales, with commercial and archival film laboratories operating in tandem with broader, profession-based motivations and artist-run laboratories working against the grain of these avenues of influence, with their actions in and of themselves forming a specific response still acting in acknowledgment of guiding pressures and logics. Operating as what can be ascribed as the paragons of the film laboratory as institution due to their earliest development, commercial film laboratories continue as direct descendants of the commercial media industry-based traditions from which the film laboratory historically originated. These laboratories shaped the governing logics of what a laboratory is and can do during their earliest years of operation and provided an organizational baseline for the practices within archival and artist-run film laboratories that

developed in later decades. For archival film laboratories, the two institutional contexts of moving image archiving and preservation and the commercial film laboratory converge within a single organization. Although these organizations maintain different funding models from that of commercial laboratories, many of their workflows and technical practices are modeled after their commercial counterparts, with worker knowledge and skills nonetheless honed to focus on the formats and needs specific to each archive's primary collections. A convergence of institutional logics on a similar trajectory but slightly different path than that of commercial and archival film laboratories occurs for artist-run counterparts. These artist-run film laboratories bring together the traditions of experimental media artmaking and both the equipment and technical traditions of the commercial film laboratory. However, aiming to operate outside of the logics of capital and commercial undertakings in a transactional market, they draw from the model of artist-run cooperative enterprise for their organizational approaches and develop specialized technical practices tailored to the needs of their particular communities of artist members.

Using the three-part typology of film laboratories defined in this work, this research foregrounded key similarities and differences across the three axes of analyses. The economics, organizational structures, and technical practices of these laboratories were analyzed to provide a deeper look as to how the selected organizations operate, and in turn, align with the efforts of moving image archiving and preservation and the broader understanding of photochemical film. An outline of their economics evaluated how film laboratories operate in the contemporary field on a financial and resource-driven basis, notably discussing who sustains their organizations and how they continue within a networked world requiring transactional exchanges of capital and human interactions to keep their operations going. An analysis of organizational structures pointed out the high-level functions of the film laboratories included in this study, generating a

way to compare the elemental frameworks of the different film laboratory organizations and the way they operate. And lastly, an exploration of their technical practices allows this research to draw out specific sets of expertise the included film laboratories have honed and what skills their employees, participants, or technicians conduct to help situate their organization as a notable contributor within the moving image archiving and film practice fields at large.

Economics play an overarching presence across the three types of laboratories and largely dictate how the responses of the selected film laboratories are shaped by larger institutional norms that structure avenues for possibility, thus influencing a participant's choice of actions. Operating within a landscape in flux, distinct forms of integration and consolidation took place across the three types of film laboratories analyzed. Commercial film laboratories Colorlab and Pro8mm tailored their sources of income based on client needs and demand; archival film laboratories at the LOC and the PHI relied on a top-down, externally driven model where the archiving and preservation interests of their parent organizations provided financial sustenance; and artist-run film laboratories L'Abominable and Nanolab emulated commercial traditions while introducing hybrid approaches that foregrounded cooperative enterprise over a focus on profit. For all three laboratory types, other dominant factors in the field such as the shift from photochemical media to video and digital technologies dictated what film laboratories could be and offer to their constituency, often transforming their organizations into sites that blend legacy photochemical image making with present-day digital technologies.

Film laboratories answer economic impacts by implementing various organizational structures that allow the laboratories in question to carry on in pursuit of their interests. For commercial and archival film laboratories, the demands of external stakeholder groups shape how the laboratory carries out its work and takes action on its ideas. Not abandoning commercial

logics altogether, archival film laboratories model their divisions of labor and roles within their organizations, following the organizational structures of commercial film laboratories. Differing from their commercial and archival counterparts, artist-run film laboratories L'Abominable and Nanolab reinvented approaches to the traditional organizational enterprise employed by their film laboratory industry predecessors and implemented cooperative structures that better aligned their interests in providing artists with avenues for photochemical means of production. While the implementation of a cooperative model can shape an artist-run laboratory's avenue of financial income and sustenance through affiliated membership costs, such a model also results in the creation of a horizontal structure of control within the organization.

An evaluation of the laboratories' technical practices points to the shifts in the history of the media field at-large as a prominent influence film laboratories must act upon. Impelled by the historical decline of the number of film laboratories, commercial film laboratories focus on innovation in a market-driven system as a way to expand offerings to their stakeholder groups. Colorlab demonstrates this work by offering clients a way to minimize costs for preservation, demonstrating the film laboratory's ability to instigate new approaches to archiving and preservation work. Pro8mm is able to identify gaps both their own offerings and those of their industry counterparts, with their introduction of new small gauge filmmaking resources shaping a new technology-based expertise that must be honed and integrated into existing workflows across the commercial film laboratory. Archival film laboratories seek to consolidate laboratory offerings that are in line with the ongoing preservation work of their parent archival organizations. In doing so, they focus on technical abilities that allow them to support the post-war collecting history of their parent organizations as shaped by the establishment of FIAF and U.S. film preservation efforts ignited by the historical legacy of motion picture studio

productions. Continuing upon the historical decline in the number of commercial film laboratories, artist-run film laboratories reclaim the technologies of these now-shuttered organizations and seek out ways to fill in the gaps of obsolescence through their work supplementing and repurposing legacy equipment. In conducting these efforts, they introduce new practices for film laboratories through their organizationally unique approaches—from the implementation of ad hoc technological solutions to the creation of non-narrative moving image forms—and have shown both a commitment to the continued use of film as a medium and an openness to experimenting with alternative technologies for reformatting content from more obscure, obsolete film formats to more common ones that can be used on the equipment they procure and maintain.

An additional question guiding the formation of this study also inquired about the role of preservation within the three-part laboratory typology and questioned whether approaches to preservation within each laboratory mirrored or diverged from one another and whether they were tied to broader institutional logics. At the organizational level, the growing prominence of preservation work in commercial film laboratories is reflected in dedicated or hybrid positions tasked with performing this work alongside more traditional tasks oriented toward film production and distribution. Preservation constitutes the exclusive focus of work in archival film laboratories, which were designed especially for this purpose and specialize in the holdings of its parent organization. For artist-run film laboratories, traditional preservation activities assume a less centralized role and are performed where and as needed, without being assigned to any particular person or position. This reflects the larger horizontal structure of their cooperative model but also the continued secondary role of preservation concerns within these organizations in general. However, coined in this research as “informal preservation” in juxtaposition with the

“formal preservation” of film conducted by archival and commercial laboratories, artist-run film laboratories conserve the traditions associated with the film laboratory as they become prone to being forgotten practices amid the rise of video and digital formats from the 1980s onward. Each laboratory type displayed a unique approach to preservation that acted in accordance with the pressures shaped by professional and field-wide circumstances permeating across the media landscape.

As the technologies and understanding of moving image media and photochemical film developed over time alongside these greater forces, the film laboratory as institution converged and diverged from those of moving image archivists, the latter forming its own professional identity in the post-war period through the establishment of organizations such as FIAF and film preservation efforts in pursuit of a national identity within North America. Revisiting Figure 1 on Page 12, taken from L. Bernard Happé’s 1974 instructional book *Your Film and the Lab*, the chart demonstrates the centralized role of the film laboratory in the creation, distribution, and exhibition of works on film. The findings and analysis of this research also highlight the film laboratory’s centrality beyond initial distribution and exhibition to the subsequent preservation of film-based works and production elements. When the film lifecycle accounts for a wider scope that includes creation, distribution, and preservation of film, we can come to a greater understanding of both the historical development of film laboratories and the various emphases of the different types of film laboratories as they exist today.

While the lines between commercial, archival, and artist-run laboratories have often diminished and overlapped, utilizing this diagram as an illustration of the lifecycle of film can provide additional insight into the three-part laboratory typology and can help outline where certain laboratories have prioritized a particular moment of photochemical film’s lifecycle.

While commercial film laboratories traditionally focused on production and distribution, their activities now also encompass preservation. Archival film laboratories arose to meet more preservation-specific needs, and while modeling themselves in many ways after commercial laboratories, engage in minimal production work due to their focus on archival endeavors. Artist-run film laboratories, similar to commercial film laboratories, have at this stage in their development focused mainly on facilitating film production and distribution but have also begun engaging in informal, ad hoc preservation work that may or may not gain a more central role in their operations as these organizations continue to expand and mature.

This thesis began by acknowledging that the knowledge and specialized skills within film laboratories have traditionally existed separate from film archiving and preservation institutions despite their interdependent relationships as a means of drawing attention to this research's primary area of concern. The final question remains as to how to more effectively bridge divides between these two fields and their associated institutions. This can be done not only through consciousness-raising efforts of studies such as the one at present, but also through the integration of film laboratory training within professional archiving programs to forge better understanding of the work that film laboratories conduct. Topics of discussion can include photochemical processing and duplication, digital work at film laboratories, and the type of work a film laboratory would be responsible for as a vendor, all of which can be integrated into courses covering basics on film handling and storage. While this gap remains but one of many issues in moving image archiving and preservation, active education of archivists responsible for the safekeeping of photochemical works can help foster stronger communication and professional allegiance between these two fields.

The literature review outlined a body of scholarship generating from moving image archiving and preservation graduate programs across North America, programs that are often responsible for training the next generation of moving image stewards and can play key parts in bridging this professional divide. Writing from a position of professional cross-collaboration when discussing their organization's efforts to provide an opportunity to learn laboratory techniques at Haghefilm Digitaal, a commercial film laboratory in the Netherlands, archivist Daniela Currò, film curator and historian Paolo Cherchi Usai, and chemist and conservation professor Ulrich Ruedel elaborate on bridging the skills of professionals engaged with photochemical film preservation practices. They state, "film laboratory technicians and media educators speak distinctive languages, reflecting the specificity of their own principles and methods."<sup>129</sup> Due to the assortment of vernaculars across professions, the "view of [film] laboratory work as a purely mechanical task is no longer sustainable," highlighting the importance of their laboratory's training program done in collaboration with graduate programs such as the L. Jeffrey Selznick School of Film Preservation in Rochester, New York.<sup>130</sup> The authors' work discusses that the preservation practices pursued within cultural heritage organizations and film laboratories display a coherence toward unified efforts in film, and their efforts to implement their training program further adds to the discussion that there is solid ground for collaboration and exchange between the film laboratory and archival practice.

As the title of this work highlights, the creation of cultural heritage precedes its preservation, thus also highlighting the need to recenter those who contribute to photochemical film's earliest formations and bring to light labor occurring outside of the archive. Revisiting the

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<sup>129</sup> Paolo Cherchi Usai, Daniela Currò, and Ulrich Ruedel, "The Haghefilm Foundation, Amsterdam: A Learning Laboratory." *Journal of Film Preservation*, no. 82 (2010): 87–88.

<sup>130</sup> *Ibid.*, 87–88.



artist-run film laboratory's movement of "informal preservation" also points to a need to understand preservation not only within a profession-based realm driven by its own set of pressures, but to also incorporate the efforts of those both working in tangent or within its periphery who highlight the medium's point of creation. Such work can take place through the integration of elementary media arts practices in film handling curricula, giving future archivists and preservationists the opportunity to engage with photochemical media upon its visual inception and earliest moments of tangible engagement. Doing so can better connect archivists with a fuller picture of the lives moving images experience and the ecosystem they engage in prior to their archival acquisition rather than being limited to knowledge and practices associated with what can colloquially be described as a work's "later end," otherwise defined by its entry into its preservation period. Notably, commercial film laboratories such as Colorlab have also branched out into projects preserving the works of an experimental media arts tradition, further suggesting that the lines between laboratories and approaches to preservation practice have blurred.<sup>131</sup> While such work points to the forward directions of laboratories in today's field, the need to expand archival practice and build a fuller understanding of media traditions in order to supplement existing preservation efforts remains.

This work has demonstrated that film laboratories, through an analysis of their roles and various applications with film they bring to a larger discipline, contribute greater momentum to the moving image archiving and preservation profession than is often recognized. An investigation of the economics, organizational structures, and technical practices within commercial, archival, and artist-run film laboratories have provided examples of how the

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<sup>131</sup> Recent initiatives to preserve experimental films have often cited Colorlab as a project's film laboratory. See Antonella Bonfanti, "This Is Serious Business: Preserving the Films of Pioneering Bay Area Women Filmmakers of the 1960s-1970s." *Off the Shelves* (blog), n.d. <https://bampfa.org/page/shelves-serious-business>.

audiovisual archiving field can benefit from a better understanding of film laboratories and what they bring to film preservation efforts. While not comprehensive in its scope, this research has also outlined the logics driving the actions of these organizations, sought to raise their visibility within the moving image archiving and preservation field, and better aligned the labor of film laboratories with that of the archival realm. In doing so, this discussion has cultivated a more integrated and universal outlook on the contributors and stakeholders in the preservation of motion picture film and its associated traditions—a medium that continues to enjoy strong support across all stages of its lifecycle and will engender new preservation practices and communities of interest in the future.

## Appendix: Interview Questions

### *Background information about the participant*

- Describe your background, education, and other formal training.
- How did you receive training for the skills you have now?
- Why did you decide to pursue work in a film laboratory?

### *About the organization and the individual's workplace responsibilities*

- What are your organization's specific mission and goals?
- How was your organization founded?
- How is your organization structured, e.g., employees, members, founders, etc.?
- How long has this organization been involved in film laboratory work?
- How do you receive support and funding for your organization?
- What is a typical day like at your laboratory? What are the primary responsibilities you have?
- When working on projects, what skills has your formal training covered, and where have you needed to supplement that training through additional professional development?
  - If further training was required, where or how did you obtain this?

### *Current practices*

- What film equipment do you have at your organization?
  - How did you acquire this equipment?
  - Are you the first owner of this equipment? If not, from whom did you acquire it?
  - How do you maintain this equipment?
- What technological competencies or skills are currently in demand at your organization, and in what areas is your organization presently building for future expansion?
  - What specific technologies or influences are shaping the field and work in your profession for the future?
- Do you perform any work or projects for the public outside of the laboratory, such as workshops, services, etc.?
- What sector(s) of film practice make up your primary clientele?
- Does your organization offer digital services aside from photochemical film laboratory work?

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