

Minding the Materiality of Film

The Frankfurt Master's Program 'Film Culture: Archiving, Programming, Presentation'

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Film—understood here as a succession of still images on a material support designed for projection, which results in a perception of movement—is an ephemeral medium. To show a film, as Paolo Cherchi Usai argues, is to destroy a film (2001). Perhaps more than any other medium, film requires special efforts of preservation to save its storage technology from what appears to be an irreversible material decay. Yet at the same time, a film only lives for and through an audience. One could argue that film is a four-fold object: First, a film is a given print; second, a film encompasses the entirety of prints (and versions) in which it is available; third, a film is a projection, an ephemeral event on a screen; and fourth, a film is the memory and record it leaves in the form of shared experiences and written texts. For its cultural meaning to come alive, a film must be projected and performed, but for that to be possible, its material base must be preserved. To elaborate on Cherchi Usai's point, a film is an ephemeral medium in the sense that it can only produce cultural meaning at the price of the impairment and ultimate destruction of its material base.

For the first roughly thirty years of film history, this paradox was of little concern to the people who made and screened films. With very few exceptions—such as the films of Charlie Chaplin that were reissued on a regular basis even in the 1920s—films usually had a shelf-life of a maximum of two years, and audiences almost never returned to watch a film more than once. That 80% of films produced prior to 1928 are irretrievably lost is not so much the

result of negligence as it is a feature of the industry's business plan. The film industry of the so-called silent era was an exercise in planned obsolescence.

This changed with the emergence of the ciné-club movement in France, which evolved around a canon of masterpieces, and the first film collection and preservation efforts in the 1920s, which led to the creation of the British Film Institute, the Cinémathèque Française or the Museum of Modern Art's film department (Hagener 2007). These institutions set film on course to become a regular modern art, i.e. an art with a documented history and a consciousness of its own history (Wasson 2005). But it took another fifty years for what we might call the "Cherchi-Usai paradox" and its implications, which we discussed above, to come fully into view. Starting in the 1950s, the film industry discovered that films could have an infinite commercial lifespan through television broadcasts and video releases. Film preservation became a concern for studios, as well as a growing concern for the archives organized in the FIAF. Nitrate degradation, color dye fading, and the vinegar syndrome became key concerns of film archivists. In the 1970s and 1980s, film studies' turn to early cinema further sharpened a sense for the precarious nature of the material base of film. It is no coincidence that one of the first university training programs in film preservation was created in Amsterdam, where the Netherlands Filmmuseum became a major site of Early Cinema research.

There are several ways of responding to the Cherchi-Usai paradox. One of them is to think of film

archives as a kind of Svalbard Global Seed Vault for moving images. The Svalbard Global Seed Vault, located in Spitzbergen, Norway, is a meta-archive of the roughly 200 global seed banks. It stores seeds from all plants currently available in a nuclear-safe vault. The Svalbard Vault was built in view of the possible scenario of rebuilding the world food supply after some kind of civilization-ending catastrophic event. Until that time, the seeds are not be touched or used. Along similar lines, one could think of a film archive as a storage device for cultural meaning in view of post-apocalyptic reconstruction efforts. While some film archives tend to develop policies that go in this direction and strongly curtail the circulation of films, archives can also be seen as resources for contemporary cultural production. The very notion of *Filmmuseum* suggests that films should and will be screened, to make them accessible to contemporary audiences. These are the two positions at stake in the well-known Lindgren-Langlois debate about the role of film archive. While Lindgren—then the head of the BFI archives—stressed the primacy of preservation, Langlois was a champion of performance, of making films accessible through projection. While this tension persists, recent projects such as the Living Archive project of the Arsenal Institute für Film und Video Kunst in Berlin take the notion of the archive as cultural resource one step further. Artists and curators are invited into the archive to use its holdings for their projects as they please. They re-integrate the archives into what cultural economist Michael Hutter (2006) calls the “novelty spirals” of cultural innovation, i.e. the cycles in which historic works are taken as the template and foil for the creation of new works. But while they highlight the live of the archive as a cultural resource, such projects also highlight the tension inherent in the Cerchi-Usai paradox: “access” alters the contents of the archives, both by adding new layers of cultural meaning and wearing down their material base.

The Frankfurt master’s program “Film Culture: Archiving, Programming, Presentation,” which the departments of theater, film and media studies at Goethe-Universität Frankfurt and the Deutsches Filminstitut offer jointly since 2013, addresses the Cherchi-Usai paradox already in its title. Building on graduate level courses in film history as well as courses covering film economics, copyrights issues and the institutional dynamics of museums and festivals, the master’s program requires a six-month intern-

ship followed by a master’s thesis in the second year. Combining state-of-the-art film studies with hands-on training in the field, the program aims to train scientific personnel for film and media archives and other institutions of film culture. The term “Film Culture” in the title indicates that the program indeed aims to bridge the two divergent poles of the Cherchi-Usai paradox, i.e. close the gulf between archiving and presentation on the one hand and programming and presentation on the other. “Minding the materiality of film” describes the ambition of the master’s program: It aims to train scholars and specialists who are mindful of the ephemeral materiality of film, yet also use their imagination to develop ways of bringing their knowledge to the minds of others, thus re-inserting film archives in the cycles of the production of cultural meaning. In the following, we would first provide a brief sketch of the history of the program, followed by a section on the programmatic aspects of the Frankfurt approach to training scientific personnel for film and media archives, and finally a section on the cooperation between university of archive as seen from the point of view of the program’s key partner, the Deutsches Filminstitut.

1.

A Program Waiting to Happen: How the Frankfurt Master’s Program ‘Film Culture: Archiving, Programming, Presentation’ Was Established (Vinzenz Hediger)

In 2004, the Ruhr Universität Bochum, Germany’s sixth-largest research university and one of the first German universities to offer a film and media studies program, created an endowed chair for documentary film studies with a focus on non-artistic films, particularly industrial films. The chair was funded by the Krupp Foundation, which encouraged the university to hire a candidate with an interest in the corporation’s important historical archive. Across the Ruhr valley, a number of similar corporate archives with film holdings from the classical period of industrial film (i.e. the 1930s through the 1970s) exist, among the Thyssen archive in Duisburg and the Mannesmann archive in Mülheim. This made Bochum a good location to address what was already then a pressing issue in film and media studies: The need for master’s programs that train highly qualified scientific personnel for archives, along the lines proposed by the Pres-

ervation and Presentation Master offered jointly by the University of Amsterdam and the Netherlands Film Museum. When I took the Krupp professorship, Sabine Lenk was the director of the Film-museum in nearby Düsseldorf. Convinced that there was a demand for such a program, Sabine Lenk, Patrick Vonderau, who was then a post-doc at Bochum, and I set out to design a master's program in film archiving that would involve the Film-museum, the corporate archives of the Ruhr Valley, and be hosted academically by the Ruhr Universität. However, the initiative never really gained traction. In particular, the heads of the corporate archives were not convinced that there was a job market for graduates. They extrapolated from their own archives, which were primarily paper archives rather than film archives, and concluded that only a very limited number of jobs would ever be available for graduates of such a program. Even in Germany, potential employers, of course, include a variety of major film archives, from the Deutsches Filminstitut in Frankfurt to the Bundesarchiv Filmmarchiv in Berlin and Koblenz, the Friedrich-Wilhelm-Murnau-Stiftung in Wiesbaden, and the Stiftung Deutsche Kinemathek in Berlin to the various state television archives and smaller archives, such as the collection of the Arsenal Institut für Film und Videokunst in Berlin. The initiative folded when Sabine Lenk left the Filmmuseum a couple of years later. The lesson learned from this failure was that a program of this kind could only succeed in collaboration with a strong institutional partner, an archive or film culture institution with a focus on collecting and preserving moving images. In particular, what was required was an institution with an understanding of the Cherchi-Usai paradox and its implications—that is an institution not only dedicated to the preservation of archival materials; at which the corporate archives in the Ruhr Valley excelled, but with a strong commitment to performing the archive, that is to making moving images accessible through projection and exhibition.

The opportunity to work with such a partner materialized in 2010, when I received a job offer from Goethe-Universität Frankfurt. The offer included the promise of a strong institutional partnership with the Deutsches Filminstitut, and I made the creation of a master's program in film archiving and presentation as part of my contract negotiation. Immediately upon my arrival in

Frankfurt in 2011, Claudia Dillmann, the director of the DIF, and myself got together to lay the groundwork of this program. As the director of one of Germany's largest institutions of film culture and a former advisor to the EU commission, Claudia Dillmann had a very different assessment of the job market for potential graduates. To her, the need for scientific personnel with a university pedigree was more than obvious. In fact, she had tried to create a similar program with university partners several times, but no specific plans had materialized. It took us one meeting to agree on the outlines of the program and the curriculum. In particular, we quickly concurred that students should obtain a solid training in film history and film historiography; they should acquire an understanding of the basics of museology and of the institutional dynamics of the institutions of film culture, from archives to museums to festivals; they should understand the basics of copyright as well as the basics of marketing; and they should be thoroughly trained in the technical, material and institutional aspects of film archiving, programming and presentation. In concurrence with these goals, we enlisted the cooperation from the faculty of law and economics at the university, which allowed us to co-opt introductory courses on copyright law and marketing. We also re-assigned our in-house film scholar and archivist Bettina Schulte Strathaus to coordinate the university side of the program, i.e. to counsel students, prepare internships and coordinate with our institutional partners at the DIF, but also with the Arsenal - Institute for Film- and Video Art, with the Friedrich-Wilhelm-Murnau-Stiftung, and with all different kind of institutions such as film festivals, film-related research institutes, museums, cinemas, television stations and archives, production companies, film distributors, independent organisations, private archives and foundations, motion picture and video trade associations, film market, and press agencies, etc. After a convincing personal pitch by Claudia Dillmann to the University president, the program was fast-tracked for accreditation and approved for a program start in the fall of 2013. In addition, we received support from the Hesse ministry of arts and sciences, which made funds from an initiative for innovation through teaching and research available for the program. Crucially for the success of the program, the funds from the ministry, which were later augmented by additional funds from

the Quandt Foundation, allowed us to create a so-called “Juniorprofessur,” i.e. a non-tenure track six-year professorship for a post-doc scholar with a specialization in the field of film conservation and presentation. After an international job search, we were able to hire Sonia Campanini, a specialist for the restoration of film sound with a joint Ph.D. from Amsterdam and Udine, two of the leading schools in the field. Focusing her research and teaching almost entirely on archiving, programming and presentation, Sonia quickly established herself as the academic backbone of the program. At the core of the program is the cooperation between the university and the Deutsches Filminstitut, with the DIF offering a complete module on archive practice and archive politics taught by professionals from the institute. In order to be able to offer a broad choice and multiple perspectives in the internship phase of the program, the network of the program’s partners was extended to include a number of other institutional partners, and it now actually spans the entire globe. Two important partners in the immediate neighbourhood are the Friedrich-Wilhelm-Murnau-Stiftung in Wiesbaden, the capital of Hesse, which is dedicated to the preservation of the German film heritage, and ZDF/ARTE, one of the two large German television networks, which is located in Mainz, also only a half-hour’s train ride away from Frankfurt, and which also operates the German leg of the Franco-German arte television channel. Both partner institutions offer internships to the program’s students, and ZDF/ARTE has even hired program graduates. Other institutional partners of the internship program include the EYE Nederlands Film Institute, the Academy of Motion Pictures Arts and Sciences and particularly the Margaret Herrick Library in Beverly Hills, and the Arsenal Institut für Film und Videokunst in Berlin. All in all, it has been remarkably easy to set up the Frankfurt master’s program. One of the reasons why we received so much support from the university and the ministry is that the program fits into a broader trend to redirect university teaching towards more specific professional profiles. Unless they train teachers, which is the preferred career choice of a plurality of students in history, philosophy, language and literature programs, from Germanistik to Romance Studies and English and American studies, the humanities are increasingly under pressure to justify their existence through

what in German is called a “Praxisbezug,” i.e. an orientation towards professional practice. I personally remain wary of this trend. The university remains a unique place of reflection, research, and innovation that thrives on the fact that it is walled off from the economic and political spheres of society. Curtailing the freedom of research and teaching by reducing university curricula to a variation of vocational training is a recipe for stagnation and regression. The German economy thrives partly on the strength of its system of vocational training, the “Berufslehre,” which creates a strong supply of highly qualified technicians outside of the institutional frameworks of tertiary education. At the same time, the “Berufslehre” remains connected to tertiary education through the “Fachhochschulen,” the universities of applied sciences, which offer a variety of degrees in professional sectors. To put the university under the yoke of a strict “Praxisbezug” creates dynamics that eventually lead to a redoubling of the thriving institutional frameworks of vocational training already in place. The solution to this conundrum is to develop a profile that valorizes the specific strengths of a university degree program, yet creates a strong opening towards professional practice. In the field of film preservation, the Hochschule für Technik und Wirtschaft (University of Applied Sciences) in Berlin offers a master’s program in “Konservierung und Restaurierung,” with a specialization in film restoration, headed by Martin Koerber, one of the leading figures in film restoration. The focus of this program is on the technical and practical aspects of film preservation and restoration. Rather than entering in competition with the Berlin Applied Sciences master’s, the Frankfurt master’s program covers an area that is adjacent and complementary. As already stated, the mission of the program is to train scientific personnel for film and media archives and other institutions of film culture. The specific focus is to offer an education that enables graduates to bridge the chasm of the Cherchi-Usai paradox. Graduates of the program are fully cognizant of the restrictions related to the precarious nature of the material basis of film. At the same time, they are capable of using their knowledge of film history, economics, law, and the arts to create ways to open up the archives, devise innovative ways of programming and exhibiting, and thus re-integrate historical film materials into the cycles of cultural innovation.

In that sense, the Frankfurt program thrives on the dynamics of two basic tensions: The tension inherent in the Cherchi-Usai paradox, and the tension between the university as an autonomous subsystem of society and the exhortation of the “Praxisbezug,” the insistent calls for the university to pay heed to the practical requirements of professional life beyond its confines.

2.

Teaching Film Culture: The Frankfurt Curriculum (Sonia Campanini)

As junior professor for Film Culture, I am responsible for the academic curriculum of the master’s program “Film Culture: Archiving, Programming, Presentation.” The curriculum is structured in four semesters and divided in six modules. In the first year students take lectures and seminars in the following modules: “film and media history, theory and aesthetics,” “film culture institutions,” “film economy and media law,” and “archive praxis and archive politics,” which cover the four areas of expertise defined by Vinzenz Hediger above. In the third semester students engage in internships within film institutions in Germany and abroad, where they can pursue and implement a practical project in the field of film culture. The project leads to a documentation, which students add to their portfolio for applications after graduation. The fourth semester is dedicated to the development of a personal research project, elaborated in the form of a master’s thesis: in the module “colloquium” students can discuss their works in progress under the supervision of their tutor.

The curriculum of the master’s program is based on a close interconnection between theory and practice, which I support in my teaching and tutoring activity under the motto of *minding the materiality of film*. During my studies I had the possibility through international exchange programs to attend courses at the master’s programs “Preservation and Presentation of the Moving Image” at Amsterdam University and “Moving Image Archive Studies” at University of California, Los Angeles. Both these pioneering programs are founded on a solid combination of theory and practice; the theoretical courses held by academics at the university are combined with seminars conducted by archival personnel in film institutions and complemented by hands on experience through internship

programs. As a student I found this combination between theory, history and archival practice extremely valuable. The conviction that this combination is not just an added value but a fundamental premise for the archival work got stronger during my professional experience in the field of film archiving. For working in film preservation and restoration as well as in film presentation and film curatorship, a deep historical and theoretical knowledge of film and media history and theories is in my opinion fundamental to better sustain the practices and techniques required in this field. In other words, one can be a better archivist, restorer and curator having a strong theoretical and historical background in film and media studies. On the other hand, one might also be a better film and media scholar having a basic knowledge of issues related to film archiving and presentation.

In the master’s program, theory and practice are combined in such a way that they can mutually sustain and benefit from each other. Film history and media theory offer the basis for a critical reflection on film culture practices, while archival and curatorial work provide new insights into and relevant perspectives on the theoretical and historical reflection on film and media. The master’s program aims at training scientific personnel for film culture intuitions, such as film and media archives, museums, festivals, as well as for film laboratories, televisions and media companies.

The program provides a solid scholarly knowledge of film and media as well as professional skills in film archiving and curatorship. At the same time, the program offers a research focus on film culture and archiving, with graduates becoming eligible for Ph.D. programs in film and media studies upon graduation. The research training group “Configurations of Film,” which is funded by the Deutsche Forschungsgemeinschaft and housed at our department at Goethe-Universität Frankfurt, is one avenue for doctoral research on subjects related to film culture.

The master’s program fully benefits from its framing in the university context. The students have access to the complete teaching schedule at the department of theater, film and media studies. Moreover, thanks to cooperation with the departments of economics, law and the master’s program in curatorial studies, which is hosted by the department of art history, students can take classes on relevant subjects in the field of film culture—such as copy-

right law, film marketing, museum and exhibition practices—examining them from the perspectives and insights of other disciplines.

A core element of the academic curriculum consists of the introductory and specialized courses on film culture, which I conduct following the principle of the interrelation between theories and practices as well as a focus on the materiality of film. These courses are aimed at giving a basic scientific knowledge on film history and film technology as well as the theoretical foundations of film preservation, restoration, exhibition and curatorship.

The introductory course entitled “Die Materialität des Films und des Kinos” is centered on the issue of the materiality of film and cinema, which is analyzed in its different aspects within the perspective of film culture. During my graduate school years I first engaged with this focus on materiality in teaching film sound¹, starting from the observation that in film the material matters or, in words that recall the book by Eisenstein (1987 [1964]), the material is *nonindifferent*. In the theoretical reflection on the importance of the cinematographic material basis I find very useful to work on the concept of *material form* as elaborated by film art historian Cesare Brandi (2005 [1963]). This concept highlights the close interconnection between matter and form in the work of art, i.e. the conditions of material existence on one hand and the aesthetic manifestations of the content on the other. Applying this concept to cinema, the material form can be defined as the result of the interrelation of different factors.

In film studies the concept of materiality is usually linked to the film object, referring to the chemical and mechanical characteristics of the physical base, the film roll. I find it useful to expand this notion and consider that the material form of film encompass not only the material carrier but also the technological apparatus and the material conditions of film production and reception. Following this line of reasoning, the materiality of film can be defined on three levels: physical, instrumental, and formal. The *physical materiality* refers to film as a material object, as an artefact: it concerns the characteristics of the physical carrier both in the analogue and in the digital domain. The *instrumental materiality* concerns the cinematic apparatus—that is, the technologies used to produce and display the film—but also to the techniques adopted by technicians in employing those particular machines

during production and exhibition (e.g. the use of anamorphic format, Technicolor system, Dolby Digital sound system and so on). The *formal materiality* refers to the formal aspects of film as received by spectators, i.e. the narrative content and the aesthetics qualities of film intended as an audiovisual text and a work of art.

Considering the interrelation of all this different levels, in the introductory course we discuss the material dimension of the medium film and of the cinematographic dispositive. The issue of film materiality became central in film theories after the conversion to digital cinema, referring mainly to the demise of the filmstrip. In class, we debate to what extent materiality pertains not only to the analogue film but also to digital cinema: in this sense it is useful to consider materiality as referring not just to the physical carrier but also to the technological and formal conditions of existence in film production and reception.

In this frame we analyze different cinematographic machines, technical apparatuses, and diverse color and sound systems. In approaching film materiality we benefit from the presence in our department of a 16 mm film archive with a variegated collection, as well as analogue film technologies such as film projectors, film cameras, film viewing tables. We have the possibility to project 16 mm films on a big screen, to handle film rolls and to experience the different characteristics of analogue and digital reproduction technologies. On a theoretical level, we discuss in class concepts such as cinema apparatus and dispositive, medium specificity, convergence and remediation, trace and indexicality.

A main question in the course is how the materiality of film relates to the film’s inherent and permanent transition, i.e. to the continuous transformations that involve the technological, economic, institutional and aesthetic dimensions of cinema. The malleability of the medium film, its permanent transformation through different material forms is analyzed considering the dialectic between transition and transience: this means to acknowledge on one hand which characteristics of the material form change in the transition but also, on the other hand, what remains the same despite all the transformations. This theoretical approach is particularly useful when applied to film preservation and presentation practices, since it allows to reflect on the extent to which film restoration change the material form of film, which means to examine which

characteristics are getting lost in the restoration process and which other ones are remaining and persisting. Such considerations and discussions are useful to prepare students for their practical training during the praxis semester: with this theoretical and methodological background they gain tools to critically reflect on the practices learned in the field during the internship semester and possibly to use these considerations in the development of their master's thesis.

In addition to the seminar on film materiality, I foster a mutual contribution of theory and praxis in other seminars. For instance the course "Film Preservation and Restoration" aims at discussing the theories, practices and methodologies of film preservation and restoration. Here students tackle theoretical issues like the ones of original and version, text and artefact, reproducibility and authenticity. These different topics are discussed through the reading of theoretical contributions² and technical texts, as well as through the analysis of significant film restorations³. The examination of different restoration projects made by different institutions in different periods allow us to have a diachronic perspective on film preservation activity, i.e. to discuss film preservation and restoration as theories and praxis having a specific history and historical development.

In the course "Presenting Archival Films: Film Heritage Institutions, Archives and Festivals" we analyze the history of exemplary film archives and cinémathèques, their establishment as cultural institutions, and their different approaches to the "preserve vs. show" dilemma. Here we debate how film heritage institutions act and work in order to present archival films and we discuss which strategies they adopt in film curatorship. The activity of film heritage institutions as well as the one of film festivals dedicated to the presentation of archival films is to be considered as an important factor in the continuous redefinition of film history and film canons, as well as in the definition of film culture as part of social and collective memory. We also examine in which forms archival film as material artefact and cultural product survive in the digital media environment: in relation to this topic, the contemporary theories on archive, remediation, and convergence are explored.

Along with the courses on film culture subjects, students also attend seminars on film history, film theory and the economy of cinema, as well as on

topics related to early cinema, film sound, avant-garde cinema, where they can deepen their knowledge on the historical, technological and aesthetic dimensions of cinema. New theoretical approaches and methodologies in the field of film and media studies are also debated in curricular courses: for instance, in the seminar "Film History as Media Archaeology" the media archeological approach is used in tackling subject related to film archiving and preservation. A research and teaching subject that we intend to further establish in the following years is film and media literacy for schools.

Aside from the curricular courses and seminars, students profit from diverse extracurricular activities such as organized excursions to international conferences as the FIAF Congress and to international film festivals as the "Berlinale" in Berlin and "Il cinema ritrovato" in Bologna. A project recently developed within the master's program is "Think Film!," a student symposium dedicated to the discussion of problems, issues and projects in the field of film culture.

3.

The Role of the Deutsches Filminstitut (Ines Bayer)

The Deutsches Filminstitut – DIF in Frankfurt and Wiesbaden has a long tradition as a place of teaching, learning and research. From the collection, preservation and scholarly analysis of film and film-related literature, to the compilation and validation of filmographic data and facilitating its access for the film industry and researchers, scholarship and research have played a central role at the Institute since its founding in 1949.

As an institution encompassing all fields of work essential to a film heritage institution, the consideration of the materiality of film, as outlined by Vinzenz Hediger above, is a central and permanent task underlying all the activities of the Deutsches Filminstitut. Our institute's work includes the collecting and archiving of film and film-related materials in our diverse archives; the curation of film programmes for our cinema and film festivals; the presentation of exhibitions on filmic themes in our film museum; and the fostering of film culture through a wide array of educational initiatives, publications and online projects. Each of those activities demands a careful balance between the primacy of the preservation of the original artefact

(Bohn 2013) and the desire to make it accessible to the public and thus part of the public discourse, a dilemma which is present in any film archivist's decision as to whether to clear an individual film print for projection, thereby necessarily exposing it to the impairing effect of the technical apparatus it will be running through. In accordance with Sonia Campanini's previous suggestion not to limit the term "the materiality of film" to the carrier medium itself, but to expressly include all kinds of artefacts linked to the production and the reception of film (including fan culture), one might add that the same dilemma applies to each collection archivist's decision to provide original artefacts like scripts, posters, photos, autographs, costumes, props, historical film journals, or film technical equipment, all of which the Deutsches Filminstitut collects and preserves in extensive archival departments, for the purpose of being exhibited in a museum, taking into account the risks that come with the exposure to light, transportation and changes of humidity and temperature. Thus, the notorious Langlois-Lindgren opposition, which pits making film accessible at all costs against rigorously preserving it, shines through the everyday practice of a film heritage institution (Dillmann 2016). That the Deutsches Filminstitut has always felt itself closer to Langlois than to Lindgren in this debate is a crucial element of our institution's identity and mission, complying with our central task of fostering film culture and promoting film heritage.⁴ When the Deutsches Filminstitut entered into partnership with the Goethe University in the form of the master's programme "Film Culture," conceived and shaped by Claudia Dillmann and Vinzenz Hediger, it was with the express aim of training and recruiting our own scholarly personnel. The diverse tasks of the Deutsches Filminstitut, performed in our archives, the cinema, the exhibition department, and the projects mentioned above, can in no way be seen as isolated activities. To create an impact with the audience and thus to function successfully within the wider context of film culture requires comprehensive strategies, constant dialogue and re-evaluation across departments. That such a wide-ranging understanding of film culture, including the overarching economic and copyright issues, need not be obtained by young employees while already working on the job, but can be brought into the position by graduates of the new master's programme as a resource to draw

upon right from the beginning, has been a major motivation for the commitment of the Deutsches Filminstitut.⁵

The interconnectivity of all fields of work within film culture has, if anything, grown during the past decade, which is due not least to digitisation. From the perspective of a film heritage institution, digitisation must, in many ways, be regarded as a challenge. It has transformed film archives, which have had to design workflows for the intake and handling of digital film files of different formats, with long-term storage posing a problem that has yet to be satisfactorily solved. Another effect has been less predictable: paradoxically, the digital revolution is causing the public collections of analogue film prints to grow significantly, with producers, distributors and filmmakers giving up their own storage facilities and offering the material to institutions like ours (an offer which we, of course, accept in order to prevent the prints from being destroyed). Thus, expertise in the handling of analogue film material is as much in demand as ever, with the additional requirement of designing and carrying out strategies for making the material accessible to the public. In contrast to a book, an analogue film print relies on the mediation of a technical apparatus in order to be properly 'deciphered'. With cinemas in Germany having gone fully digital from 2010 (in an industry effort largely helped by state funding), the projection facilities for analogue film prints are today, with the exception of museums and a small number of cinemas that still retain their 35mm projectors alongside their digital projectors, non-existent. Thus, access to the vast majority of the German film heritage can only be achieved through the digitisation of the films themselves.⁶

This is where we move from challenges to opportunities. Not least thanks to the efforts of Claudia Dillmann, who started convincing the authorities of the necessity of film digitisation both on a European and a national level in 2008, public funding of retrospective film digitisation began in 2013 and has gradually grown ever since, and there is now the prospect of steady federal funding for a decade and more. This is relevant for future graduates of our master's programme in more than one way. Firstly, there will be a constant demand for qualified personnel. Secondly, digitisation has not only changed the archive, but has opened up a multitude of new directions for film cultural initiatives in the

educational, curatorial or artistic sector, especially on the Internet, provided that the necessary copyright issues can be solved. Apart from that, with the advent of high-resolution digital projection technology, museums have become capable of using film excerpts as exhibits in their own right, not merely as illustration, as was hitherto the case (by showing film clips on small monitors).⁷ One ought not to ignore the fact that with the obsolescence of analogue film technique and with the shifting of the dominant mode of reception of moving images from cinema to monitors, tablets and smartphones, the tasks of film heritage institutions are expanding insofar as strategies need to be developed to pass on the cultural practice of (analogue) cinema itself. The Deutsches Filminstitut has long started doing so in its many educational projects, which in the case of the statewide “SchulKinoWochen,” taking place in 80 cinemas in mostly rural areas, often challenge school children and youth with their first-ever visit to a cinema, and which, in the case of the “MiniFilmclub,” confront pre-school children with experimental film and with the mechanics of the analogue film apparatus. In 2015, as part of an exhibition of large-scale photographs of former film theatres now in a state of ruin and decay, our curators set up a 35mm projector, which was operated by a projectionist twice an hour, in a glass booth within the exhibition space, thereby raising awareness of the fact that the analogue film technique has already become a museum piece itself.

Regarding our teaching responsibilities within the Film Culture programme, a core element is the compulsory module “Archive Practice and Archive Policies,” which is taught by the heads and specialists from our Institute’s different departments. The lessons in the first term focus on the question of the materiality of film from the perspective of the film archive, with sessions mainly taking place in the Institute’s film archive in Wiesbaden. In the second term, the seminars are built around all three core elements of archiving, programming and presentation: Sessions take place across the various departments of the Institute, be it using the special collections or the Filminstitut’s library and text archive, working on film education and film literacy projects, fostering film culture on the Internet, developing database projects, curating film exhibitions, or designing cinema and festival programmes.

In our courses, we incorporate, as a matter of principle, all aspects of the Deutsches Filminstitut’s

work, thus taking a broad approach to film culture, while encouraging specialisation during the compulsory internship and the master’s thesis in the second year. We align our teaching closely to the Institute’s regular tasks and ongoing projects, while also keeping a keen eye on the working practices of other institutions. We talk about cultural management and about strategies for the financing of projects, and we make clear why continued lobbying with the relevant political authorities is important. As a member of the Association of European Cinémathèques (*Association des Cinémathèques Européennes*) and of the International Federation of Film Archives (*Fédération Internationale des Archives du Film*), the Deutsches Filminstitut brings international debates and models of best practice directly into our discussions with students, and we consistently supplement our teaching with workshops led by visitors from other institutions and professional contexts in order to ensure students have the widest possible exposure to film culture. Through these exchanges, students can engage with colleagues from European film libraries, festival directors, film critics and journalists, with copyright lawyers, and with key figures involved in film distribution, film production and marketing.

As a rule, we strive to deepen and to complement the students’ theoretical understanding, as described by Sonia Campanini above, by aligning it with the work policies of our archives and curatorial departments, and by putting it to the test on actual practical tasks.⁸ Thus, for example, the students’ knowledge of the materiality of film, of the theory and history of film archiving, of the historical and technological developments in film restoration, and of the impact of digitisation, is challenged and expanded when we ask them, as an exercise, to compile a list of film titles to be designated for digitisation. In the process of doing so, the students have to consider archival criteria (the availability of source material either in our Institute’s or in other film archives, its characteristics and physical state, and the technical conclusions arising from this when preparing the material for digitisation), curatorial criteria (the relevance of the individual film as seen from a film historical, film theoretical, aesthetic, educational, or any other perspective) and legal criteria (who holds the copyright, and what are the conditions under which the material may be digitised?). Similar experiences, always monitored and supported by our staff, can be made in the seminar sessions in our

other departments, with practical tasks including, among others, the identification and classification of different archival materials in the Institute's special collections or the creation of biographies for the Deutsches Filminstitut's online platform on German film, *filmportal.de*, following in-depth research in our text archive.⁹ With "Treppe 41," a film club named after the staircase to the Deutsches Filmmuseum, we have also established a space for students to put curatorial theory into practice: With only minimal institutional input in areas such as budgeting, the film club members design and organise a programme of late-night screenings twice a month, securing theatrical rights, arranging the logistics, organising the publicity and presenting the films prior to their screening. Similar "training grounds" will be created in the course of a number of our Institute's projects in the future, to which the master's programme may be linked through special working groups and practical seminars. Current examples include the development of digital learning tools on the online platform *filmportal.de*, and the conception and delivery of smaller exhibition projects and publications from the holdings of the Deutsches Filminstitut. We also encourage students to develop their master's theses using the Institute's archives. The theses are co-supervised by the heads of archives and the project leaders, with the scope to go on to develop PhD projects.

Providing opportunities and support during the third term of the programme is another aspect of the Institute's commitment to students' learning and professional development. Over the past four years, a third of students have completed their three-month placement at one of the departments or on one of the Deutsches Filminstitut's in-house projects. In addition, we play an important role in facilitating internships at partner institutions. Recent examples of placements at film heritage institutions include the EYE Film Institute in Amsterdam, the Austrian Film Museum in Vienna, the *èque Royale de Belgique* in Brussels, the Academy of Motion Picture Arts and Sciences in Los Angeles, at the retrospective at the Berlin Film Festival, with the film periodical *epd Film* and with the specialist digitisation company *Omnimago*.¹⁰

The commitment of the Deutsches Filminstitut in the master's degree in Film Culture requires the input of the Institute's staff and resources, demands additional work from the departments and project leaders, requires the provision of rooms and tech-

nical infrastructure for conducting seminars, and incurs transport and accommodation costs for our external visitors. Without doubt, this would not be possible were it not for the partial sponsorship provided by the Hesse Ministry for Science and Art. But the time and financial expenditure required is worthwhile and valuable in every respect. Not least because the opportunity to engage and re-engage in theoretical discourse, to meet external visitors, and not least to talk to students gives us a fresh impetus to reflect on our own work and practice in new ways. In doing so, the master's programme creates a space for interdisciplinary exchange and for continuous reflection on the daily work in our Institute.

Conclusion

Academic film studies and film archives used to have history of eyeing each other with suspicion. Archivists often felt that film scholars engaged in lofty theorizing at the expense of a proper understanding of the basic materiality of film, while film scholars, even after the advent of apparatus theory, detected a positivist slant in the archivist's focus on the technical and material aspects of film preservation. That suspicion has long given way to the development of one of the most thriving and productive sub-fields in film and media studies. When we created the Frankfurt master's program "Film Culture: Archiving, Programming, Presentation," the fact that the cooperation between the DIF and the university also presented another triumph of productive curiosity and good sense over old habits was merely an afterthought. We have long moved past old inhibitions and understand that the university and the archives are partners in a project that mutually beneficial. In addition, the placement record of the program so far seems to indicate that our original assessment for the demand for qualified scientific personnel for film and media archives and other institutions of film culture has, if anything, been on the conservative side. With a number of research initiatives currently, among them a project on university archives directed by Sonia Campanini, and others in the planning stages, the Frankfurt program has also turned into an incubator for post-graduate research that offers long-term perspectives to graduates in academic research. The focus of our efforts now is to consolidate our gains and to make the program sustainable for the long run.

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Endnotes

1 I gathered some reflections on this topic in Campanini 2012.

2 The lectures are taken from among others: Cherchi Usai 2000; Read and Meyer 2000; Fossati 2009; Rasch and Dörnemann 2011; Bohn 2013; Noordegraaf, Saba, Le Maître and Vinzenz Hediger 2013; Hagener 2014; issues from the *Journal of Film Preservation*.

3 Examples here include *Inferno* (1911), *Das Cabinet des Dr. Caligari* (1920), *Faust* (1926), *Beyond the Rocks* (1922), *Metropolis* (1927), *Variété* (1925), *Die Büchse der Pandora* (1929), *Bronenosets Patyomkin* (1926), *Napoléon* (1927), *Touch of Evil* (1958).

4 In Germany, the task of a national eque is assigned, by way of a contract between the federal states and the federal government concluded in 1978 and renewed in 2005, in equal shares to the Bundesarchiv-Filmarchiv, the Stiftung Deutsche Kinemathek (both in Berlin) and the Deutsches Filminstitut, who together form the *Kinematheksverbund*. While the Bundesarchiv-Filmarchiv acts as a central film archive, the Stiftung Deutsche Kinemathek and the Deutsches Filminstitut expressly perform the task of fostering film culture and of promoting German film heritage through film distribution, retrospectives, film festivals, exhibitions, publications, research and the accumulation of filmographic data.

5 We have already been successful in recruiting a number of outstanding graduates of the program; graduates have taken on positions in our film archive, in film literacy projects and as assistant to the Director,

while under-graduates work as research assistants in the Institute's online and database projects, in the film archive, in the special collections and in the library.

6 The Deutsches Filminstitut currently digitizes and digitally restores about 10 to 15 German feature films and/or short film programmes per year, among them classics (G.W. Pabst's *Der Schatz* [1922/23], Peter Lorre's *Der Verlorene* [1950/51], Wolfgang Staudte's *Kirmes* [1960], Peter Fleischmann's *Das Unheil* [1970/71]) as well as rare archival programmes like *Tonbilder*—silent short films with matching soundtracks on shellac discs—or chromolithographic loops from the 1900s to the 1930s. It is crucial to stress here, in light of the current public debates which often fail to make that distinction, that for the Deutsches Filminstitut, the digitisation of analogue films is *only* a means to ensure accessibility of the German film heritage (by providing digitally restored files in the Digital Cinema Package for the purpose of cinema screenings, Blu-ray releases or online presentation), not a means of preserving the materials themselves. The preservation of analogue film still does require archiving the film material according to FIAF standards, in climate-controlled vaults and handled by qualified personnel.

7 Recently, the Deutsches Filmmuseum installed its very first exhibition restricting itself solely to large-screen projections: *RED – A Spatial Film Installation* (2017), comprising nearly 300 film excerpts which allowed visitors to engage with the different ways this most culturally significant of colours functions and operates in film. Being well aware that digital projection in gallery spaces can only serve as a reference to exhibiting the films in the reception context for which they were made, we complement such projects by showing many of the films in our in-house cinema, in their original format (35 mm, 16 mm, or 70 mm, or any digital format in the case of digital-born material).

8 We draw upon the same lectures as mentioned by Sonia Campanini, supplementing them with lectures on curatorial strategies (e.g. Cherchi Usai, Francis, Horwath and Loebenstein 2008; Gass 2017); digitisation (European Commission, DG Information Society and Media 2011; Bordwell 2012); copyright and access (Klimpel and Euler 2014); and with a special emphasis on current debates in professional journals and blogs (*FORUM – Das Fachmagazin des Bundesarchivs*; *FLAF Journal of Film Preservation*).

9 Examples of such biographies written by students of our master's programme can be found on www.filmportal.de (for example, see the entries on director Dore O., composer Martin Böttcher or producer Seymour Nebenzahl).

10 Internships play a significant role in Germany's academic education system, especially in the humanities. Students are usually expected to have completed one or

more internships, either voluntarily or because of the requirements of the curriculum, before they enter the job market. More often than not, interns receive no (or only low) pay for their work, a fact that has rightfully led to a debate about German "Praktikumskultur." On the other hand, the host institutions provide interns with a much-needed practical education, and frequently the way into regular employment leads through an internship.

The Materiality of Heritage

Moving Image Preservation Training at HTW Berlin

Ulrich Ruedel & Martin Koerber

Introduction

The Conservation and Restoration curriculum at *HTW – Hochschule für Technik und Wirtschaft* [University of Applied Sciences] Berlin, with audiovisual heritage as one of four dedicated specialization tracks, offers a hands-on and materials-science-based approach to education in moving image preservation. Here, the field is taught in a very broad, ‘classical’ conservation/restoration context. Teaching the entire breadth of audiovisual heritage preservation, including not only video, for instance, but also photography, provides strong synergy in ensuring an understanding of photographic materiality, chemistry and history of black and white and color imaging in general. Also, a substantial part of the fundamental training for students of audiovisual heritage in subjects such as cultural history, or training in relevant skills such as microscopy or cleaning techniques, is shared with students of parallel specialist education in preservation of archaeological/historic artefacts, industrial heritage/modern material, and field archaeology. Thus, where, for instance, the other two national film heritage programs in Potsdam and Frankfurt focus on “archiving, programming and presentation” (Frankfurt),¹ the focus of the HTW program is in the heritage objects’ materiality, whether in passive conservation, material treatment, study of historical traces, scientific investigation, manual restoration or more historically, visually and ethically faithful duplication and digitization.

Teaching is headed by individual specialist professors corresponding to and responsible for each of the four B.A. and three M.A. tracks² heralding from a professional and academic background in the respective fields of museum object conservation/restoration (or field archaeology) and moving image and sound preservation, as well as a science professor devoted to the relevant chemistry and analytical-scientific investigations. Also, as discussed further below, a number of associate lecturers contribute teaching to specialized subjects, resulting in a combination of shared and specific training for each of the tracks, considered fully competitive with specialized individual training programs.

The school offers a seven semester B.A. program and a subsequent three semester M.A. program. Given appropriate certified training, candidates with Bachelor’s degrees from other conservation/restoration programs are eligible for the Master’s degree, optionally by joining select bachelor classes as needed.

The HTW program and the audiovisual track, in particular, have a strong belief in the international nature and opportunities in cultural heritage preservation, thus international candidates interested in studying moving image preservation in Berlin, Germany are specifically encouraged to apply. Towards this end, the program aims for regular presence during international festivals and conferences (such as through presentations in the REEL THING Symposium or the Pordenone Silent Film

Festival's Collegium), and through work with such professional organizations as FIAF (through membership in the Technical Commission, which allows for maximum alignment between the technical interests of the film preservation community and the respective research focus at HTW).

The Curriculum

The curriculum reflects both the shared foundations (culturally and ethically, technically and materially) of the different disciplines in classes taught for combined specializations, as well as their highly specialized nature. For instance, restoration ethics is taught for students of all fields together, reflecting how film restoration ethics is rooted in (or, sometimes, differs from) classical approaches, and includes reflections on texts ranging from the classics such as Riegl, Le Duc etc. to Benjamin, and Ray Edmondson's *Audiovisual Archiving Philosophy and Principles*.³ Other classes are shared between the audiovisual preservation and modern materials/technical heritage tracks, since both share an interest in technology history of the 19th and 20th centuries or the chemistry of plastic materials.

In doing so, as one of the authors observed earlier

The charm of the interdisciplinary concept [...] is in essence its antagonism to an unfortunate separation of technical and philological aspects in restoration. The integration of archaeology furthermore counter-acts the unfortunate misconception that there is something inherently more modern about modern media than those records preserved on paper, paintings, and messages on clay tablets or stones. The shared basic training of all students fosters development of broad awareness for our culture, of which artefacts of audiovisual heritage do form specialized cases, albeit not free from their own presuppositions. (Korber 2003, 62)

The cultural course topics for the audiovisual heritage students thus range from general cultural history of the 19th and 20th centuries to the specific history of film and photography. Science and restoration classes range from general materials science (general, inorganic and organic chemistry, history of metallurgy and of plastics, etc.) for stu-

dents from all tracks to, for instance, photographic chemistry for those in the audiovisual tracks, all of which provide a thorough grounding in, and awareness for, the material nature of images. Practical restoration classes ranging from manual photography restoration (dry and solvent cleaning and retouching) to digital moving image and sound processing acknowledge the imminent changes and opportunities owed to digitization as much as the history of more than a century of photo-chemical imaging. Training in collection surveys and passive conservation is shared with the students of archeological restoration, while the HTW's own media archive of GDR audiovisual training materials (see below) offers an opportunity to apply student's recently acquired methodologies to a relevant audiovisual collection in house. A number of group and individual projects throughout the seven semesters are an integral part of the bachelor and master curricula and theses. These can include work on individual objects from the university's collection, or objects on loan from partnering institutions. Notable recent projects include Sowon Choi's master thesis work on German Missionary Films Shot in Korea in 1925 (Choi, 2016) and the semester project by two students, Corinna Reinhard and Lea Frankenbach, on manually-chemically removing misguided historic china ink interventions, likely dating from the 1950s or 1960s, on emulsion-damaged areas in one reel of a vintage nitrate print (held by Bundesarchiv) of *Der Kampf ums Matterhorn* (Germany, 1928) for a 2016 digitization project by *Deutsches Filminstitut – DIF*.⁴ These semester and thesis projects, as well as choice of classes, subjects of study assignments and thesis, and an external internship allow students to either enjoy relatively broad training in audiovisual heritage, or to pursue further specializations such as classical photography restoration, recorded sound, magnetic tape, and scientific means of studying the materiality of media. The recent revision of the bachelor and master curricula has aimed to further strengthen existing and emerging partnerships with other fields of restoration and field archeology. For instance, in recent years, a surprising kinship between digital archeology and digital restoration of audiovisual heritage has emerged, while the most important synergy remains the one with conservation science (in particular, analytical and materials chemistry).

A brief history of the study program

Founded in 1993, the conservation and restoration curriculum emerged from a distance-learning program in restoration dating back to the GDR era. Officially having commenced in the winter semester 1993/94, the history of the degree course dates back substantially further, as outlined by Matthias Knaut in a retrospective essay (Knaut, 2003). Plans to establish this type of training date back both to initiatives in the German Democratic Republic in 1976, where distance learning for restorers had been established at Museum of German History in East Berlin, while an initiative of the National Museums to launch a restoration study program in the mid-1970s ultimately failed. Following the German re-unification, these initiatives effectively merged into a 1992 proposal to launch a dedicated restoration curriculum with a threefold focus on archaeological cultural heritage, technical heritage as well as photo, film and data carriers, while further integrating excavation technology (field archaeology) into the course. Finally, in winter 1993, the course commenced with two focus professors for archeological heritage and technical heritage, while the professorships in natural sciences and photo/film/data carriers were first filled in 2000 and 2003, respectively, the latter by the co-author Professor Koerber.

Both authors of this paper have been privileged to lead the audiovisual track of the program from 2003–2007, Professor Martin Koerber headed the specialization (then known as ‘photo/film/data carrier’). Professor Koerber’s return as head of the film archive to the Deutsche Kinemathek in 2007, combined with his ongoing commitment to and teaching as professor for the HTW program has resulted in an especially strong connection between the school and the Kinemathek. Opened in 1963 on the basis of director and archivist Gerhard Lamprecht’s film collection, the institution is one of the most important German archives, renowned for a number of film reconstructions. The institution holds a collection of some 26,000 films as well as a host of non-film materials, and since 2000, has exhibited in the Filmmuseum at Potsdamer Platz, Berlin.⁵ Projects for individual students or groups are now routinely conducted in the archive’s collections, as are preservation screenings of classic silent and sound films in the

screening room of the archive as part of the film history class. In including films which have been subject to restoration projects headed by Professor Koerber, these classes particularly reflect the intimate relationship between film history and the preservation of works forming it. The appointment of Professor Ruedel in 2015, originally an analytical chemist before becoming internationally active in film preservation in different positions and institutions, on Prof. Koerber’s former position further strengthened the scientific, material approach to moving image preservation.

HTW’s heritage: the Media Archive

One of the more serendipitous opportunities afforded by the school is provided by its ‘media archive,’ a collection of films, magnetic tapes, as well as sets of slides and overhead transparencies, originating from IFBT – *Institut für Film, Bild und Ton* [Institute for Film, Image and Sound], an institution subordinate to the East German Department of Education, and materials dating back as far as the 1940s. Comprehensively documenting university didactics from about 1962 to the end of the German Democratic Republic, these archival materials offer research opportunities not only in audiovisual materials history, but also in film studies of non-theatrical film and the humanities. Effectively saved (and occasionally used for multimedia teaching exercises) by Professor Jürgen Sieck, of the former FHTW, the collection found its way to the conservation and restoration program, under the aegis of Prof. Koerber (Koerber 2003). While a fair share of the necessary work indicated by Koerber—most prominently, reorganizing of the materials in the HTW vaults and establishment of an online database—the latter during an extensive project initiated in 2008, work remains to be done in addition to ongoing monitoring (Koerber, 2003). For instance, it was only recently that the slide collection was investigated more deeply in a first student project, evidencing the film materials and duplicating chains known for cinema rather than still films in the collection of loan slides and master materials. This underlines the value of the collection not only as history of didactic, but indeed also of a repository of East German film, photo and audiovisual carrier materials.

Present and future directions

The availability of two professors from the field of moving image restoration, preservation and archiving is a particular strength for that track, and the audiovisual heritage track at HTW's Conservation and Restoration program has always embraced a broad approach.

An indispensable asset to the curriculum adding very specialized strengths are the visiting scholars teaching specific classes in moving image and sound restoration. These currently include Nadja Wallaszkovits (Phonogrammarchiv - Austrian Academy of Sciences) on the preservation of sound, Fenna Yola Tykwer (Universalmuseum Joanneum) on video, Egbert Koppe (Bundesarchiv-Filmarchiv) on digital sound restoration, and Andrea Krämer (Arri) on digital image restoration, the latter a HTW graduate continuing the class and tradition established by Julia Wallmüller, also graduate of the then-FHTW program.

The current research, project, and education strategy, as reflected in the curricula and collaborative and research projects (which students participate in), pursues the following goals:

- Embracing and furthering a materials-based approach in moving image preservation through applying both classical, manual approaches (e.g. refined cleaning methods) as well as conservation chemical techniques (particularly, techniques of analytical chemistry/conservation science) to the field of moving image and sound.
- Scientifically studying the relationship between a moving image's visual impression and the materiality of its imaging layer (gelatin, grains, tinting and chromogenic dyes, metal and mordant tones etc.), in particular as regards the measurement, reproduction, recreation, and scientific documentation of moving image color through spectroscopy/colorimetry.
- Furthering the understanding of passive conservation strategies, the decay and possible chemical recovery mechanisms of moving image carrier materials such as cellulose nitrate—a daunting task and very long term goal to propose specific realistic milestones for, given that a sufficient understanding of the vinegar syndrome, or

that of paper acidification for that matter, has required decades of research, yet one that should be reflected in the breadth of topics for student projects and theses—i.e. the decay of the select few polymers relevant in the audiovisual field, offering obvious synergies with the expertise of plastics conservation pursued in the HTW sister track record focusing on modern industrial materials.

- Last, embracing the challenge of digitization and the emergence of born-digital media, while remaining aware of an inherent, important caveat expressed by Koerber in 2003, and still equally true more than a decade later: “We would be well advised to limit our activities to those media carrying encoded photographic, moving image and sound recordings. Data preservation in IT [...] has similar, but also vastly different problems and solutions, not quite immediately related to those of restoration and philology” (Koerber 2003, 63).

Tools and Techniques

The interdisciplinarity of the conservation/restoration curriculum, the audiovisual track in particular, and the need for special equipment, demand and encourage that students find opportunities for external projects and internships. Consequently, archival work in the Berlin area, or elsewhere nationally or internationally, is as crucial for the moving image and sound restoration students as, for example, field trips for archeological excavations for the students of that specialization. That being said, dedicated working (and hands-on teaching) environments for the conservation and restoration are available at the school. In addition to restoration studios such as for photography work, these include a media-teaching laboratory with a variety of disc, audio and video playback machines, a digitization setup and a *Diamant Film Restoration Software* workstation to practice moving image restoration. Furthermore, a dedicated room is equipped and available for work with nitrate film elements. Moving image equipment available to students includes 16 and 35mm sound Steenbeck viewing tables, inspection benches and a synchronizer. The scientific working and teaching spaces include a microscopy room (including the instrumentation required for

preparing cross-sections of specimens) as well as a chemistry laboratory. An FT-IR (Fourier Transformation Infrared) Spectroscopy instrument allows for non-destructive analysis for *organic structure* towards, for instance, the determination of image carriers, adhesives, plastics, binders, etc., often in direct comparison with a library of relevant spectra. Complementing this, the technique of XRF (X Ray Fluorescence Spectroscopy), a non-destructive *elementary (atomic)* analysis, is especially powerful for the identification of chemical elements, such as the metals in colour toning or in early natural colour film systems. Reflecting a particular interest in early colour, a dedicated Konica-Minolta colorimeter/UV-Vis spectrophotometer has most recently been installed in 2017 in collaboration with the Clothing Technology degree course. Thus, analytical-chemical study of audiovisual plastic carriers, binding layers, image metals and organic dyes, as well as calculation of the colour impressions they provide are now all available for education and research in moving image preservation at HTW.

Internationalization, Outreach, Conferences

Furthering collaborative projects with moving image archives, the program enjoys particularly fruitful and long-standing collaborations with *Stiftung Deutsche Kinemathek* and *Bundesarchiv*), nationally (such as the project with DIF – *Deutsches Filminstitut* regarding *Der Kampf ums Matterhorn* mentioned above, or, thus far, two separate projects focusing on the materiality and color of chromolithographic loops)—and internationally, remains crucial. Furthermore, a teaching collaboration with the Film Heritage masters program *Filmuniversität Babelsberg* Konrad Wolf is already informally underway, strengthening the connection between the materials/conservation/restoration aspects of the moving image heritage, and its historic study and contemporary dissemination, through exchange visits of students and teachers or in joint events during either program's annual field trip to the *Cinema Ritrovato*.

Internationalization is believed to be crucial for the future of moving image preservation, and this is also increasingly reflected in the student body. While teaching at the HTW program is in both German and English, past graduates have also included professionals both from Iceland and Korea, for example.⁶ The school continues

to strongly encourage international candidates to apply, and maintain active ties to FIAF and FIAF's technical commission, to BFI, BFI's FoFA (Future of Film Archiving) group, to the Colour Group Great Britain, to the University of Zurich (ERC Advanced Grant FilmColors and SNF Film Colors. Technologies, Cultures, Institutions) and other international archives, professional groups, film preservation training programs and other players in the field of moving image preservation. Two conference endeavors associated with the HTW program add to the training, education and networking opportunities afforded to the students. Co-organized by the Conservation and Restoration program's *Modern Materials* track, the biannual *Plastics Heritage* conference deals with a subject of obvious relevance to the moving image and sound field. Although covering a substantially wider range of relevant polymers than those historically used for photography, film and tape carriers, it has been known to sport relevant sessions and contributions on the specific challenges of select plastic materials as image and sound carriers. The *International Conference, Colour in Film* has been established in 2016⁷. Co-organized by HTW and the Colour Group (GB), the conference was first held in London in early March 2016. Its return to London in late March 2017 marks the aspiration to establish it as a regular conference. *Colour in Film* is intended to foster and stimulate the interaction between the two vibrant, but still separate, colour film restoration and colour science circles. It is explicitly aimed at everyone, specialist or non-specialist alike, interested in colour in cinema, colour in cultural heritage, colour reproduction and restoration, and colour perception. The 2017 edition has been held in cooperation not only, as in 2016, with the British Film Institute (BFI), but also with both ERC Advanced Grant FilmColors (University of Zurich) and The Eastman Revolution project (University of Bristol), thus bringing in and together the two most relevant current colour film research projects. 2017 also marks the addition of student presentations, to help foster the next generation of interdisciplinary and internationally oriented film preservationist—a goal fully shared between the conference organizers and HTW's degree in audiovisual heritage.

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Endnotes

1 As translated from <https://www.uni-frankfurt.de/45978235/filmkultur>

2 Students of field archaeology can continue their studies towards a master's degree in a separate course in cooperation between HTW and FU Berlin.

3 Third Edition, 2016, <http://unesdoc.unesco.org/images/0024/002439/243973e.pdf>

4 Also see the respective report from Ger-

man regional television, embedded here <http://krg.htw-berlin.de/studium/studienschwerpunkte/audio-visuelles-und-fotografisches-kulturgut-moderne-medien-avf/> or directly available at <https://www.youtube.com/watch?v=4tFBUTTYWcM>

5 <https://www.deutsche-kinemathek.de/en/about-us/history>

6 See, for instance, the study by Choi as an example of a project that only became possible through such a transnational approach.

7 Please visit www.colour-in-film.net for information on upcoming editions.