

## **GEEKS, BOFFINS, AND WHIZ-KIDS: THE KEY ROLE OF THE INDEPENDENT EXPERT IN TIME-BASED MEDIA CONSERVATION**

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### **ABSTRACT**

In this paper we will introduce you to four experts that the Time-based Media Conservation team at Tate have worked with for many years. These partnerships have made vital contributions and we will explore these through a number of case studies that have broadened our horizons, and explain why these collaborations are so fundamental to what we set out to achieve in our daily conservation practice. In doing so we also hope to encourage conservators to initiate and propagate more projects that will help to capture the wealth of dying skills (particularly in the analog realm), whether it is through oral history studies, training placements, or sabbaticals—because these experts are disappearing at an alarming rate.

### **INTRODUCTION**

Conservation is essentially a collaboration between artists, curators, collectors, and a combination of art and science. But in the context of contemporary art, and in particular technology-based artworks, often neither the conservator nor the artist is a technical expert in the media explored. At Tate in London, we take guidance from principal IX of AIC's Code of Ethics to “. . . recognize the specialized knowledge of others” (AIC 2012, 301) and to actively seek out technology specialists, computer programmers, and designers to work with the artists and us, where our role is often to glean, interpret, and then use our professional values and experience to devise a conservation strategy for the variety of technology-based artworks with which we are confronted.

This is nothing new. Since the birth of the profession, conservators of all specialties have relied upon ancient techniques practiced by modern-day craftsmen, primary sources, and the principle of passing on knowledge from one generation to the next. Most of us might be trained in one particular discipline but have long undertaken a wide variety of tasks outside our particular field of expertise, especially when working in small organizations and businesses with limited resources. We can only manage such situations when we know our limitations and where to turn for advice. Time-based media conservation may take this principle to a new level when it comes to admitting how little can actually be done on one's own without the help of various technology specialists: whether it concerns the preservation of video, the repair or re-making of neon tubes, 35 mm slide duplication, 16 mm film preservation, or designing bespoke electronic control devices which are used to synchronize multi-screen installations. Over the last three years, however, we have begun to find that independent practitioners and businesses on which we have relied are retiring and closing down. There are a number of reasons for this, but primarily the old technology and its specialists are now largely obsolete. The challenge now facing us is that many of the artworks in question rely specifically on specialist equipment that has been superseded by technological advances (fig. 1).

This paper introduces some of the experts with whom the time-based media conservation team at Tate has worked for many years. These partnerships have made vital contributions to the way in which technical problems are approached; they have influenced the way we train junior staff, and have proved invaluable at times when all practical solutions seem to have been exhausted. These relationships are presented through a number of case studies that have broadened our horizons, and the reasons why these collaborations are so fundamental to what we set out to achieve in our daily conservation practice are explored. In this way we hope to encourage conservators to initiate and propagate more projects that will help

to preserve the wealth of these dying skills (particularly in the analogue realm) whether it is through oral history studies, training placements, or sabbaticals—because these experts are disappearing at an alarming rate.

It has been seven years since we started working as time-based media conservators at Tate and we feel that it is now time to introduce our independent experts and acknowledge these individuals and reflect upon the partnerships we have forged. Thus, we support and commend the efforts of bodies such as the Electronic Media Group (EMG) and the TechFocus initiative for inviting these specialists to talk and demonstrate their expertise to a conservation audience.

In preparation for this paper, we formally interviewed four specialists with whom we regularly work to: reflect on the relationship from both perspectives; question how they have changed over the years; and consider what is needed to sustain them in the future. What immediately struck us was that we are still working closely with these experts even though we have practiced time-based media conservation for several years. It might be thought that we would gradually rely less upon these experts, which in some ways is true. We are dealing, however, with a broad range of commercially manufactured technologies that are constantly changing. We are now much better at troubleshooting and predicting failure; we can strip and maintain slide and film projectors; but there is always a new or slightly different problem because artists like to subvert technology and use it in ways for which it was not intended. And although collectively our team has built up a wealth of in-house knowledge, at times we still reach the point where we have exhausted all known remedies and it is then that these outside experts continue to prove utterly invaluable.

#### **JOCHEN TRABANDT**

(interviewed by Tina Weidner)

Jochen runs the Activity Photo Lab in Esslingen on the outskirts of Stuttgart in Germany with his wife Elke. For



Fig. 1. Time-based Media Conservation Department and our experts.

the last two years, he has been instrumental in allowing me to share his broad knowledge about quality control for producing accurate 35 mm slide duplicates. This collaboration began shortly after Kodak's Ektachrome duplication slide film (EDUPE) was discontinued at the beginning of 2010, and as a consequence Tate was faced with an urgent requirement to explore options for the continued display of slide-based artworks.

Jochen clearly recalls the day we first made contact as this coincided with artists Phil Collins (b. 1970) and Tris Vonna-Michell (b. 1982) both enquiring about slide duplication, which according to Jochen was the first time in 10 years that he had been approached to do such work. At the same time a conservation student from the Museum of Modern Art in Frankfurt was conducting a survey on which remaining photography businesses still possessed the skills and equipment for producing 35

mm slide duplicates. Whether this was pure coincidence remains unclear, but Jochen was ecstatic to be given a fresh opportunity to use his Forox Trick Camera, which had lain unused (but carefully maintained) for a decade.

Forox is a precision reproduction table that can be used to duplicate slides and many other analog graphics applications that were state of the art until the introduction of digital design programs. When he talks about the early days of Activity, Jochen often refers to the day when the first Forox rostrum camera arrived in 1986, which, at a cost of \$150,000, was a huge investment for the young couple. At this time only three other companies in Germany owned a Forox. Shortly after mastering this extraordinary piece of equipment, he bought another so that Elke could work alongside him when producing elaborate, often last minute, commercial productions for the automobile industry, then Activity's main client. Subse-

quently, he bought two more and about ten replacement color heads, the most crucial part of this camera, so that he is fully prepared for a future lack of spare parts, as this technology is now long obsolete (fig. 2).

Jochen is a perfectionist and holds degrees in electronic engineering, physics, and media communications, but not in any art-related discipline. He has lectured in Media Design and Photography for almost a decade at the Stuttgart Media University and has shared his expertise with countless interns and apprentices who are now scattered around the world but with whom he has stayed in contact. As with Adrian Fogarty (interviewed later in the article), Jochen was exposed to cutting-edge technology as soon as it became commercially available, which helps explain how he approaches a problem and unravels its potential causes and remedies. For my part, and that of the younger technicians I work with, we are constantly

trying to work on two fronts—as we need to gain an understanding of past technologies while being confronted with the latest developments. Jochen and Adrian have a different form of appreciation, having experienced the evolution and entire life cycle of this equipment.

Since working with Jochen, my knowledge about slide duplication has grown exponentially despite slide duplication becoming an ever-more challenging task given the demise of industrial support. In 2011 we started to test the feasibility of using Fujifilm CDUII 70 mm slide duplication stock for which we plan to build a machine to cut the film stock in half to produce 35 mm film strips. Jochen has, in anticipation, modified his pin-registered camera so that it can transport film with perforations on just one side and still maintain perfect registration. Jochen is always one step ahead of me and many potential obstacles are resolved almost immediately. In 2010 we



Fig. 2. Jochen Trabant in front of the Forox rostrum camera (contact: [info@activity-studios.de](mailto:info@activity-studios.de)).

worked together on *Magic Lantern*, 1987, tape and slide program; 3 slide projections and soundtrack, by Susan Hiller (b. 1940), a work that required slide mounts with different sized circular openings that have long been discontinued. I was still pondering how we could best re-manufacture them, and by the time that I had worked out a plan of action, Jochen had already milled and stenciled them with perforation holes on either side so that they could clip in pin-registered mounts—I was speechless.

Obviously slide-based artworks are a little different from commercial large-scale multi-vision slide production, which Jochen used to design, and he is often surprised at the sub-standard quality in which artworks were shot or duplicated. This simply reflects the environment in which artworks are often made, which does not follow any standards or norms as each one has its unique story to tell. I often travel with the artists to meet Jochen at his lab in Esslingen and talk through the tests that he produces in advance. To sit around a large light box, each of us equipped with a loupe to magnify the slide, while discussing the beauty of slide transparencies in general, is a very festive moment for all of us. Even if this might be the last time that these slide duplicates are made for this particular work, it is a celebration of mastering this analog skill to perfection.

There are only three times that I have seen Jochen at a loss for words. The first was when the commercial photography lab developing his film entirely lost control over the chemicals in the processing bath because of control strips from a faulty production batch. The second was when around one thousand 70 mm slide duplicates that took many days to produce were scratched as the film was sleeved, and finally, when we both unknowingly bid against each other on eBay for the same film stock.

I would not be surprised if Jochen has the world's largest stockpile of slide duplication film at the moment. He went to a great deal of effort to locate remaining stocks, testing them to check whether the emulsion was still

viable, and finally purchasing them in the last couple of years so that he can support museums and artists in their endeavor to keep displaying slide-based artworks. Though Tate has recently been able to earmark resources to arrange for a reasonable amount of slide duplicates for the works in its collection, on the whole, many museums struggle to decide whether they should digitize the slides or arrange for analog duplicates, as the funding available may often only stretch to one or the other. Jochen often asks me for advice on how best to approach museums to make them aware that time is of the essence, as it is unclear how much longer E-6 processing will be available. Sadly, I know too well that it can often take years to discuss this in-house and find ways to arrange for funding, which is difficult for him to imagine, given the short lead times that museums frequently demand of his service.

Very recently, he has invested in a new set-up so that he can offer digitization alongside analog duplication, as we both felt strongly that when artists present a unique opportunity to have temporary access to their in-camera originals, it is of paramount importance to be able to offer both. I very much hope that all the slide stock will come to good use so that Jochen can carry on producing the best matched slide duplicates imaginable and that the legacy of this medium and the beauty of slide-based artworks can be witnessed as the artist originally intended for longer.

### **BOB WHEELER**

(interviewed by Kate Jennings)

Bob Wheeler is a consultant for video projection, monitor, and digital playback technology. Pip Laurenson, former Head of Time-based Media Conservation (now Head of Research for Collection Care at Tate) met Bob some 10 years ago. She had contacted Sony about their D-50 cathode ray tube (CRT) projectors. They suggested she contact a company called Marata Vision who dealt with the technical side, but also with home theatre, which meant that they understood set-up, viewing environments, and customer requirements. At this time Bob

worked for Marata Vision and came to assist Pip. Bob has been a constant guide for the team ever since. He has accompanied us on our projector technology journey starting out with CRT and liquid crystal display (LCD) projectors in the late 1990s, onto digital light processing (DLP) and then D-ILA projectors, the latter which is a form of liquid crystal on silicon (LCOS), and no doubt in the near future for our next step into light emitting diode (LED) projector technology (fig. 3).

Bob is incredibly generous with his time and knowledge and one of his greatest strengths is translating technical specifications and the language of a sales pitch delivered by the projector manufacturers. Manufacturers can embellish the truth and he can always point out exactly where they do. He continues to remain competitively priced and he doesn't blink when we ask if he can assist in setting up what we refer to as "a projector shoot-out."

This is a comparative test that we carry out when we might be looking to increase our equipment pool or if we have a particular artwork and need to work out with the artist the type of video projector technology that is most appropriate. Bob will source perhaps three different types of projectors on which to run our tests. We line them up side by side and then project the same source material through all three projectors simultaneously to make the comparison.

Marata Vision was bought by a larger company and three years ago Bob went solo. We continued our relationship with him rather than with the original company. During our interview to prepare for this paper, I learned that through working with Tate and subsequent word of mouth, the majority of his business is now primarily working with artists and galleries and he consults predominantly across the UK, but has also worked in the



Fig. 3. Robert Wheeler in Tate's equipment storage (contact: bob@rlwconsultancy.co.uk).



Fig. 4. Timothy McGill during an archiving session (contact: [tim.mcgill@btinternet.co](mailto:tim.mcgill@btinternet.co)).

Middle East and North America. So, it was interesting to learn that there has in fact been an exchange of knowledge, which was a pleasant surprise.

### TIM MCGILL

(interviewed by Kate Jennings)

Tim has worked with videotape technology in the London post-production environment for approximately the last 25 years. It is his long and intimate knowledge of both running the video playback decks and looking at this range of material and recognizing artifacts typical to different sources that are invaluable to our acquisition and long term video preservation activity.

Tim met Pip Laurenson 15 years ago, when she hired an edit suite to work with artist Sean Landers (b. 1962) in a now disbanded post-production facility in London's

Golden Square. Tim was the senior operator that day and supervised the session. He mentioned that in order to assist with the work, he needed to think laterally to understand the unorthodox workflow of the artist, compared with the usual broadcast industry standards he worked with on a daily basis. He realized that a different approach was required in this instance and when reflecting during our interview, he said that he was also really interested in what Pip and the artist were doing. This is Tim's key quality: he understands what we do and more importantly enjoys it.

He said he finds it both exciting and nerve-racking to work with the unpredictable production style in which works of art are often created. Originally he became interested in working with video through a creative rather than technical impulse. Most of Tim's technical knowl-

edge is self-taught and consequently I sense this better helps him understand where I get lost and so is able to patiently explain technical issues to me in a clear way. Up until about three years ago, Tim would assist us when we hired post-production facilities in Soho, to work on new acquisitions or carry out our annual video migration that was, until recently, all tape-based. Over the last few years we have witnessed a significant shift and now artists generally deliver digital video files on external hard drives or via File Transfer Protocol (FTP) across the internet, rather than on tape, at acquisition. Fortunately, home editing is now affordable and we are able to do the majority of this work in-house. Today, Tim comes to our studio at Tate whenever we rent videotape playback decks to capture and migrate video tapes to digital files. During these sessions Tim and I often spend seven hours together in a dark room watching video artworks, and this means we have gotten to know each other well (fig. 4).

Through working with us, he now also freelances for a number of artists working in London including Catherine Yass (b. 1963) and Hilary Lloyd (b. 1964). For them he carries out post-production tasks in a structured way and also prepares files for playback in the gallery. This is possible because with the advent of affordable editing software, he can now run his own edit suite at home, instead of resorting to a multi-million pound post-production facility for every edit. Our interview ended with a philosophical discussion about a tape being something you can hold in your hand as an object whereas, although digital files are easier to replicate, they are in a sense more ephemeral. Tim and I have endless technical debates when working together and on some occasions we do not always agree, which is what I value the most, as it keeps me on my toes when devising preservation strategies for video works.

### ADRIAN FOGARTY

(interviewed by Tina Weidner)

Adrian Fogarty is the specialist with whom we have worked the most. Adrian has a double value to us. First,

he is a trained engineer and works directly with many artists on the fabrication of their artworks where he is often presented with an idea that he then translates into a practical solution. Second, he is an expert in electronic devices and motors who helps us to understand the workings of particularly complex equipment. One of Adrian's main tasks when working with us is to improve the robustness of a device so that it can withstand the ambitious performance that Tate requires, running for 70 hours a week for anything from three to twelve months (fig. 5).

Adrian's involvement with Tate started in 1996 when he set up the video projections for Douglas Gordon's (b. 1966) award-winning Turner Prize exhibition, at a time when video projectors were rarely seen in galleries and museums. This was before Tate had a time-based media department or even an audio-visual technician.

My first encounter with Adrian was during the first project that I worked independently at Tate, the installation of the exhibition *Summer of Love* at Tate Liverpool in 2005. I set out to prepare a condition report on his newly designed equipment for Gustav Metzger's (b. 1926) *Liquid Crystal Environment*, 1965, remade 2005, 5 control units, liquid crystals and slide, 35 mm, 5 projections, color, 22 min., acc. no. T12160. I was soon hopelessly confused by the level of technical detail. But after working with and learning from Adrian over the past few years, I am now able to install this work single-handedly.

Until the early 1980s, Adrian specialized in the engineering of oceanographic scientific instruments and he worked on tools such as the current meters used by oil companies to plan the positioning of oil rigs in the North Sea. Consequently he started working with computers as early as 1974, and simple but effective programming remains one of his core skills combined with the design of printed circuit boards. When asking how he ended up working in the arts, he recalls that a good artist friend of his, Roberta Graham, for whom he made equipment and



Fig. 5. Adrian Fogarty in his multifunctional lab (contact: AMF4broaduse@hotmail.co.uk).

helped create her slide tape works, introduced him to an artists' collective known as the London Film Cooperative. Around the same time he designed a synthesizer and produced the sound effects for a Derek Jarman (1942–1994) film and suddenly, he became one of the default technical experts in the London arts field in the 1980s. This has continued to the present today, although there are periods when the phone goes quiet. Adrian has never advertised his services and does not have a website as his sole publicity is priceless word of mouth. Adrian's lab, in his attic at home, has a footprint of just three by two meters and yet contains a milling machine for mechanical parts, a sound and recording studio, and a micro-soldering station to produce electronics for which he sometimes has to turn the kitchen into a chemistry lab to etch printed circuit boards.

Over the years, Adrian has been involved in the production of multiple artworks, which he designed or custom modified, some of which later became part of Tate's collection. There is also a very high demand to help us repair and maintain electronic-mechanical equipment and Adrian is often the first point of contact.

The following two projects are exemplary of Adrian's genius. Gustav Metzger's *Liquid Crystal Environment* originally provided the visuals to accompany a live performance by The Who in 1965. This was reconstructed as a fully automated version for the 2005 *Summer of Love* exhibition at Tate Liverpool. For this Adrian designed a box of tricks that could change the temperature inside the slide projector, regulate the brightness of the lamp, and rotate a polarizing filter. All of these elements are em-

played to alter the appearance of liquid crystals enclosed in a slide mount so that their aggregate state changes between liquid, solid, and crystalline, and consequently creates a truly psychedelic projection. Gustav and Adrian worked together constructing a sequence that would allow subtle changes at first, which evolve to a state where the slide projectors respond to one another, until the full drama unfolds. The first prototype for this project dates back to 1998 and Adrian is now working on “Version 5.0,” the latest update of its technical invention (fig. 6).

A similarly notable work in Tate’s collection where Adrian proved indispensable is Martin Creed’s (b. 1968) *Work No. 112*, 1995–2004, acc. no. T12211, a floor-based installation consisting of 39 metronomes. The metronomes are placed in one room and as a result of setting

the weight attached to each of their needles at different heights, the beat of each differs in rhythm creating a cacophony of sound. These traditional metronomes are designed on the principle of a spring that requires manually rewinding once unwound, which is normally done by hand using a small key. As this was impossible to sustain in a museum display, open all day seven days a week over several months, Adrian was approached to design a system in which the metronomes could be automatically rewound. Naturally there is not much space inside a metronome; hence compactness was of the essence. The problem was to allow the mechanisms to detect the moment when rewinding was required and equally, how they could prevent over-winding. Adrian’s solution was to include a mini microphone and a processor that together would count the ticks to know when to turn the motor on



Fig. 6. Re-construction of Gustav Metzger’s *Liquid Crystal Environment* (1965) in 2005 at Adrian Fogarty’s lab showing modifications to slide projectors. Installation view of artwork in Tate Triennial 2009: *Altermodern – Introduction*, Tate Britain, London in 2009 at lower right (Courtesy Gustav Metzger and Tate).



Fig. 7. Modification for the automated playback of 39 metronomes in Martin Creed's *Work No. 112* (1995–2004) in 2009 at Adrian Fogarty's lab. Installation view of artwork in *Classified: Contemporary British Art at Tate Britain*, London in 2009 at lower right. Courtesy of Tate.

and listen for the gearbox stalling to turn it off. It seems a shame that his compact and elegant solution should remain totally invisible (fig. 7).

Adrian has technical limitations and fully respects these when it comes to the complexity in which consumer electronics have evolved; for example there is no screw on a Kodak S-AV 2050 slide projector that he does not know intimately; but he was most reluctant to undertake the dismantling of a Kodak Ektapro Cine 9020 slide projector. We had recently purchased a large number of these second-hand and soon realized that they were all programmed with an auto soft-fade feature that could not be overwritten. The only option to overcome this was by replacing the microprocessor chip, which meant stripping the whole projector for which I badly needed Adrian's assistance. We were both out of our depth but

succeeded and have since trained Tate's Time-based Technician to carry out this modification. It is always a revelation to master a task that we both doubted was possible; it broadens our horizons and reinforces our trust in our own expertise. This, in itself, is one of the greatest paybacks in our job.

Adrian only accepts jobs that he is comfortable with. When in doubt, he presents a thorough feasibility study and submits it as a written report. I do not know whether Adrian actually likes writing reports, but he certainly produces a lot of them. Such is the precision, and the clear operation instructions and insights they include, that we use them as manuals. Adrian has never manufactured something that failed but also never stopped taking his designs further, just out of curiosity. Microchips are growing increasingly smaller and more powerful, and

this frees up valuable space on his tiny PCBs for new features. When visiting his lab, I can make out the remains and prototypes of every project we have worked on together.

We often contemplate how we could improve the mutual benefit we gain from working intermittently on various projects. Adrian is great fun but also very inspiring and motivating in the way in which he ponders problems out loud and brainstorms in a unique fashion. He always involves museum technicians in this process, asking for our opinion, so that whatever is the ultimate conclusion, it is the result of teamwork. Tate has a flat structure and working with somebody like Adrian often makes us notice how we can improve on our own teamwork, but also on how little it takes to share our experiences and successes together.

One idea that has developed from this process is to instigate regular training modules on various aspects of understanding and maintaining these technologies. Obviously this will not make us engineers but it will improve our understanding of technical challenges and our ability to communicate this knowledge. Lately, Adrian has started to use Skype to assist during installs when Tate loans artworks with which he has been involved and he is not able to be present in person. This is often just for my own peace of mind, and it only works if I can follow his suggestions and implement them myself. He knows the level of expertise I should have by now and he challenges this—which is a great way for me to be aware of my progress.

## CONCLUSION

On reflection, we would both like simply to spend more time with our experts at the bench learning skills, as their combined knowledge is something unique that no book or university degree could replace. It is also their

approach to narrowing down a problem, to freely brainstorming on available technology, and the resilience in which it is followed through that we hugely benefit from when dealing with the ever-changing environment to preserve time-based media works of art and care for their continued display. We have a number of specialists with whom we work that are a generation older than the four introduced in this paper, and with the former we have noticed that apprenticeships, which were arguably until recently a common model for learning and building knowledge from previous generations, have also become an obsolete construct of the 21st century. However, on the flip side, we are now looking for experts in emerging technologies, especially when it comes to the preservation of software-based art.

One of our aims is to capture and propagate the wealth of dying skills particularly in the analog realm, and following a discussion with Adrian Fogarty, we are researching the viability of online tutorials for the conservation field. Proposals for topics include simple electrics such as power calculations and the use of a digital voltage meter, maintenance procedures and trouble-shooting of electronic equipment, and understanding the choice of transformer for different sized neon light installations.

They are relatively simple ideas but extremely useful tools that help us master the challenges that we face on a daily basis. If you are interested or have additional topic proposals, please do get in touch. In conclusion, we sincerely hope to encourage conservators of time-based media artworks to initiate and propagate more projects that will help to capture the wealth of dying skills whether it is through oral history studies, seminars, lectures, training placements, or sabbaticals, because as we mentioned at the start of this paper, these experts are disappearing at an alarming rate.

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