



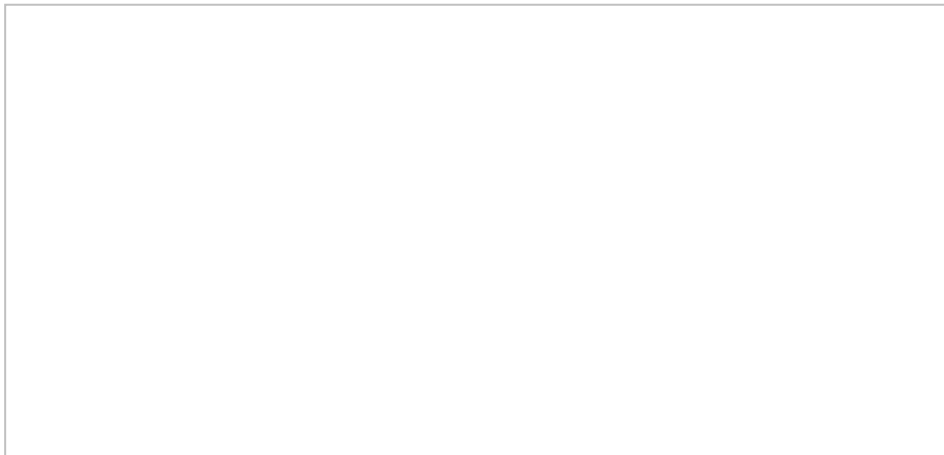
# The Royal Photographic Society

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## HOLOGRAPHY GROUP

### CHRISTMAS NEWSLETTER

2007



#### ***Hologram from SiTech – Spatial Imaging Technology Ltd***

*Made in Mexico using the SiTech Lightgate B5 digital hologram mastering system.  
It shows the many techniques available with the system such as full colour three-dimensional images, high resolution kinetic images, photographic images, white images and hidden 'secret' images only viewable with special equipment.*

## Editorial

At last, another Newsletter. I apologise for the exceptionally large gap between this and the previous one, initially because of the uncertainty surrounding our next conference (which it was intended to announce here), and latterly because your editor has been in and out of hospital for the last two years (and housebound in between). However, I did manage to struggle to the Symposium at St Asaph for one day, and was delighted to renew many old acquaintances – an important part of all such conferences. I am happy to be able to report that I am once again fully mobile, with a 20-year guarantee on my new knees.

Our own conference was postponed partly because we didn't want it to follow too closely on the Symposium; also because the demise of the Shearwater Foundation had left us short of the funds we needed in order to achieve the kind of quality that would do justice to the Group and its aims. We had already been given half of the promised amount, which was most welcome, but the rest was still outstanding and looked like remaining so. Fortunately, another source, the newly-formed International Holography Fund, has come to the rescue and made up the deficit; and, with possible contributions from the Institute of Physics and the RPS itself, we hope to make the forthcoming conference a real success.

The RPS Annual Awards ceremony again took place in the RIBA's palatial quarters in Portland Place on 3 October. At one time this ceremony was an almost furtive affair conducted with minimum publicity in some fairly obscure venue, but has over the past few years pulled up its metaphorical socks and has become, thanks to some good PR and past President Ray Clark's inspired and lavish presentation, the big event of the year for the Society. This year, I am happy to say, a fair number of our Group members were visible among the audience. The award for progress in three-dimensional imaging was for only the second time given to a non-holographer, whose research involves both high-speed cinematography and 360° imaging of moving objects. A description of his methods, as well as that of another up-and-coming company, this time based in Dresden, appears in this newsletter. By the way, there is still time to nominate people for any of the RPS awards for 2008, as long as you are fairly quick about it: the Awards Committee is anxious to have as many nominations as possible in order to make a fair choice for each award. You can get nomination papers from the Awards Secretary Jo Macdonald at the RPS, or from me by e-mail.

As I write this, there are only a few weeks left to Christmas, which seems (at least for the High Street retailers) to begin earlier every year, as do all the other festivals – the fireworks started up locally in the third week of October, and already there are hot cross buns and chocolate Easter bunnies in Sainsbury's! So it is time to wish you all a very merry Christmas and a happy New Year from myself and all the Committee.

Graham Saxby

## **Holography Group Conference**

Our one-day Conference is now definitely scheduled for Friday 19 September 2008. The venue will be De Montfort University, Leicester. As we now have full financial back-up, we are able to invite some distinguished guest speakers from overseas, several of whom have already indicated their willingness to take part. There will be a standard fee for attendance, with a reduction for students: we expect this to be around £45, including lunch and coffee. We should also be able to arrange accommodation for those who need it.

The suggested conference title is 'Holography in the Modern Museum', the main theme being the application of holography in the recording and conservation of valuable artefacts and the role of holography in art exhibitions, but other relevant topics such as advances in techniques and in materials and processes may be discussed. In a separate room there will be demonstrations between sessions of basic holographic methods.

The conference will be accompanied in the same building by an exhibition of display and art holograms, of a type similar to the one that was mounted in conjunction with the Symposium held last year at St Asaph. It will include recent work as well as some classic images from Jonathan Ross's collection. The exhibition and the holography demonstration sessions will be open to the public.

Once the arrangements are finalised we shall be sending out a call for papers. There will be a poster session for those whose papers can not be included because of time limitations.

A full report of the proceedings will be made available at or shortly after the conference.

## Two new approaches to motion recording in 3-D

It was good to see a non-holographer winning an RPS Award that had previously gone almost exclusively to members of the holographic fraternity. This year the Saxby Medal was awarded to Dayton Taylor, who has developed a system that produces extraordinary images of objects moving at high speed, in full 360° parallax. In a typical demonstration series on his website [www.digitalair.com](http://www.digitalair.com) you can see a bullet with visible shockwaves crossing the picture area, then suddenly frozen in mid-air, whereupon the viewpoint passes right round the subject matter, after which it continues on its way. The technique involves conventional high-speed photography, and employs a ring of cameras round the test chamber, covering 360°. There are applications in schlieren imaging, explosion propagation investigations, and other high-speed phenomena, as well as a number of commercial possibilities for imaging moving subjects hitherto depicted only in 2-D. These certainly have the 'wow' factor in spades.

Another up-and-coming concern, based in Dresden, also markets images using 3-D technology, this time based on an ingenious amalgam of hologram, TV and stereogram techniques. The problem underlying holographic video has always been the reduction of the enormous amount of image information contained in a hologram to the level where it can be transmitted as a signal at normal TV rate, i.e. 50 or 60 images per second. Steve Benton managed to reduce this discrepancy to something rather more manageable, simply by eliminating vertical parallax (inventing the rainbow hologram in the process, to our everlasting gratitude). But in fact this was still a long way from the goal. The team at MIT has continued to work on the problem, and has recently achieved some success. (More about this, I hope, in a subsequent newsletter.) However, this company, RealImaging, has found one solution that combines the flying-spot principle of TV with the two-beam technique used in dot-matrix holograms and with eye-following optics, to produce a convincing holographic motion image. In order to reduce the information content sufficiently, the horizontal parallax is also removed by using the reference beam in the form of a single flying spot, so that each image is a single tiny spot of light at each instant, but by the 'persistence of vision' phenomenon the viewer is able to see the whole scene, just as in a TV image. An optical tracking device follows the viewer's eye position so that a specific image is created for every viewpoint. The subject thus appears in full parallax, like a stereogram; and in addition each pixel (or rather voxel) contains a small piece of image in

full depth. The response is fast enough to permit real-time action to be recorded, and it is claimed that more than one person can view the screen at the same time (presumably with extra position sensors), over a wide angle. On the company's website [www.Real.com](http://www.Real.com) you can see examples, and learn about the process, or as much about it as the company is prepared to release (because of its reticence in this matter, the above explanation contains some educated guesswork).

## **Why collect holograms?**

(Abridged from an article first published in *Journal of Holography & Speckle*, a special edition celebrating the achievements of Yuri Denisyuk)

When I mention to someone new to holographic lore that I collect holograms, I can tell from their reactions that they think of projected images floating around the room, or perhaps, more realistically, of little shiny squares on credit cards. Some of them may have been to an exhibition of holography years ago, and vaguely remember eerie green images. Why would anyone want to collect these? But when I tell them that artists have used holography as a creative medium since the 1960s, and that an early work by Bruce Nauman recently fetched over \$200 000 at Christies, they begin to see the point.

Collecting holography from the 1960s onward resembles collecting early photographs, except that holograms are comparatively rare. Scientists and artists who struggled with the process in the early days created images that are now a good deal rarer than, say, daguerreotypes. I began by collecting the work of just a few artists, but gradually my collection widened in scope to include examples from the printing and packaging industries, along with holographic curiosities such as action figures, sunglasses, mobile phone screens, clothes, jewellery and the like. Such a collection gives an interesting take on fin-de-siècle Western society and its obsessions. Many museums incorporate twentieth century design into their collections: packaging design incorporating holograms is a field of its own. One can also collect banknotes, authentication stickers and government seals (I even have an Iraqi banknote with a holographic stripe and featuring Saddam Hussein). However, at present few if any curators seem to be interested in acquiring examples of such material.

Becoming a collector is perhaps a question of mindset. For myself, I accumulated a few holograms over the first ten years with no real thought of a collection. Then, having sold my business but wishing to remain involved in holography, the formation of a collection of holograms seemed a promising venture. I was aware of other collections in Germany, France, and the USA; furthermore, by the 1980s small holographic galleries were beginning to spring up in cities in Europe and the USA. So I decided that a better policy would be to try to infiltrate museums and galleries that already exhibited photography and other contemporary art, so that holography would begin to be understood as a legitimate art form rather than existing in a ghetto of its own. I had a few good pieces left over from our opening exhibition at the Hologram Place in London (1978–80) and decided initially to focus on British holographers. In 1990 I began to collect seriously. The unfortunately short-lived holography unit at the Royal College of Art was at that time still flourishing, and the course had already produced some excellent work. This was a high spot in English creative holography. I bought work at all the degree shows. In retrospect, perhaps I should have bought more!

The first time I had heard of Yuri Denisyuk's part in the development of the reflection hologram was from Nigel Abraham, my former colleague, who had made a holographic stereogram of the great man. (This image is now in MIT's collection.) But it wasn't until several years later that London's Light Fantastic Gallery staged the exhibition Holography Treasures of the USSR that we had the opportunity to see the full splendour of Soviet holographic technique. The USSR's concept of art holography was in fact no more than three-dimensional images of existing art objects, made in order to take 'art' to the people in correct Socialist fashion. Impressed as we were by the technique, to Western creative artists, holography needed to be more than just a way of making facsimiles, and it was American workers such as Dan Schweitzer and Rudie Berkhout, creating abstract white-light transmission holograms, who showed the way. Following such examples, artists began to employ the medium to produce works that could not be achieved by any other means.

Twenty five years later, I still believe holographic art to require more than just a three-dimensional image of an art object, though I have now acquired respect for the artisan holographer whose craft skills enable him or her to record a perfect holographic image of such an object.

The British Museum does indeed have one hologram on display, a recording of the famous Lindow Man alongside the real thing. The V & A also possesses some more creative holograms collected in the 1980s by curator Chris Titterington. But how many other museums have them? One photography museum is recorded as having declined an offer of holograms, saying that they had one already – presumably implying that that box had already been ticked!

But why should museums – or individuals – wish to collect holograms? Well, many museums already have collections of photography, and holography is a further development in image making. It is true that comparatively few well-known artists have made use of the newest technologies as yet, so that many museums possess only second-rate representations of contemporary art. As far as holography is concerned, there is an opportunity for an entrepreneur to buy into a new art form at comparatively little expense. A private collector is not bound by committees and trustees, and can pick and choose among the best.

In spite of the lead by the major Soviet museums in the 1960s and 70s, museums in the West have never taken up the idea of making holographic replicas of their precious artefacts for travelling exhibitions or even for sale in their gift shops. Today, with low cost lighting, inexpensive equipment and full colour materials available, there seems to be little excuse for this omission. In this respect the market is wide open for commercial exploitation. But it is equally wide open for the private collector, of whom there are still fairly few; and high quality work is still affordable (if not always easy to find). Time will tell whether art holograms become valued collectables in our lifetime, as classic photographs have done. But I like to tell myself that after some thirty years of involvement I did manage to get in early!

Jonathan Ross