Looking Back and Forward – Holography at the Academy of Media Arts, Cologne (KHM)

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Abstract. The holography laboratory at the Academy of Media Arts, Cologne (KHM) has been active since 1990. During this time numerous students and staff have created holographic artwork and experimented with various printing techniques. Several projects are presented to show how holography can be used to explore a range of artistic concepts, leading to a discussion of the holographic image in relation to creative practice and art education.

1. Introduction
Academy of Media Arts, Cologne [Kunsthochschule für Medien] known as the KHM was founded in 1990 with the aim of establishing an environment for the advancement and teaching of new media arts. The founders understood that exploring artistic questions with new media required not only technical proficiency but the cross-pollination of conceptual thinking in a number of disciplines.

One of the founding professors, Dieter Jung, established the holography laboratory – the ‘hololab’ – with the assistances of KHM technician Urs Fries and assistant professor Andrew Pepper. Over 22 years the hololab has seen a wide range of projects created by KHM students, many guests and a number of visiting fellows. The assistant professorship in holography is a limited term position that had been held by Michael Bleyenberg (1997–2002), Peter Schuster (2002–2008) and currently Martina Mrongovius (since 2009). In 2008 Mischa Kuball became the professor of holography, creating the -1/MinusEins / Experimentallabor and encouraged students to develop artworks with optical media and present these on the ‘urban stage’[1].

The holography laboratory in -1/MinusEins currently comprises:
- A multiplex printer ‘the Imager’ first installed 1991 and updated in 2003
- A dot matrix hologram printer with a resolution of 280 x 380 px installed in 2002
- A small table with HeNe laser

The multiplex and dot-matrix systems were designed by Walter Spierings of the Dutch Holographic Laboratories.
This paper describes a number of conceptual explorations made with holography at the KHM to reflect on the broad scope of the medium and raise the question of where holographic imaging technology could lead next.

2. The hologram as an architectural element
Michael Bleyenberg was both a student and assistant professor at the KHM and developed holographic works that he came to consider as ‘Light Architecture’[2]. Bleyenberg currently collaborates with the Cologne based company HoloPro to produce architectural installations with dot-matrix holograms.

3. Animation in holographic images
The multiplex holographic printing system ‘the Imager’ has been used to print both stereographic images that synthesize 3-dimensional space as well as a whole range of animated sequences.

Jean-François Moreau was a fellow from 1994–1996 and made multiplex ‘video-holograms’. He also used the multiplex printing system to create 3-dimensional portraits using a camera track and through data collected by scanning the subject. Moreau was interested in how time could be captured and viewed through holography, “the hologram introduces a new type of time... The movement in space of the viewer corresponds to a displacement in time for the image.” [3]
Martina Mrongovius who first came to the KHM as a guest in 2005, became interested in the way multiplex holograms provoked the viewer to move and has creating a series of works that played on the relationship between the movement of the viewer and the animation of the scene.

4. The hologram as a memory

The relationship of the hologram to memory was nostalgically captured by postgraduate student Stefan Sillies in his installation *Schau heimwärts!* [Look homeward] (2005). The installation consisted of six tables each with a number of small boxes, some of these boxes could be opened, some could not. Some of these boxes illuminated a hologram when opened. Other boxes when opened were empty or filled with small things. Each small box reflected a stage of life or a special event.
A guest student from Chile, Claudia Sandoval considered the social implications of holographic images and was drawn to the disappearance of the image when not illuminated or viewed from the correct angle. Working with this quality Sandoval created a series of dot-matrix hologram portraits ‘Holograms of Deportation’:

“In ‘Holograms of Deportation’, mirrors stand blindly reflecting throughout the day on walls of Berlin. Only during a couple of hours of the day and from a certain perspective these mirrors reproduce the images of three people who have been deported from Germany, as if these dot holograms were bringing back a sort of screaming ghosts. The street art intervention is transmitted through the internet during the day. Opposite to all expectations, nothing happens to the holograms. In a city like Berlin three standing mirrors are quite invisible. As if the city itself knew they contain only ghosts, as if it was better to keep the deported as they are: Unseen.”[4]

Claudia Sandoval, ‘Holograms of Deportation’ 2010

5. The limited viewing of a hologram
The limited yet relational geometry of viewing white-light transmission holograms was the basis of Stuart Rosenberg’s experimentation leading to ‘Viewing Apparatus’(1991–1993), in which relationships of viewer, light-source and hologram are materialised into a device. The first iteration of the project View1 looked something like a medieval torture device: the viewer inserted their head between two planks of scaffolding wood. The physically uncomfortable restriction was reflected in the hologram designed for the installation.

Stuart Rosenberg, ‘Viewing Apparatus’
View1 and hologram for installation, 1991
This positioning of the viewer was also the theme of Mioon’s installation *Holopublikum* (2005) “In front of the audience there is a stadium. 200 holographs hang down within this stadium to give a clap to the audience. Moving components (consisting of ten motors) are installed behind the 200 holographs to move them. With this motors the people shown in the holographs are generated to shout and cheer. If the audience stands in front of the stadium, it can hear sounds of shouting and cheering peoples, too. Actually in our huge modern society people are standing under the influence of mass media, politicians, capital and other external influences. Historically we have seen the example of control or domination thru this so many times. So with this works I want to show this situation and the lack of critical faculty of the general public, and the lack of personality of them. Besides that, I also want to show to the people that they are controlled right now by somewhat.” [5]

6. Playing of the holographic image

Seth Riskin who was a fellow at the KHM in 1999 considered the playing of light through the hologram by using his body as a light source for performance that was then viewed through a holographic diffraction grating.
The playing of the holographic image was also explored by postgraduate student Auriel in his garden installations of dot-matrix holograms. The holograms, which he changed like during the performance, were illuminated by dappled sunlight and accompanied by a reel-to-reel recording of Auriel’s music.

7. **Fragmentation and structure**
Miri Shin, who is currently completing her post-graduate diploma, uses holography among other mediums to explore a chair as a hyper-cubist form. Shin’s work fragments and combines the representation of this familiar object into a structural form, which she describes as a means “to find out another latent reality of the object by tracing aspects of changing time and space in act of looking at it”.

Miri Shin ‘Rotating Chair’, 2011/12
Left: 20-panel etched-image plexiglass sculpture. Centre: Lenticular. Right: 200-frame multiplex transmission hologram.
8. Visual texture
Guillermo Federico Heinze an undergraduate student, explores and uses holograms to create objects and installations with a visual texture that moves and changes colours according to the observer's interactions. In ‘the hologram and the girl’, observers could interact with a dodecahedron composed of twelve digital full color holographic stereograms. Wearing golden gloves and moving the shape around under three lights the observer can interact with the work in a ludic way. Discovering each hologram reveals that the girl inside the hologram is doing the same, wearing the same golden gloves and interacting with platonic bodies like pyramids, cubes and spheres.

![The Hologram and the Girl](image)
Guillermo Federico Heinze, *The hologram and the girl*, 2006

With ‘In and out-sides’ Heinze's invites the observer to explore a landscape of irregular surfaces, toys and deep visual cavities of holograms on the surface of an asteroid-like sculpture. The holograms show different abstract sculptures, connected to the whole through the materials they involve. The pink surface of the sculpture is composed of Styrofoam balls, sugar and glue, designed to make the observer hungry for sweets and is reminiscent of a huge cotton candy. The kinder-surprise toys, joysticks and computer parts suggest a playful way to perceive and transform reality, something that is very usual to children.

![Ins and outsides](image)
Guillermo Federico Heinze, *Ins and outsides*, 2007
9. The collective holographic image

The seminar ‘Collecting the Image’ in 2009 encouraged students to compile holograms from multiple related photographs, much in the way that images are ‘pooled’ online.

A recent work by Guillermo Federico Heinze that follows this theme is ‘mydailyfaces’ – an achromatic multiplex hologram that is composed of two hundred self-portraits, taken over a two hundred day period. When viewing this hologram, it is impossible to see only one frame, instead, the viewer sees a collaged face, composed by different days, different emotional states, combined to offer a wider spectrum of the portrayed person.

10. Conclusion

These are just a few of the projects created at the Academy of Media Arts, Cologne (KHM). With each project being developed through creative dialogue and experimentation. The process of presenting concepts through installations with holographic images involves a negotiation between the possibilities of holographic conceptualisation and the recording and printing techniques available. Compared to other media in the last 22 years at the KHM, the scope for printing holograms has not changed significantly. Yet culture and technology seem poised, ready to explore new holographic installation possibilities. So the question is how to develop holographic imaging practice as a tool for future artistic expression?

References

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[4] Claudia Sandoval http://www.claudiasandovalromero.com/
[5] Min-Sun Kim http://www.khm.de/pm/projekte/projekt/paview/1968/paiitems/60/pasearch/mioon/

Information about holography at KHM: http://kunst.khm.de/plattformen/holographie-und-lichtkunst/