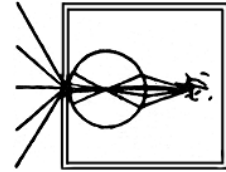


# CHArt

COMPUTERS AND THE HISTORY OF ART



## Seeing... Vision and Perception in a Digital Culture

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### - ABSTRACTS -

Eduardo Abrantes, *New University of Lisbon, Portugal.*

#### **Night-Coloured-Eye: Night Vision in Video or the Mediated Perception of Invisibility**

Joseph Anderson and Donald Richie, in their 1959 reference work *The Japanese Film: Art and Industry*, describe the distinct chromatic experience of cinematic night in western and eastern tradition. Whereas in the early colour conventions of western films night was expressed in a blue tint, in eastern films, namely Japanese and Taiwanese, the night scenes were coloured orange.

Why such a radical difference in twilight tonal perception? It is interesting to notice that blue-purple and orange are complementary colours, meaning that while it is mimetically clear that a night sky might appear bluish-purple to human eyes, if one were to suddenly look towards an empty white film screen, the brain would reproduce an orange colour, owing to the physiological trait that an afterimage is produced by the fatigue of specific colour receptors. Somehow, the visible in time seems to manifest its invisible counterpart, its complement.

But what happens to the colour of night in the digital age? How does video relay the chromatic experience of darkness unbound? The limited range of colour and light sensitivity that video still possesses, when compared to film, causes its technological role to become active more than passive.

The colour of night in video is green. The nightshot has become a common mode of our perception. It seems as omnipresent as night itself – in its military uses, in CCTV security arrays, in art, in music videos, in amateur and celebrity porn... mostly anywhere light has faded.

Considering that the green-coloured night of video in the digital age is produced by moving beyond the spectrum of visible light, to its infrared nethermost realms, the video camera has become literally an active technological eye. Brain-like, it produces its own light, and admits in its specific sensitivity the reality that rewards such a broadened perception.

This paper considers examples at large in amateur video paraphernalia, 'youtubism' and CNN style live coverage of the globe's bellic state, as well as particular instances of the use of nightshot in contemporary art and videography, such as Spike Jonze's 2002 music video for Björk's song *It's in Your Hands*. If, in its common use, nightshot is an exceptional access to a banal reality, just happening beneath the visible threshold, in Jonze's video, it becomes a realistic access into an extraordinary reality – a nature set at wonder with its own scale and environment, where the human figure is at once comfortable and foreign.

Essentially, the question raised is that if night vision, made possible through contemporary digital means, has become a commonplace tool to venture into the previously invisible – the private, the obscured – an answer to riddles produced by our awareness of the limits of our perception, how does this manifestation shape our world view and the place of visibility itself in contemporary culture?

Catherine Baker, *Norwich University College of the Arts, UK.*; Iain Gilchrist, *University of Bristol, UK.*

#### **SCANPATH**

At its most conventional, drawing is the making of marks on paper. However such a narrow conception of drawing belies the complexity of the processes involved. Our scientific understanding of the drawing processes and particularly the active way we interact with visual material suggests that drawing itself is occurring as our eyes move over the scene. Over the last five years we have been developing ways to

represent this active visual process as drawing. This work involves recording eye movements and using these eye movements to create a drawing that bypasses the hand. In effect we create drawings directly with the eye. The drawings created are further developed in order to question what constitutes drawing within contemporary fine art practice and to explain the biological processes that underpin drawing and looking. Modern technology has made it possible to measure eye movements very accurately and describe the types of movements generated. For example, whilst looking at a picture, the eyes make fast ballistic movements, called saccades. Saccades are followed by fixations when the eyes are stationary. Fixations stay at one location for only a short time, somewhere between 1/10 and 1/2 of a second, before another saccade is generated to a new location. The eyes gather little useful visual information during a saccade, so patterns of fixation over time indicate from where, and for how long, information is being gathered from the visual environment. Saccades are required to sample the visual world because our visual ability is not the same across the visual field. Vision is better in the centre than out in the peripheral part of the visual field. A sequence of saccades and fixations is known as a scanpath. The scanpath indicates the shape of our interaction with the visual environment. The last 10 years have seen a detailed development of our understanding of the neural basis of this behaviour and our scientific understanding of it impacts on diverse parts of all our lives from car design and learning to read, to the understanding of behaviour following brain injury.

However the ways the eyes move and how that effects how we see is both counterintuitive and initially confusing. If we think of the eye as like a camera then it's a camera that is jumping around the whole time and is quite unstable. How then can it be that our visual experience is of a static stable world? In addition we have the sense that we can see everything in front of us all at once but instead the science tells us that we can only really see what we are looking at. The work we have created so far and future work will help us grapple with these questions and ultimately understand the processes of seeing.

David Crawford, *Göteborg University, Sweden.*

#### **Realism vs Reality TV in the War on Terror: Artworks and Models of Interpretation**

Much of what is associated with the so-called 'War on Terror' bears a relation to images. While society is increasingly media savvy, these images tend to be produced and consumed in such a manner that spectators are left little room and even less encouragement to engage in critical thinking as an intermediary act. The proliferation of new technologies for the production and distribution of images (e.g. camera phones and the Web) have added new elements to the equation worth consideration. This article attempts to open up a space for reflection using a combination of theoretical contextualisation (largely by way of Jean Baudrillard) and artistic example. The practice of art making is thus cast as a productive tool for sense-making on the part of those producing and consuming images associated with the so-called 'War on Terror.'

...the distinction between civil and military is tending to disappear, like that between private and public. [...] Hence the advent of a third type of conflict, after 'civil war' and 'war between nations': namely, war on civilians... (Virilio 27)

If we are in the midst of a 'war on civilians' as Paul Virilio claims, one which sees citizens physically besieged by terrorist acts and symbolically attacked via images of those acts, then the proliferation of camera phones creates an unprecedented situation whereby large numbers of 'photographer-witnesses' (Susan Sontag's term) become de facto war photographers. War photography is a practice beset by ethical challenges and thus we are likely to have to wrestle with the questions it poses on an increasingly large scale, both as producers and consumers of imagery.

Luciana Bordoni, *ENEA*; Attilio Colagrossi and Lorenzo Felli, *Institut for Research and Protection of the Environment (IRPA), Italy.*

#### **GIS and WebGIS Technologies for Enhanced Seeing in Archaeology. The Case of the Roman Aqueducts**

In Cultural Heritage there exists a strict relationship between seeing, knowledge and technology. Seeing a work of art generates knowledge. Considering a work of art, the knowledge about it allows for different and in-depth interpretations that, by the use of appropriate technologies, offer more precise and detailed seeings for that work of art. For example, in a fresco painting the knowledge about the patch of plaster applied for a day's work ('giornata' in Italian), offers of that fresco an enhanced seeing because the painting techniques adopted by the artist are revealed and shown (Bordoni, Colagrossi, Martellotti, Seccaroni, 1999).

In Archaeology the relationship between seeing, knowledge and technology is even stronger. In fact, the knowledge acquired by the analysis of some fragments can offer a much more complete and informed

seeing of the archaeological find. As an example, the virtual 3D reproduction of a terracotta slab discovered in the Etruscan Necropolis of Cerveteri (Bordoni and Rubino, 2007), offers an enhanced seeing of the slab because it shows, using appropriate technologies, the knowledge acquired through scientific analysis performed on only few fragments.

The case of the Roman-era Aqueducts is quite different. The Aqueducts are universally recognised as monumental works of exceptional interest and beauty for their architecture and hydraulic technology. In this case the knowledge and the technology can offer not only a more in-depth seeing, but even a seeing 'tout court' of such monumental works. In fact, the Roman Aqueducts are not concentrated in a single place or a well defined location, but they are distributed over the territory, sometimes even in wild places. This characteristic appears to pose a serious obstacle to the complete 'physical', in person, seeing of such important works.

The use of GIS and WebGIS technologies can offer a more in depth seeing of the Roman Aqueducts. This work presents an application of these technologies to the Roman-era Aqueducts built between the third century BC and the third century AD. In particular, two products have been developed: the first consists of a vectorial representation of the outlines traced by the eleven Aqueducts within a radius of about 30km from the Capitol; the second consists of the development of a WebGIS application that allows the vectorial representation to be exploited on the Internet, employing a standard web browser.

The basic cartography taken into consideration is Carta storico-archeologico-monumentale-paesistica dell'Agro Romano – the historical, archaeological, monumental, and landscape map of the Agro Romano. The vectorial map thus produced was then used to develop a WebGIS application to allow it to be exploited as widely as possible. Among the features provided, the elevation – obtained by employing the satellite DTM (Digital Terrain Model) – was added in order to evaluate the slope for each Aqueduct's route. Further, aerial photographs of the territory, photographs and drawings of the remains of the Aqueducts, inscriptions and other elements of knowledge about Roman Aqueducts are available with the WebGIS application on Internet.

Dirk de Bruyn, Deakin University, Burwood, Victoria, Australia.

### **Play it again, SAM.**

The speed-up of images that the digital has delivered, as McLuhan suggested, can be linked to increased spatial and social mobility, pattern recognition and also a pre-occupation with surface (Flusser) within the flux of everyday life. This situation has imposed sampling and collagic organisational strategies onto the flood of incoming sensory data. Inasmuch as this situation can be read and experienced as 'trauma inducing', recent neurological research into the functioning of memory systems during overwhelming (traumatic) experiences is useful.

Brewin (2001) has proposed two parallel memory systems. Verbally Accessible Memory (VAM) or explicit memory is characterised by instant verbal recall, linear and of low band-width (limited information flow) and involves the hippocampus in normal functioning. Situation Accessible Memory (SAM) is implicit, situationally triggered, information intensive, conveys no sense of time (is immersive) and is processed through the amygdala. During stress, the SAM system is dominant as the VAM system shuts down. The result is that there is no comprehensive 'story' of the event able to be constructed, only disparate impressions.

During an earlier period of technological change reading the moving landscape overwhelmed the early train traveller. 'The inability to acquire a mode of perception adequate to technological travel crossed all political, ideological and aesthetic lines.' (Schivelbusch, 1986: 58) New perceptual strategies had to be developed that contextualised the blur and the streak. 'To adapt to the conditions of rail travel, a process of decentralisation, or dispersal of attention, took place in reading as well as the traveller's perception of the landscape outside.' (Schivelbusch, 1986 :68-69)

This paper argues that, as another round of unprecedented technological change impacts on our senses, in which Flusser's 'technical images' (Flusser, 2000 [1983]) dominate, another 're-alignment' of the senses is required. It is suggested that, in the interactive dialogue between VAM and SAM processing, this re-alignment involves a greater emphasis on the SAM system.

Brewin, C. (2001) Memory processes in post-traumatic stress disorder. *International Review of Psychiatry*, 13, 159-163.

Flusser, V. (2000) *Towards A Philosophy of Photography*, London, Reaktion.

Schivelbusch, W. (1986) *The Railway Journey : the industrialisation of time and space in the 19th century*, New York, Berg.

Alan Dunning, *Alberta College of Art and Design, Calgary, Alberta, Canada*; Paul Woodrow, *University of Calgary, Calgary, Alberta, Canada*.

### **Seeing Things – Ghosts in the Machine**

The Einstein's Brain Project is a collaborative group of artists and scientists who have been working together for the past nine years. The aim of the group is the visualisation of the biological state of the body through the fabrication of environments, simulations and installations. The project has developed numerous systems and installations using analogue or digital interfaces to direct the output of the human body to virtual environments that are constantly being altered through feedback from a participant's biological body. The core of the Einstein's Brain Project is a discursive space that engages with ideas about the constructed and mnemonic body in the world and about its digital cybernetic and post-human forms.

Recent advancements in technology, computing science and medicine have opened up new possibilities of representation for the artist, who can now use novel and surprising methods of imaging the body in ways that question our traditional notions of world, mind and body. The interdisciplinary nature of this investigation has forced artists to recognise the necessity of deep collaboration with practitioners of other disciplines, such as medicine and computer science, in order to create, develop and use the new languages and technologies of bodily representation in sophisticated ways. The Project proposes new interdisciplinary and collaborative methods, using art as one just one mode of inquiry, to create more comprehensive and total versions of the body, to explore and develop novel forms arising out of interdisciplinary collaboration.

This paper discusses the recent work of the Einstein's Brain Project, and its development of generative systems, to reference the ideas inherent in EVP (Electronic Voice Phenomenon) to examine ways in which we construct the worlds, and bodies in worlds, through pareidolia (a psychological phenomenon involving a vague and random stimulus - often an image or sound - being perceived as significant), apophenia (the seeing of connections where there are none) and the gestalt effect (the recognition of pattern and form).

These works provide a means to examine the Project's interest in systems of meaning making that rely on pattern recognition, and the problematised relationship between meaning and the meaningful. The development of meaning in the Project's work is dependent on an increasingly, yet seemingly infinite, complex recursive and recombinant loop between meaning made and meaning found. In this loop the external and internal worlds are blurrily indistinct, each acting upon the other in the construction of a new self/space forever suspended at the point of becoming. The effort to restabilise the self in this world where everything is in play, is questioned and negotiable, is unavoidably revelatory and reproblematises current and preceding models of authenticity and resistance.

Stuart G. English, Northumbria University School of Design, UK.

### **Creative perception; Sensory, Conceptual and Relational Ways of Seeing**

As the things we buy become more technically advanced and functionally reliable the value we assign to products and services shifts into the realm of human experience, meaning and interconnectedness. In this context the ability to recognise patterns and opportunity out of the ill-defined mist of complex problems may appear to be something of a 'black art' that is hidden within our ways of seeing. By considering the split-second journey we take from our experience, to perception, to understanding, this paper explores the 'fuzzy situations' (Basadur et al 2000) in the 'swampy lowlands' (Schon 1983) of creativity. The author builds on Popper's (1973) 'three worlds of mankind' to establish physical, personal and shared realities. This philosophical representation is used to describe perception as a creative event that is influenced by our awareness, maturity and purpose.

The paper reflects on three distinct but interrelated ways of seeing and explores how they are employed in creative practice.

- Sensory seeing: The direct personal and incommunicable experience of sensing the particular objects and environments around us.
- Conceptual seeing: The general, universal and communicable shared perception described through language, signs and symbols.
- Relational seeing: The contextual relationship of objects, experiences and concepts from which we derive meaning and plan action.

Since we see ourselves as observers passing through an independent and objective reality, we discern little difference between the sensory neural patterns of direct experience and the conceptual neural patterns we create to perceive that experience. This can be considered as a limitation on our creativity since it makes it difficult for us to simultaneously see an object as a 'cup', a 'bottle' and a 'bin'. Innovators must tolerate perceptual uncertainty and ambiguity, (Kimbell 2007) holding open potential in order to create possibility.

A case study interior design project, 'Mental spaces for business' aims to model environments free of creatively limiting mental constructs, bringing our attention to the present by challenging the way we see the spaces we work in. The paper concludes that there may be creative benefits in learning to choose how we see.

James Faure Walker, *Camberwell College of Arts, University of the Arts, London.*

### **Machines, Drawing and Vision**

What anyone actually 'sees' depends on what they are doing, where they are going, and what they expect to see. To sketch a busy city centre with pencil and paper can mean filtering away all that matters – and it makes you conspicuous. A cameraphone can catch the moment, and record the sounds, but this may not count either as 'drawing' or 'seeing'. If you stand still, and observe the flow of pedestrians and traffic, you notice people are navigating without really attending to their surroundings – except for tourists, who experience 'the sights' on flat-screens on cameras. Overhead, CCTV cameras record everything they can. Cyclists navigate focussed on a spot thirty feet ahead. Commuters are lost in iPods. Everyone, and every gadget, edits the scene to fit their purpose. Drawing is no different: you see what you are conditioned to see by force of habit and the materials you use. Perhaps drawing with a pencil has become too archaic to deal with Leicester Square.

For the most part, strict observational drawing has retreated from the busy spectacle, confined to the measurable conditions of the studio: the static model, 'traditional' materials, with no new technology at all. Life drawing is its gold standard. In the nineteen thirties drawing 'outdoors' was the fresh-air antidote to the rule-bound studio ('outside drawing' was still on the art school curriculum in the nineteen sixties). Today Wacom tablets, scanners, Photoshop, Illustrator, Flash, Maya, all extend the scope way beyond the 'drawing studio'. Yet they do not require you to observe with your own eyes. You manipulate photos, lines or forms. What you observe, what you engineer, is the drawing itself. No problem for the abstract painter.

Can we speak of a 'digital way of seeing'? Now that digital devices are ubiquitous, does it make any sense to speak of 'digital drawing'? Anthologies of drawing include anything from map-making to raindrops on paper, but liberal-minded commentators hesitate over digitally assisted drawings – as documentary evidence they seem unreliable. This paper steps back and looks at drawing methods popularised from the 1900s on, when airbrushes, rulers, cameras, came into the reckoning. Some 'modern' methods emulated the machine, the diagram, others analysed the drawn line. Elsewhere faith persisted in the timeless values of 'good drawing'. Who is actually looking at the so-called 'world'? It is a familiar dichotomy.

Monika Fleischmann and Wolfgang Strauss, *Fraunhofer Institute IAIS, MARS - Media Arts and Research Studies, Germany.*

### **Performing the Archive for the Visibility of Information in Space**

How to present knowledge as a visible shape? How to visualise it as a space to enter? Looking from a perspective of media art, this artists' presentation examines the notion of knowledge space. The staging of information structures and the procedure of interactive perception will be exemplified by the authors' own works.

The difficulty of orientation in online archives is due to contents only being viewable on hundreds of individual web sites. Two installations show how digital information can be spatially staged as publicly accessible archive. 'Matrix' and 'Media Flow', offer a complete overview of the online archive, which allows a dynamic switch of criterion, from detailed overview, down to the individual artwork. Both applications can reach back to data, which is saved in the online archive. They are exported via an XML gateway and presented audio-visually as an installation in physical space.

Interfaces were sought out, which make clicking around on websites dispensable. It is always the same problem with online archives: how can great masses of information be structured, so that everyone can easily find what they are looking for? What can one offer an audience that enjoys playing with the modern media, and in the process wants to gain experience and to learn something? It is Deep Storages' storytelling. .

Inspired by art historian Aby Warburg and his notion of the Denkraum, we do research on the Virtual Denkraum and the aesthetics of staging knowledge space to enter - between experience and expertise. By knowledge space we understand architectural space furnished with data. Thus physical space transforms into a data landscape to walk in - an interactive environment connecting data, space and user. The visitor of such an environment is not only the protagonist, but also the producer of knowledge through interaction. For the human it becomes an enlarged action space that is experienced fourfold: by perception of the spatial (and other attendees), by exploration of data, by production of knowledge through active experience, finally,

by the communication with others. In this presentation we introduce media art examples of staging knowledge in real and virtual space, driven by different paradigms of interactivity – and as public space of knowledge.

Simone Gristwood, *Birkbeck, University of London, UK.*

### **Amalgamating vision: photography, artificial intelligence and visual art**

This paper discusses the relationship between the emergence of photography in the nineteenth century, and artificial intelligence in the twentieth. At first glance the two may seem to have little in common. Whilst connections have been made between photography in the nineteenth and twentieth centuries, these links have been limited to the development of digital cameras or later technological or scientific discoveries of the late twentieth century. These connections do have some relevance and photography and what it represents has had a great impact on the twentieth century.

However photography has also addressed implications which would appear again in the twentieth century in a way which is often overlooked. This paper will argue that many reactions and debates that arose with the development of artificial intelligence and computer imaging in the mid twentieth century were not only related to the changes that occurred at that time, but that that had already begun to be addressed in the previous century through responses to the invention of photography. Their connections are strengthened through the visual, not only by the role they played in altering our understanding of vision, but also by providing new visual experiences and understandings of the way we see ourselves.

In 1992 in the Introduction to his book *Techniques of the Observer* Jonathan Crary declared that there was a 'transformation in the nature of visibility probably more profound than the break that separates medieval imagery from Renaissance perspective'. This remark relates to the increasing development of computers and computer techniques that Crary suggests were part of a 'sweeping reconfiguration' of the observer and modes of representation. By using Crary, and referring to and combining research into the history of photography, Artificial Intelligence and visual art (related to photography and Artificial Intelligence), this paper will show how Crary's observation was actually part of a transformation that began to take place much earlier.

Ada Henskens, *Tasmania, Australia*

### **Perception and Representation: the Visual Cortex and Landscape Art.**

My illustrated paper will be based on research for a Ph.D. in Visual Art that investigated the process of creating concepts of reality. Fuelled by personal experience of hearing loss and the impact of this on cognition, it was entitled Perception and Representation: the visual cortex and landscape art. The project revisited representation of landscape as a concept of reality in order to arrive at a manner suited to the culture and beliefs of the 21st Century. My paper will commence with traditional portrayal of the world in Fine Art, how this arose from a mindset and culture of an earlier stage of industrialised society, and how this is inappropriate to the present time. Classical landscape reflects, for example, Newtonian mechanics (relating chiefly to slow-moving planetary bodies), and popular belief of the eye as camera wherein a coloured, perspectival image of a pre-existing reality is imposed on the retina. This will be contrasted to a world culture dominated by flux, change and fragmentation. The latter concept will be supported by contemporary published books, abstracts, and conversations with professionals in neurophysiology, quantum physics, digital technology and the arts, on contemporary advances in these fields and mass-communication networks. Imagery used will reflect this flux, speed and fragmentation by sources taken from the natural world.

Vision is our main mode of perception; we now know that we move through the world, scanning as we go, building a composite image from selected fragments. The brain is hard-wired to look for continuities, and by making rapid comparisons from its store of known factors, arrives at a consensus of what is being viewed. Aspects of quantum physics, (the science of very small, fast-moving objects), will be quoted in the combination of traditional and contemporary media to convey the visual bombardment enabled by fibre-optic networks and mass electronic technology, and allied to such current market-place technology as lasers in supermarkets, medicine, holographic advertising and video production. Artworks will quote actions of cells within the visual cortex, activated by light reflected off surfaces, to recognise edge of form, movement of object, separation of form from background, tonal factors, and the dual visual system that has evolved principally in primates. They will convey selective scanning, speed and translation, continually in motion, in the manner of the life of sub-atomic particles, and of this world society saturated with information, interacting physically as never before, but with those fractures in personal and social relationships that conversely exist in a much more public domain.

Birgitta Hosea, *Central Saint Martins School of Art, London, UK.*

### **Digital synaesthesia: hearing colour/seeing sound/visualising gesture**

Starting with Marleau-Ponty's theories of multi-sensory perception, this paper will examine the concept of synaesthesia, in which the senses are cross-wired, and the computer as a synaesthetic medium.

An overview of a century of artists and animators from Kandinsky to the MTV generation who have been fascinated by the relationship between colour / form and music will be presented. This will feature experiments that have been done to map colour values onto musical scales and to play colour through 'light organs' derived in design from musical instruments.

A few animators have gone so far as to create visual elements that translated into sound. For example, Norman McLaren, Oscar Fischinger and the Whitney bros all experimented in generating sound from visual media. In the contemporary digital environment, however, the possibilities for interchange between colour and sound are vastly increased.

Colour as represented by a computer is an entirely synthetic process. A computer user creates colour through the use of algorithms (vector graphics) and /or a matrix of pixels (bitmaps) enabling an average desktop computer to potentially create approximately seventeen million distinct colours. The computational power now available on an average machine is capable of instantly processing centuries of knowledge about theories of colour.

Just like colour information, digital audio can have a relationship with the real if it has been sampled from a natural source or it can be created entirely synthetically within the digital environment. Audio is often represented in software as a waveform – representing a natural pattern of vibration. Audio can also be represented by a colour spectrum. Indeed, in a digital environment both colour and sound information are stored as a series of digits – the same basic building blocks. Thus, digital technology now enables colour and sound to be linked as never before.

Birgitta will present some of her own projects in which colour has generated sound and gesture has been visualised as imagery. She will also show work-in-progress on a series of automata activated by light and physical proximity.

David Humphrey, *Royal College of Art, London.*

### **Seeing What You Believe, Believing What You See: Revisiting 'Photorealism'**

Issues surrounding the relationships between digital modelling, animation, visualisation and 'photorealism' have been argued over for as long as the core digital technologies enabling them have been available. 'Photorealism' for many is a grail: for others it is unobtainable or irrelevant. Agreeing a definition for 'photorealism' has proved a key area of controversy. As simplistic as, 'Is that a photograph of an apple?' may appear simplistic but it is one possible measure for 'photorealistic' output from digital visualisation systems.

Such systems have now evolved to a level of sophistication which repositions issues related to 'photorealism' into new territory. Crucially those systems are capable of supporting an approach in which detailed modelling of complex objects is possible via sub-division-based applications, animated output is driven more by simulation engines than by key framing and visualisation is supported by unbiased rendering engines. It is now possible to construct objects, make them move and interact through simulation and be visually represented at a level of fidelity which places such objects into a domain where they may be considered as digital doppelgangers: manifestations from the world we live in. 'Photorealism' as a term is fast becoming redundant: 'simulated realism' is a more encompassing and relevant description.

This paper examines issues surrounding how systems of such sophistication and their output require a re-evaluation of our willingness to believe and trust what we see before us and to what extent we can make decisions on the information they provide and how it will affect our lives in the future. At one end of the spectrum such systems will play major roles in the evolution of new breakfast cereals: at the other they will become front ends for our understanding of our own mortality via next-generation body imaging systems. The paper is based on outcomes from research supported by the Leverhulme Trust, SRIF2 and the Royal College of Art Research Development Fund.

Graham McAllister, *University of Sussex, Brighton, UK.*

### **Seeing in 3D: New Problems In Accessibility**

Virtual worlds such as Second Life are becoming an increasingly popular place to learn, socialise, and do business. However, these 3D virtual worlds are not accessible to people who are visually impaired, effectively creating a digital divide. This paper discusses the barriers to access for blind and visually impaired people to these increasingly popular environments, and asks the question to the CHArt community, 'Can we engage in 3D digital worlds without vision?'

The paper will detail the problems that are presented when the modality of vision is removed from 3D worlds and present approaches that attempt to map the affordances of vision onto the modalities of sound and touch. It will achieve this by presenting a series of visual scenarios (screenshots) from Second Life that represent typical tasks and propose how these highly visual scenes can be remapped onto audio and touch for people who are blind. In addition to various scenarios being presented, alternative approaches to the remapping model will also be presented and discussed.

The list of problems to be solved will be analyzed and will include; navigating in 3D digital worlds without vision, mapping multimodal feedback, object occlusion, context, collaboration with sighted people, social issues and interaction design.

This problem of how to make 3D worlds accessible is more likely to be solved whenever there is a combination of artists, engineers, scientists, psychologists and other disciplines present to discuss the various approaches possible. It is expected that this paper will prompt active discussion and debate, ultimately leading to progress in the field.

Linda Matthews and Gavin Perin, *University of Technology, Sydney, Australia*

### **Digital Sites and Performative Views**

In the essay *Unreal Estate*, prominent Australian Architect, Carey Lyons, argues that the post-industrial economy, and specifically its reliance on the image, necessitates design methodologies outside those used traditionally to substantiate built form. However Lyons, being conceptually wedded to a postmodern interest in semiotics, doesn't extend this argument to consider how the technological means of production and modes of propagation influence those images released into the public sphere. This conceptual limiting of the image to that of signification not only denies the designer agency in its making but also discourages an exploration of the social and cultural impact of the performative capabilities of these technologies.

The permeation of digital systems throughout contemporary space is typified by the CCTV webcam system. Research recently conducted within an undergraduate context revealed the increasing use of these systems as a new privileged vantage point from which the 'remote' tourist can view the city. The transformation of the role of CCTV from surveillance to the imagistic promotion of the city also provides an opportunity for the designer to work outside the traditional repertoire of formal strategies and tactics derived from the physical interaction with urban form. This paper, explicated through design-based practice, presents a methodology of generating public space whereby the raw data from this virtual space is processed through the strategic recruitment of a range of open-source digital software. The paper will discuss how this procedure paradoxically adapts the 'flat' CCTV image as the primary site for form making and how its implied three-dimensional space subverts the disciplinary reliance on the two-dimensional orthographic plan. There will also be a discussion of how interaction between the co-existence of duplicate virtual and real-time sites both challenges and shifts the traditional temporal framework used to guide formal intervention.

The paper, therefore, will discuss how the virtual provokes a technical springboard from which to establish an intervention that departs significantly from traditional urban design methods. Following this, the discussion will examine the formal agency of the 'scopic regime' of the CCTV webcam and will demonstrate how its logic can be co-opted to serve social and cultural demands beyond those for which it was originally intended. In doing so, the paper reveals how this approach to the making of urban form exceeds the symbolic expectation of post-modern processes and works to replace the idea of signification with that of affect.

Frieder Nake and Kolja Köster, *Informatik, University of Bremen, Germany.*

### **Behind the Canvas, an Algorithmic Space. Reflections on Digital Art**

No longer is visual space restricted to the space defined by canvasses, prints, sculptures, or video we find museums. Visual space has, of course, always been more than this, even in traditional times. Canvasses, graphics, and sculptures always only defined the obvious boundaries of such spaces, their trivial visible surfaces. Those tangibles never reach the deeper layers that make up the essential dimensions of space. True space is full of stories, biographies, styles, theories, successes and failures, happiness and despair. The artist contributes to the making of visual space when he or she delivers a work in form of a painted



canvas; the cultural processes and institutions of society, however, let emerge visual space in uncontrolled and uncontrollable ways along a multitude of paths we know and don't know at the same time. Artists of the 20th century, notably Marcel Duchamp, have understood this situation. The situation could be described as the meeting of canvasses in a cognitively and culturally determined abstract space. Without constantly newly appearing canvasses, nothing would happen in or to that space. It would remain largely stable and static although re-evaluation, re-organisation, and re-description of old works would create some momentum towards development of visual space.

Recently, however, the situation has changed in a most dramatic way. By the advent of the computer and of the algorithmic principle, the objective space of canvasses and the subjective space of art appreciation have been amended, enhanced and hyperised. New corners, rooms, areas, fields, landscapes with roads and pathways have been added to traditional spaces. Each work of algorithmic origin first exists in the same way a canvas has existed before. But it also exists in an objective algorithmic space. The double mode of existence of the algorithmic work distinguishes it critically from traditional works. It is true; each traditional work may also be viewed as existing in some objective space of measurement, and not in subjective spaces of valuation only. Whatever data are taken off a traditional painting, in order to turn them into entities of a data base, may become the source of new visual experiences along algorithmic paths, and this is actually happening.

We suggest studying this point by way of example. To this end, we will use the algorithmic art of Manfred Mohr, and a recent interactive installation of our own. Mohr's art can be opened to a totally new viewing experience by putting it into an appropriate virtual space. The interactive example demonstrates how several people can 'walk' on a projected image thus changing it in surprising and, in part, random ways.

Carinna Parraman, *University of the West of England, UK*; John J. McCann, *McCann Imaging, Belmont, MA; USA*; Alessandro Rizzi, *Università degli Studi di Milano, Italy*.

### **The Art and Science of Colour: Bridging the Gap between Art and Perception**

The paper considers the relation between the art and science of colour perception and how computational procedures, which mimic our visual system, have been developed to advance digital imaging techniques for the enhancement of colour and image quality in digital photography and art.

How to describe and measure colour is a problematic activity, for colour scientists, designers and artists alike. Furthermore, there is a difference between how the radiometry of colour is measured and how the appearance of colour is perceived. For contemporary colour science, there is a requirement to accurately measure and specify a colour. However when looking at art, at photographs and at real life situations, attempts to define what we 'see' are more complex. For example, if two colours are placed side by side, the eye might perceive modifications to the intensity of one colour when compared to another, and their colorimetric measures might not predict or correlate with the appearance.

The experiments undertaken by Edwin Land in the 1950s and the Retinex theory of colour vision (1964), links with Johann Wolfgang von Goethe's experiments (*Zur Farbenlehre*, 1808). They can be regarded as examples that bridge the gap between biology, physics and art.

Edwin Land is better known for his invention of the instant Polaroid film and camera. Moreover, he was interested in the human visual perception system, how colour is perceived in relation to its context and through his experiments developed the Retinex theory of colour vision (1964). Land and McCann's Retinex (1971), starting with analogue electronics and quickly expanding to digital imagery, used a new approach based on computational algorithms that has made it possible and practical to manipulate images based on spatial methods of image enhancement, that has led to brighter and more colourful photographic images. (McCann, 2005 and 2008).

Goethe's interest in human perception as presented in his *Farbenlehre* (Eastlake, 1840) attempted to record his many observations on colour phenomena. One of his experiments with a prism investigated how fringes of colours appeared and changed according to different black and white patterns; the position of the edges revealed not just spectral colours but their complementary colours.

Although separated by over 100 years, Goethe's experiments in colour phenomena and perception correspond with Edwin Land's theory of the human colour perception and his psychophysical experiments undertaken into human colour constancy and colour in context. Through their very different experiments, they attempted to gain a deeper understanding of physical vs. perceptual colour, and how the brain elaborates the physical signal in order to enhance the extraction of visual information – what appears in our brain and what lies in front of us. (Tallis, 2008).

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Jussi Parikka, *Anglia Ruskin University, Cambridge, UK.*

### **Seeing Software: The Biennale.py Net Art Virus and Visuality of Software**

The presentation focuses on the Biennale virus net art piece from 2002, programmed and exhibited by the groups 0100101110101101.ORG and epidemiC. The virus as a piece of software was distributed not only in its executable form on CDs but also e.g. printed on t-shirts and promoted with various iconographic measures. In this sense it is interesting how the piece of software was framed and articulated in terms of invisibility and visibility. In itself, a piece of software remains mostly invisible to the end user especially in the context of consumer software. Software is mostly 'seen' or experienced only through its effects whether those are the actions it allows (word processor software as a process of visualising language) or through its undesired effects (malicious software that signals its presence through payloads). Through the Biennale.py software example, the presentation discusses the framing of software as a visibility of a sort.

Even though the primary processes of digital culture are non-representational and algorithmic, they are continuously coded into (audio) visual forms, which are very much entwined in aesthetic-political agendas of network culture. In other words, the time-based procedures of computational media are spatialised in contemporary media archives that are framed by questions of technical and commercial nature. Another, even more apt way to describe this endeavour would be to refer to the difference between the corporealities (the materialities) of computer viruses and the incorporeal transformations that interact with those materialities. A virus may be understood as a calculational process at the material level of computer circuits, but when this accident (event) is called 'malicious software' it connects to a whole incorporeal sphere of morals, crimes, criminals, laws and judgments, as a Deleuzian focus on incorporeal events suggests. Hence, an analysis of computer culture should not focus solely on the material event(s) of calculation or source code (the technical diagrams) nor on the discursive events, but in the constant double articulation between various semiotic regimes.

Link: epidemiC Biennale website: <http://www.epidemic.ws/biannual.html>

[1] Such ideas resonate with Félix Guattari, *Chaosmosis. An Ethico-Aesthetic Paradigm*. Transl. Paul Bains and Julian Pefanis. (Sydney: Power Press, 1995). See also Wendy Hui Kyong Chun, 'On Software, or the Persistence of Visual Knowledge.' *Grey Room* 18, Winter 2004, pp.28–51.

Rune Peitersen, *Amsterdam, Netherlands.*

### **A presentation of 'Saccadic Sightings', reflections on the process of working with a MobileEye and on the difficulty of visualising sensory experience.**

Saccadic Sightings takes its outset in the saccadic movements of the eyes. These involuntary and unconscious movements are essential to our visual system but seem to contradict the stable and smooth view of the world as we perceive it. In this project I want to capture the 'raw' visual input as received by the eyes, to see whether it is possible to recreate the visual experience of a person. Is it possible to see what someone else sees?

Since mid-April I have had a MobileEye at my disposal. This is a tether-less eye-tracking device which has enabled me to capture my point-of-gaze onto a scene-video. In effect, I have been able to film using my eye as a camera! This delivers somewhat unpredictable footage as the movements of the eye (saccades) are very jagged and quick whilst at the same time extremely precise in their focus. The footage is very intimate, and the filming process has been very revelatory and confronting. Being unable to hide or mask one's exact point of gaze is an experience which removes the final layer between one's private self and the surroundings. So many seemingly insignificant flicks of the eye reveal themselves as being extremely accurate, often completely unconscious scans of surroundings, objects or persons.

After several MobileEye sessions, I started to become acutely aware of the act of seeing. When reviewing footage from the first sessions, I would be amazed at how my perception or recollection of what I had seen differed from the images caught on tape, and in subsequent sessions I would incorporate this knowledge, thus creating a sort of feedback mechanism. After a while I realised that I was consciously 'seeing in low-

resolution' when filming, in order to accommodate the camera's small lens. I tried to direct my gaze at larger, easily discernable objects and to avoid looking at too distant objects, which I knew wouldn't be visible in the final footage. The everyday act of 'zooming' or focusing on a specific object and blocking out all else thereby became very present in its absence.

The final work will consist of a 10-15 min. video and/or a 7 channel video installation, made up by minimalistic, fragmented visual narratives, mirroring the process of the brain (viewer) ordering/sorting/creating a coherent visual experience out of apparently incoherent visual input (processed MobileEye footage). This could be presented at the conference as part of the presentation or as a stand-alone piece.

Project website:  
<http://runepetersen.com/saccadic.htm>  
<http://runepetersen.com/>

Collaborations and sponsors:  
<http://www.artsgenomics.org/> - The Arts and Genomics Centre, University of Leiden, Leiden, NL  
<http://www.s-oliver-associates.com/> - Stephen Oliver Associates, London, GB  
<http://www.a-s-l.com/> - Applied Science Laboratories, Bedford MA, USA  
<http://www.eyetracker.co.uk/> - Eyetracker, London, GB

G. Brett Phares, *Marist College, USA.*

### **Attentional Surplus: Ambient Media Art and the Myth of Looking**

'Looking sideways, always sideways, rejecting fixity of attention, drifting from the object to the context, escaping from the source of habit, from the customary seems to have become impossible. The perceived world ceases to be deemed worthy of interest... '

-Paul Virilio, *The Aesthetics of Disappearance*

The world floods our senses, and were it not for a set of natural neurological processes, we would lie prostrate in a house of mirrors, mesmerised by the unending stimuli. Ironically, the same brain processes that allow us to get on with our daily life also blind us from seeing much of it. Mass narcissism, enabled by an always-on, highly customisable media engine migrating us to like-minded social communities (physical and virtual), further obscures our individual and collective abilities to attend to the world.

In this environment, different forms of normative subversion become necessary to reveal the world as it is and break up the 'like me' discussion. Following a brief interdisciplinary survey in Human-Computer Interaction [HCI] research, advertising and musicology, I will showcase different art work, from Jill Magid to Olafur Eliasson, to equally useful but lesser-known artists (including myself), as examples of ambient media art [AMA]. AMA pre-empts the neurological and environmental processes that shape our mental bureaucracy, to go beyond 'our right to blindness' as postulated by Paul Virilio and the Neural Darwinism foregrounds our attention, with something that unlocks fruitful opportunities in individual growth and social discourse.

Søren Pold, *University of Aarhus, Denmark.*

### **The (In)Visibility of Digital Images**

Images have undergone a technological revolution, but in what ways have technological developments influenced the content of the images, the imaging process, and how we see things? If we look at pictures broadly and especially digital photography, it seems that the digitisation has changed only little and we still takes pictures of our children, celebrations and to witness other important events in private and public life. The digital character is more or less invisible and photography is still largely understood realistically as witnesses of the real despite the postmodern debates. This paper will discuss how images in algorithmic art can develop and contrast this apparent invisibility of the digital character of contemporary visual images.

Early algorithmic art like the mid-sixties' works of Frieder Nake can be seen as culture-historical condensation of a kind of structuralist visual basic research that experimented with making interesting images out of algorithms but also showed – as some of the first and as forerunners of later digital image forms – how we already perceive algorithmically. This double character of picturing algorithms and simultaneously reflecting how our perception is algorithmically structured is continued in Antoine Schmitt's still living series (2007) that can be considered a demonstration of the algorithmic-statistical imagery and its significance today. These ten different graphs depict developments and movements via the visual codes that we normally see in statistic representations and know from the news, but their movement is generated algorithmically and autonomously. They uses a visual language that we are used to decode as information that exudes serious analyses and grave societal trends, but their allegorical self-reference asks critical

questions about the reality of such analyses and their visual language, which to a large extent govern our political agendas.

Consequently, we see other kinds of imagery than what is shown by digital photography with great importance for our contemporary culture and society. And if we ask how photographic images function in our spectacular economy Logo Hallucination (2007) by Christophe Bruno is enlightening. It finds logos in images and thus reflects on the commercialisation of visual culture, where image elements become and are recognised as trademarks.

These art works reflect how our images are changing profoundly alongside with digitisation. The technologies of the image consequently work as technological, cybernetic and semiotically mediated layers that we often first notice when art shows us the function and effect of images.

Paul Edward Scattergood and Martin John Richardson, *Institute of Creative Technologies, UK*.

**Subject to Change Without Notice: How Advances In Modern Holography and Digital Imaging Have Altered Our Understanding of Vision and Perception**

This paper explores the role that digital holography, within the arena of man-made light, has played in generating previously impossible types of visual spaces. It examines the impact novel visual experience has in shaping our understanding of vision and perception.

By replacing colour and surface with 'real' light, digital holography is a medium that explores the relationship between material and light. As such, it offers the possibility of a fundamental shift in our understanding of this relationship. Progress within the generation of man-made light, and the possibility offered by holographic optics to reconstitute and form this light, allow for a renewed examination of the relationship of light to the surface of solid matter.

Contemporary digital holography has established the production of full colour, three-dimensional depictions of both real and imagined spaces and actions. A two-dimensional view may now form part of a multiplexed image, which when viewed from a particular angle, will afford a three-dimensional depiction. Work has been carried out in this area to produce full parallax, auto-stereoscopic output for 3D digital imaging. It examines the role and impact of parallel technology including digital printing and digital image recording devices, for both still and time based media.

The work details transitory experiences, interdependent with the nature of man-made digitally-projected light. This alteration in the nature of experience, insofar as it relates to vision and perception, has produced an adjustment in the relationship between artwork and viewer. Driven by the development of artificial light and its use within art, modern holography has built upon the progress of both photography and the science and engineering of light production. The interconnectedness of many otherwise disparate disciplines within digital holography places this work in the enviable position of being able to assess, at an early stage, the effects of media convergence upon the role and perception of the artwork in a digital epoch.

With reference to the work of a diverse range of artists including James Turrell, Bridget Riley and Dieter Jung, and an exploration of contemporary developments within science and industry, the paper will extend a critical appraisal of how realities, which rest outside traditional image-making techniques have been utilised to form light, thus transmitting and shifting mass, as well as substantiating materiality.

Nola Semczyszyn, *University of British Columbia, Vancouver, Canada*.

**Seeing Through Imaging: An Exploration of Technology and Transparency**

Computer-based imaging and visualisation has radically changed practice in science and medicine in the last 50 years. From Ultrasound to CT and MRI, new technologies have given us greater access into the body than we have ever had. We may make diagnoses in utero, perform minimally-invasive surgery, and see changes in tumour size using imaging technologies. These technologies seem to grant us perceptual access to a previously invisible world, but if this is the case it presents a radical challenge to traditional philosophical positions regarding scientific observation and perception.

My paper will defend the claim that these technologies are in fact an extension of our perceptual processes. I argue that the best way to account for how imaging is used is that it is akin to perception. Drawing on accounts of depiction in the philosophy of art, I present the thesis that images can indeed engender ways of seeing things.

I examine arguments in the philosophy of science that draw a distinction between the observable and the unobservable at the limits of human vision, and show that this is an ill-conceived boundary. Our epistemic limits are not defined by the limits of our perceptual systems. I give a historical examination of the development of imaging in terms of perception. I argue that these technologies were developed as useful because they preserve perceptual information that allows us to make the kinds of perceptual discriminations we could make were we looking at the subject in question.

I then examine arguments from the philosophy of perception that images can satisfy the explananda for an account of perception. We see 'through' images and while this is a new way of seeing, because the systems of image production are new, it is not different in kind from ordinary seeing. I defend my view against arguments that seeing through pictures lacks defining characteristics of perception, ego-centric information, action affordance and an uninterrupted flow of light from stimuli to sense.

I close the paper with a brief discussion of the cultural impact of imaging as it relates to my view, and why I think that this position offers exciting potentials that outweigh some of the points of contention.

Jennifer Steetskamp, *University of Amsterdam, Netherlands.*

### **Configurations of the Unseen: Installation Art and Media History**

Installation art often facilitates multi-layered, complex experiences, both on a temporal and a spatial level. In many cases, it is impossible to experience the work in its totality, since an infinite amount of trajectories could be taken within the exhibition space. There is literally never enough time – there is always some perspective or position left that remains unexplored. Multiple combinations can be made from the presented material, whether it concerns, for example, high-tech scenarios including moving images and interactive setups or low-tech constellations based on collections of files and objects. On some occasions, only a small part of the installation may be actually viewed and experienced. In this way, owing to the limited accessibility and the impossibility of 'controlling' the work within its apparent spatial confinements (given by the parameters of the exhibition space), there seems to be a sense of 'excess' beyond the scope of the factual experience. The unattainability of the totality paradoxically depends on what is attained, what is framed, known, seen, perceived. Vice versa, what can be experienced remains dependent on what potentially could, but practically cannot, be experienced. There are (at least) two media archaeological configurations that pre- and re-enact the spatio-temporal paradox of installation art: on one hand, early cinema and the so-called pre-history of cinema, and on the other, the database structures associated with the digital era. The paper explores the ways in which installations allow us to rethink the relation between nineteenth-century and twenty-first-century technological changes, drawing on two different characteristics that designate installation art: the idea of mobility and positioning within a spatial framework (which seems key to early pre-cinematic configurations such as the panorama, but is also relevant for today's mobile technologies) and the, as will be shown, related idea of an information overload, which is part of the database logic of the digital era. Eventually, historicising and contextualising the spatio-temporal properties of installations in this way enables the re-conceptualisation of both high- and low-tech artistic formations in the context of media change.

Dolores A. Steinman and David A. Steinman, *Biomedical Simulation Laboratory, University of Toronto, Toronto, Canada.*

### **Medical Imaging in the Digital Age: Fusing the Real and the Imagined**

In the current visual environment, where there is seamless merging of the real and imagined, the medical imager has a very hard task at hand. Technology has made possible the visualisation of our inner lives and fantasies as well as our inner bodies and their hidden sites. The issue at stake is the sharing of these images and the way they find their place in the current visual culture, compounded by the lack of both clear guidelines and of a common language of interpretation with the potential of manipulating and being manipulated.

Medical images have been used in the past as educational or informational tools for medical students and health care practitioners, specialists trained to interpret them. Today these images are transcending the expert/public barrier and becoming deeply embedded in the popular psyche, hence the need for a clear, accurate and unequivocal message. Thus, our effort to generate truthful yet simple images.

Another challenge we face in this race for responsibility, accountability and commitment to truth is the seduction of visualisation, as well as the commoditisation of the body's image and of its health care, and the resulting use of appealing medical images for commercial use. As a result, the public's earlier naiveté and a certain deference is being replaced by both jadedness and a false confidence that leads to occasional

mistrust or disappointment when the computer-generated medical images supplied by us via health care providers do not match the ones seen in advertising posters or banners.

As medical imagers, we are part of the apparatus that renders the hidden body visible, and thus we are exposed to the subjectivity of choice between transparency and concealment, with the possibility of creating a 'false truth'. With ever developing technologies and constantly improving visual representations of the unseen body, the computer-generated images we create are closer to 'real' medical images and become part of popular visual culture.

Slowly, we are moving away from the position of 'high priests' using a private and obscure language while keeping the right balance between accurate representation and an appealing image totally devoid of meaning.

Building upon visual vocabularies borrowed equally from the medical and the art world, we are striving to fuse the virtual and real with developing technology while redefining visual medical conventions and implementing them into the popular understanding.

Janez Strehovec, *Ljubljana, Slovenia.*

### **Not-just-seeing, not-just-reading (On the perception and cognition of digital literature).**

Digital textuality has changed the way we write, form and organise texts with literary features. This also has profound consequences for the way we read, conceive, perceive and interact with textscapes. Moving beyond the printed page challenges the readers' attitude to the textual environments that intersect with literature and various new media genres and forms. This paper explores some of the novel strategies of not-just reading as a very complex, even corporeal user's engagement with 3-D textual pieces by placing such activity within a broader context of present visual, tactual, kinetic, and corporeal forms of perception and navigation. The not-just-reading procedure is a non-trivial activity, based on the sophisticated and complex cooperation between various procedures, activities and deployed senses.

Digital texts based on digital words/images/virtual bodies deploy both linguistic syntax and visual grammar (and in a case of animated textuality even the temporal grammar). Such a hybrid structure challenges hybrid and sophisticated perception. Rather than simply decoding the verbal meaning, the user needs to perceive the visual appearance of textual organisation by means of tactile vision. The not-just reading is therefore discussed in terms of an embodied experience of digital textuality (with literary features), foregrounding the intimate relationship between digital texts, user's/reader's bodies and human multi-sensory perception.

Digital text is both a verbal and a visual entity, so the reader/user's vision is stimulated with a special grammar of text displayed on the screen; the features such as centre, aside, margin, top, down, the seen and the unseen, already displayed vs. not-yet displayed are becoming crucial. In this paper, as an example of digital text with striking visual and animated features, Brian Kim Stefans's e-poem *The Dreamlife of Letters* is discussed. Already in the author's statement the reader is informed about the author's decision to make the piece more like a short film and not so much like an interactive artwork. At the end of the text he states 'thanks for watching', and not 'thanks for reading', which demonstrates that the author puts watching, and not reading in the foreground of the authentic perception of this 'cinematic piece'.

One of the novel approaches stimulated by digital textuality (and by the interfaces applied in a process of controlling and navigating of digital texts) is tactile vision, based on the real-time cooperation between the hand, the smart technologies interfaces and the eye. By navigating and controlling the new media contents one's eye is, we might say, inserted in a user's very active palm and fingers. Vision is activated by the movement of hand, seeing (and reading) become tactile, and the new generations of words/images called onto the screen by means of navigational devices generate a new circle of tactile and kinaesthetic activity.

In the final section of this paper, the not-just-reading is discussed as a dry run for other significant modifications of today's perception, such as not-just-seeing, not-just-listening etc. that are hybrid forms embedded in the present hybrid and (re)mixed reality of in-between spaces and cut-and-paste culture.

Pelin Yildiz, *Hacettepe University, Ankara, Turkey.*

### **Architectural Space as Virtual Reality: Regarding Perceptual Parameters in Digital Culture**

Recent technological developments in the age of digitalisation are going on with an increased and accelerated power. Technology is affective on many disciplines in conjunction with the term interactivity. In

particular, within disciplines such as architecture, engineering and design; technology has started to become the starting point for the creative process, with unbelievable methods and innovations. Technology and its multidimensional effects on architecture open new directions for designers and society. These new directions also open new means to perceive visual qualities. Previously, it was hard to recognise a space without definite limits and zones: a space was meant to be a definite area with limited zone. Today, however, a space could be understood as an area with an unlimited environment. This, in many ways, explains the adaptation of computational intelligence into space design. Computational intelligence, in a similar way to Artificial Intelligence, has recently been marked out by innovations in many areas. The way in which computational intelligence is integrated with space may be grouped as three main parts: during the designing and planning issue of space; applying virtual reality to space by practice work; and perceptual dimensions of space explorations.

So it is identified that space is formed by virtual quantities but it is important to reach the perceptual requirements with real senses.

The purpose of this paper is to evaluate architecture on the basis of virtual reality. In the first part the paper will focus on a general definition and the integration of technology to space; in the second part the definition of virtual reality and its applications on space, including media interiors, will be addressed; in the third part the spatial organisation principles of virtual reality will be evaluated in the context of a comparison between the real and the virtual. To conclude, ongoing changes in the perception and recognition of space as a result of technological developments will be discussed.